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LEPIDOPTERA IMMIGRATION TO THE BRITISH ISLES, 1969 TO 1977

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[continued from Vol. 15:110]

1973

1973 was a striking contrast to 1972. Spring came early and the summer was mostly fine, with above-normal day and night temperatures lasting into November. In all 32 scarcer immigrant species were reported, including 12 which are also resident. The most striking event was the repetition on a much larger scale of the 1972 invasion of *Hyles gallii*, of which over 260 adults and some 150 larvae are listed in a full account by de Worms (ER 87:232-239). A few may have resulted from eggs laid in 1972, but it seems probable that the immigrations which arrived in mid-July and again in the first fortnight of August originated in very distant parts of east and north-east Europe or beyond. They appear to have been associated with numbers of *Eurois occulta* reported in south England and near the east coast, and possibly with two examples of *Nymphalis antiopa* in the London area. Also notable were a dozen sightings of *Danaus plexippus*, mostly in September and October in Cornwall and the Isles of Scilly, where an invasion of North American birds was also noted.

Important single captures were *Hyles euphorbiae*, almost our rarest Hawk Moth, at Selsdon, Surrey on the night of May 27; *Coscinia cribraria* of the Continental f. *arenaria* in Suffolk on June 25; the third known British specimen of *Hypena obesalis* in Warwickshire on August 26. The Fritillary *Issoria lathonia* was watched on August 7 and 9 in a garden in Dorset, and there was also a probable sighting on the Malvern Hills, Worcestershire ten days later. *Colias hyale*, now a very scarce species here, was seen in the Isle of Wight and also arriving from the sea at Sandwich Bay, Kent.

Scarce immigrants recorded in good numbers were *Agrius convolvuli*, with single forerunners in June, main influxes from late August through September, and an adult, possibly bred locally, as late as November 10. *Rhodometra sacraria* made a massive arrival in early September; and *Acherontia atropos* adults were reported from late May until November 24, mostly in small invasions about August 22 and mid-September. There were also a few larvae. Seven of the eight *Helicoverpa armigera* were widely spread but compactly dated in September. *Orthonama obstipata* was well spread over the southern counties and also reached south Wales, Yorkshire, the Isle of Man, and at least two counties in Ireland, mostly in August and September but with records in late October and November which probably represented offspring of earlier arrivals.

Of the usual immigrant butterflies *Vanessa atalanta* had a good year. Many were seen widely in May and June, reaching as far north as the Inner Hebrides; there was a large immigration to the coast of Lincolnshire at the end of July; it was reported very widely in September, and a large late brood was noted in Essex in early October. In Ireland it was common in the east and south, where 2,400 were noted in the year at Cape Clear, co Cork. Of *Cynthia cardui*, by contrast, few were seen before August and September, when it was scarce and almost confined to the southern coastal counties in England, Wales and Ireland, although the last record of the year came from the Isle of Canna on November 8. *Colias croceus* was seen in May in west Sussex and in Dorset, where there were a few more in August and September, as also in southern Ireland. In east Sussex there was a considerable immigration, 90 being counted at Peacehaven between August 24 and September 15, and some 25 elsewhere in the county. The last records were of only three seen in Scilly from October 16 to 22.

The common immigrant Noctuidae were all much above their usual numbers. *Autographa gamma* was extremely abundant. After rather few records in May and early June, large influxes were noted in coastal traps and elsewhere in the first, third and fourth weeks of July, and several times in August; about September 9 it was said to be innumerable at the Lizard, Cornwall, about 1,000 were reported in traps at Portland, Dorset, and there was another large incursion about September 15/16. There was also probably much local breeding, and even inland in Surrey its nightly attendance at the trap continued through most of October, with the last on November 8 and a year's total of 770, to compare with only 15 in 1972. *Agrotis ipsilon* was also in very good numbers. It accompanied the late June, and most of the other, influxes of *A. gamma*, with the apparent addition of another in early October; it was seen in Surrey and Dorset as late as November 23 and 26. The resident/immigrant *Phlogophora meticulosa* was above its normal numbers, but possibly more as a result of favourable local conditions than of primary immigration. The two usually common Pyralidae, *Nomophila noctuella* and *Udea ferrugalis* were, however, unusually scarce, being reported from few places and only in very small numbers, despite the fact that in many seasons their arrivals and abundance tend to fit with those of *A. gamma*.

This was a year which was conspicuous rather for the numbers of immigrants rather than for variety of species. Only in late June and July were there many arrivals from the east across the North Sea. All the later immigrations seem to have had south westerly origins, and only those at the end of August and in the first days of September, which contained such species as *Cyclophora puppillaria, Eublemma ostrina, Diachrysia orichalcea, Hypena obesalis*, and in the first week of October, with *Danaus plexippus, Mythimna unipuncta, Heliothis armigera*, had contents which suggest sub-tropical or North American provenance. As regards numbers of individuals recorded, it has to be remembered that the generally high night temperatures and good weather, prolonged far into the autumn, was favourable for trapping and field work, so that an unusually high proportion of the immigrants available may have been recorded, and of the common species many were bred from early arrivals.

Internal dispersal of many resident species was also wider than usual in 1973. A striking example was provided by *Autographa bractea*. This northern British species had been spreading southwards for some years, as also on the Continent. In 1973 it was reported in some numbers in Gloucestershire and in single examples in Gower on the coast of Glamorgan, and at Minstead in South Hampshire. These have not been included here as immigrants, since they all probably reflected the internal spread, which has continued in later years. Other species, *Eurrhypara perlucidalis, Heterographis oblitella, Lithosia quadra, Meganola albula* have been included, with some reserve, because of marked coincidences of places and dates with those of undoubted immigrants during the long period of south and south east winds in late June and July.

Scarce Immigrants, 1973

Uresipita limbalis (2) DORSET 1973 n.d. (BENHS 7:34). SUSSEX E. East Dean, 6.10 (Ent.Gaz. 25:86).

**Eurrhypara perlucidalis* (1) HANTS S. Waterlooville 9.7 (ER 86:57), probable immigrant.

**Diasemia litterata* (2) SOMERSET S. 25.7 and 8.8 (per French), possibly *D. ramburialis*.

**Heterographis oblitella* (1) ISLE OF WIGHT St Helens 30.6 (BG Lep. Hants: 204).

**Papilio machaon* (1) DORET Broadstone 10.7 (DNHAS 95:108-111).

Colias hyale (6) ISLE OF WIGHT Brighstone Down 26.6 (per French). KENT E. Sandwich Bay 5.8 seen arriving over the sea, 26.8 female on hawkweed, 27.8 two males (C-H Kent 3:212-213).

**Nymphalis polychloros* (2) ESSEX S. Westcliff-on-Sea 3.8, worn, on buddleia (E.R. 85:225). HERTS Bushey August (per French).

Nymphalis antiopa (3) CORNWALL W. Treswithian, near Camborne 17.8, seen in garden (ER 85:244). KENT W. Hayes Common 31.7, male taken on buddleia (ER 85:269). MIDDLESEX Regent's Park, London 22.7, one caught and released (L.N. 53:87, 90).

Argynnis lathonia (2) DORSET Briantspuddle 7 & 9.8, watched in garden by E.F. Coetzee (DNHAS 95:108-111). WORCS. Malvern Hills 17.8, seen by Mr Page and watched for ten minutes, wings closed when at rest; probably correctly identified (J.E. Green, pers. comm.).

Lampides boeticus (2) WARWICKS. Charlecote 30.8, fresh male in greenhouse used for bean growing: possibly introduced as larva (ER 85:269). DERBYS. West Melton 5.9 (Derbys. ES 34:375).

Danaus plexippus (*c*.13) SCILLY 4/14.10 (*c*. five seen). CORNWALL 20.9/ early 10 (three seen, one caught). DEVON N. Porlock 30.9, female caught. HANTS N. Kingsclere early July, one seen. SURREY Oxted 19.10, photographed. CARDS. Yspyty Ystwyth 16.9, caught. (For full references see ER 94:146).

Cyclophora puppillaria (2) DEVON S. Ermington 6.10 (ER 86:25). SUSSEX E. East Dean 6/7.10 (Ent. Gaz. 25:86).

Rhodometra sacraria (c.200) DEVON S, Ermington 4/6.9, six (ER 86:24); Buckland Monachorum 4/6.9 22 males, 4 females (Ent. Gaz. 25:85). DORSET Swanage 7.9; Portland early 9 (DNHAS 95:108-111). Chesil Beach 4/6.9 (26) (BENHS 6:107); Portland 9.9 female (BENHS 7:113). ISLE OF WIGHT September (BENHS 6:107). HANTS S. Hollands Wood, New Forest 7.9, 8.9 (ER 87:75), Minstead n.d. four (ER 86:116); Pendleton Marsh *c*. 13.9 (BENHS 6:104). SUSSEX W. Walberton 6.9 two, 7.9, 16.9 two, 6.10 (Ent. Gaz 26:190). SUSSEX E. Ringmer 7.9; Peacehaven 7.9, two 11.9 (CRP Sx:307). KENT E. Dungeness 8.9 (C-H Kent 3:265). KENT W. Higham 20.8; Pembury 6.7 (C-H Kent 3:200). SURREY Bramley faded male 25.9; Thorpe 9.9 (L.N. 53:97). HERTS. Symondhyde mid-9 (ER 87:76). GLOS S. Avening 5.9, male; Tetbury 7.9 (ER 86:17); Oakridge 5.9 two (ER 86:96). BRECONS. Mountain Centre 5.9 & 6.9 four; Crickhowell 12.9 (S-B Brecon: 22). PEMBS. Martin's Haven 3/7.9 *c*. 66 plus (ER 85:299); Skomer Island 4.9 three by day on ragwort ER 87:69). CAERNS. Rhostryfan 4.6 & 8.9; Capelulu 5.9, 7.9 four, 8.9, 9.9 two; Tregarth, 6.9 (Ent. Gaz. 33:119). DENBIGHS Colwyn Bay 5.9, 12.9; Wenli 6.9; Glan Conway 15.9 (Ent. Gaz. 33:119). ANGLESEY Maltraeth and Plas Lligwy, September (Ent. Gaz. 33:119). DERBYS. Darley Dene 13.9; Hilton Gravel Pits 15.9, male (ER 86:146). LANCS N. Leighton Moss 6.9 (ER 85:270) CHESHIRE. Alderley Edge 5.9 (Lancs and Chesh. ES 26:375). WESTMORLAND Beetham 6.9 two females, 9.9 male; Arnside 8.9 two, 9.9 (ER 85:270); Warton Crag n.d. (Lancs and Chesh. ES 26:375). YORKS v.c. 63 West Melton 5.9 male (Derbys ES 34.375); Emley 8.9 two (YNU Rep., Naturalist 99:23).

Orthonama obstipata (41) SCILLY 1973 n.d. (RISR). DEVON S. Ermington 20.8, 3.9, 4, 11 & 18.11 (ER 86:25; BENHS 6:111); Starcross n.d. (RISR). DEVON N. Great Torrington n.d. (RISR); DORSET Furzebrook 20.8, 28.8; Arne 27.8 (DNHAS 95:111). HANTS S. Minstead 13, 20.8, 28.8 (ER 86:110); Portsmouth 27.8, 7.9 (per French); Ringwood n.d. (RISR). SUSSEX E. East Dean 6 & 7.10, six (ER 85:239; CRP Sx:309). SURREY Horsell 1.11 (ER 86: 26). ESSEX S. Bradwell-on-Sea 19.8, 24.8, 4.11 (A.J. Dewick per French). WARWICKS Hampton Lucy n.d. two (ER 86:163). RADNOR Llandrindod Wells 1973 (RISR). PEMBS Martin's Haven 6 and 7.9 (ER 85:299). YORKS v.c.61 Spurn Head, 1973 (RISR). ISLE OF MAN Castletown 1973 (RISR).

Co. CORK CENTRAL Fountainstown 10.9, 12.9 two, 17.9 (Ent. Gaz. 25:140 and pers. comm.). Co. CORK WEST Leap 21 and 22.9 (ER 88:252).

Agrius convolvuli (44 moths, 5 larvae). SCILLY St. Mary's *c*. 16.10 (ER 86: 72). CORNWALL W. Lizard 2.8, 28.8 two (per French); Mawnan Smith 12.9, on door (Ent. Gaz. 28:273); Mousehole 15.10 (per French). CORNWALL E. Crackington Haven 26.8, 27.8 (ER 86:124); St. Austell 15.10 (per French). DEVON S. Yelverton 4/6.9 female (Ent. Gaz. 25:85); Chillington 9.9 (ER 85: 298), Plymouth 16.9; Honiton 22.9 (per French); Ivy Bridge late 9 five larvae (ER 86:27). DEVON N. Lundy 30.8 (per French). SOMERSET S. Washford 1.9 (per French). WILTS N. Chippenham 27.8, on post (AES Bull. 33:113). HANTS S. Minstead 15.9 (ER 86:116). KENT W. West Wickham 10.11 male found in shop (ER 86:9). ESSEX S. Bradwell-on-Sea 24.8 (A.J. Dewick per French). SURREY Bramley 15.9 worn male; Bletchingley 23.9 on door (Ent. Gaz. 25:28). BUCKS. High Wycombe 27.9 (Middle Thames NHS, per M. Albertini). SUFFOLK E. Waldringfield 21.6 (Suff. N.H. 16:347); Reydon September (ibid. 16:348). NORFOLK E. Norwich 13.9 (per French). GLOS N. Oakridge 20.9 female (ER 86:96). WORCS. Broadway 4.9 (per French). PEMBS. Martin Haven 3/7.9 five (ER 85:299). CARDS. Tregroes 4.9 (per French). LINCS N. South Thoresby 17.8, 4.9, 28.9 (ER 86:58). WESTMORLAND Beetham 21.7 two, 23.7 (J. Briggs *in litt.*); Kendal 24.8 male (ER 86:95). ORKNEY Longhope 7.9 (per French). Co. CORK CENTRAL Fountainstown 21.8, 22.8, 9.9, 20.9 (Ent. Gaz. 25:140).

Acherontia atropos (20 moths, 5 larvae). CORNWALL W. Porthcarne 1.7; Cury, near Helston 18.9, 9.10 (per French); Penrhyn 19.9 on a wall (Ent. Gaz. 25:273). DEVON S. Ermington 23.8 (ER 86:24); Teignmouth 20.6 (BENHS 6:91). SOMERSET S. Castle Cary n.d.; South Petherton n.d., two larvae (ER 86:28); Sampford Brett end 9 (per French). DORSET Charmouth 24.9 (DNHAS 95:108-111). SUSSEX W. Sidlesham n.d. larvae. KENT E. Dungeness 1.10 (BENHS 6:108), 6.10, at rest on shingle (C-H Kent 3:229). SURREY Warlingham 17.9 fresh male (Ent. Gaz. 25:30); Wormley 21.9 (BENHS 7:105). ESSEX N. Saffron Walden *c*. 18.6 dead (BENHS 7:47). ESSEX S. Upminster 1.10 on grass verge (ER 86:5). MIDDSX. Enfield 7.9 (Ent. Gaz. 25:28). BERKS. Reading n.d. two larvae (BENHS 6:104). NORTHANTS. Brixworth 22.8 (per French). CAERNS. Aberdaron end September (per French). YORKS v.c.61 Skidby 4.11 (per French). Co. KERRY S. Caherdaniel early September (INJ 18:256). Co. DUBLIN Goatstown 7.10 (per French).

Hyles euphorbiae (1) Selsdon 27.5 perfect male in trap (E.H. Wild ER 85: 302).

Hyles gallii (*c*. 70 moths and *c*. 230 larvae): see de Worms, ER 87:232-239, to which should be added: SUSSEX E. Peacehaven 30.7 female. (C.R. Pratt, pers. comm.), Ringmer 31.7 (A. Batten per CRP). YORKS v.c. 61 Barlby 1/7.9, larvae 22 (YNU Rep., Naturalist 99:23), v.c. 62 West Ayton 24.7; Scarborough 6.9, larva, v.c. 63 Emley 2.8, Doncaster 12.9 larva, October larva; v.c. 64 Harrogate July. (YNU Rep., Naturalist 99:22). NORTHUMBERLAND S. Haydon Bridge n.d. one larva on rose-bay willowherb (Berw. NC 40:104-5).

Hippotion celerio (1) KENT E. Lydd 2.11 (E. Carpenter, "Field", 13.12.1973).

**Euproctis chrysorrhoea* YORKS v.c. 61 Muston 16.7 three, Kilnsea 16.7 (YNU Rep., Naturalist 99:22).

Lymantria dispar (1) SUSSEX E. Ringmer 3.9 (CRP Sx:319).

**Lithosia quadra* (8) KENT E. Dover 30.6 two males in trap; Newington 6.9 male (C-H Kent 3:326); Dungeness early July male (BENHS 6:92). SURREY East Horsley 19.7 male (L.J.D. Wakely, pers. comm.); Wormley 7.7 (J.L. Messenger, pers comm.): possibly internal vagrants from South Hampshire. BERKS Silwood Park n.d. (per M. Albertini). SUFFOLK E. Great Bealings July (Suff. Nat. 16:348).

**Coscinia cribraria arenaria* (1) SUFFOLK E. Waldringfield 25.6 (A. Waller in de Worms, Suff. NH. 16:347).

**Meganola albula* (1) YORKS v.c. 61 Muston 16.7 (P.Q. Winter, BENHS 10: 6): possibly vagrant from Kent or Essex.

**Eurois occulta* (16) SOMERSET N. Weston-s-Mare 1.8 pale (ER 86:57). SUSSEX W. Findon Park 29.7 (CRP SX:322); SUSSEX E. Eastbourne 30.7 (CRP Sx:322). KENT W. Bexley 31.7, female (L.N. 53:95). ESSEX S. Coxtie Green July (Essex Guide: 60). GLOS N. Oakridge 9.8, typical grey form (ER 86:96). DENBIGHS. Rossett 24.7 (Lancs and Chesh ES 1973-6:14). LINCS N. Woodhall Spa 28.7; South Thoresby 29.7; Lissington 29.7 three (ER: 86: 58). YORKS v.c. 61 Muston 29.7, 1.8, v.c. 64 Knaresborough 1.8 (YNU Rep., Naturalist 99:22). INNER HEBRIDES Isle of Canna 25.7 one dark, possibly native from the mainland (ER 87:10).

Mythimna albipuncta (2) ISLE OF WIGHT September (BENHS 6:107). Co. CORK CENTRAL Fountainstown 3.9 one in trap (Ent. Gaz. 25:140): probably the first Irish record.

Mythimna vitellina (18) CORNWALL W. Lizard 28.8, 5.9, six (ER 86:124). CORNWALL E. Boscastle 26.8 (ER 86:124). DEVON S. Ermington 2 & 4.9; Buckland Monachorum 4/6.9 male (Ent. Gaz. 25:85). (ER 86:24). SOMERSET S. Williton September (BENHS 7:34). ISLE OF WIGHT September (BENHS 6:107). HANTS S. Boldre September male (R.W. Watson pers. comm.). GLOS N. Oakridge 5.9 (ER 86:96). CARDS. Trelroes September (A.N.B. Simpson per J. Heath) Co. CORK CENTRAL Fountainstown 3.9 two (Ent. Gaz. 25: 140).

Mythimna unipuncta (21) CORNWALL W. Lamorna Cove 15.10 (ER 86: 72). SOMERSET S. Williton 20.9/8.10 nine (BENHS 7; per French). KENT E. Dungeness 8.9 (C-H Kent 3:247). BRECONS. Pont-ar-Dulas 11.8 (S-B Brecon: 49). INNER HEBRIDES Isle of Canna 7.1, 20.9, 22.9 three, 1.10, 3.10 two (ER 85:298). Co. CORK CENTRAL Fountainstown 8.10 (Ent. Gaz. 25:140).

**Lithomoia solidaginis* (1) LINCS N. South Thoresby 22.9 (ER 86:59).

Helicoverpa armigera (8) CORNWALL W. Lizard 5.9, 9.9 (ER 86:124). DEVON S. Buckland Monachorum 4.9 male, 6.9 female (Ent. Gaz. 25:85). DORSET. Swanage 9.10 (per French). SUSSEX E. Ringmer n.d. (CRP Sx:330). ESSEX S. Bradwell-on-Sea 8.9 (per French). PEMBS. Skomer Island 4.9 (AES Bull. 33.114, ER 87:69).

Eublemma ostrina (1) DEVON S. Ermington 26.8 ab. *carthami* (ER 86:27).

Diachrysia orichalcea (2) HANTS S. Ringwood 21.9 (BENHS 7:34; BG Lep. Hants: 401). SUSSEX W. Walberton 5.9 (Ent. Gaz. 26:190).

**Rivula sericealis* YORKS v.c. 61 Muston 18.7, 19.7 two, 22.7, 28.7 (P.Q. Winter, pers. comm.). Dates coincide with those of *H. gallii* and other undoubted immigrants, but possibly, like *E. chrysorrhoea*, vagrant from colonies further south.

Hypena obesalis (1) WARWICKS Charlecote 26.8 good female in trap. Third British record (D.C.G. Brown, ER 85:240).

1974

This was generally a very poor year for immigrants, in a cool and wet summer after an early spring. Of the scarcer species only 24 are listed, all in below average numbers, including five residents which were also possibly immigrant. Almost all the commoner species were unusually scarce. One new butterfly was, however, added to the British list. A single example of *Arethusana arethusa* (False Grayling) was caught among many *Hipparchia semele* on heathland in Surrey on August 21, but was not identified for some time. The date of its capture falls within the most productive period for immigrants in the season, and it was possibly immigrant from France and Spain rather than an accidental introduction, or a member of a temporary colony. There were also important single records of *Hyles lineata livornica* in Suffolk on August 14 in Suffolk and of *Clostera anachoreta* at Dungeness, Kent, on August 16. *Senta flammea*, trapped at Peacehaven on June 6, was only the second example known in Sussex and probably came from marshes near the French coast, like the few examples known from East Kent, though the possible existence of local colonies, temporary or resident, is not excluded. Captures of the rare pyralid *Uresipita limbalis* on the coasts of Sussex and Essex on September 14 and 15 are also notable. The single *Nymphalis antiopa* caught on April 4 in Derbyshire had presumably overwintered successfully from 1973, an unusual occurrence.

Another interesting feature was the recurrence of *Hyles gallii* after its abundance in 1973. Six which were taken or seen between June 11 and 22 are thought to have been over-wintered results of the many larvae in 1973; the remaining three, caught in Fair Isle and Shetland from July 29 to August 16 probably represented another invasion from northern Europe. (de Worms, ER 87:232-239).

Of other scarce species only *Agrius convolvuli* (20) and *Acherontia atropos* (11) reached double figures: the former in the usual periods in mid August and September, with a last record on October 7 and northern limits in South Lancashire and co. Antrim; the latter in a compact invasion of East Kent from July 18 to 22, from which, however, no larvae were reported later.

Of the common butterflies, there were single records of *Vanessa atalanta* in Surrey and Sussex on May 15 and 19, a few in June, including six in the far north on the Isle of Skye on June 6, and rather more in July, when larvae and pupa were found in Co. Cork. But there seems to have been no considerable influx later, and little local breeding, so that records remained few until the last from Dorset on October 10. *Cynthia cardui* was first seen at Hastings, Sussex on April 26; but none were reported in May and only four, in Dorset, in June, and only scattered singles later, including the only records for the year on the Isle of Canna on September 9 and in Anglesey on September 29. Of *Colias croceus* three at Hastings, on May 20 and 22, and one in North Devon in late July or early August seem to be the only mentions.

Of the common moths *Macroglossa stellatarum* alone had a fairly good year, with over 70 reported, ranging as far north as Yorkshire and Orkney and with 17 in Ireland. There were small immigrations to East Kent, Dorset and South Devon about July 18; a few were noted in early August but no more until the last, at Guestling, Sussex on October 11. All the nocturnal commoners were much below average numbers. At regularly operated traps in South Hampshire, East Sussex, South Devon and Surrey the year's totals for all species were almost as low as for 1972. Even for *Autographa gamma* the only considerable influxes seem to have been about June 26 and July 16 to 19 and in mid-September elsewhere.

1974 was thus a year of thin and scattered immigrations, mostly coming across the English Channel or only moderate distances from the south west. The most concentrated dates for arrivals were in the last ten days of June, July 18 to 22, August 14 to 20, when at least nine of the scarcer species were reported, and mid-September; October and November yielded little. The only movement from the east appears to have been that of the *H. gallii* in late July and early August.

Scarce Immigrants, 1974

Uresipita limbalis (2) SUSSEX W. Aldwick Bay 14.9 BENHS 8:18, ER 87:51). ESSEX S. Bradwell-on-Sea 15.9 (Emmet, Smaller Moths of Essex: 140).

**Diasemia litterata* (1) BRECONS. Pont-ar-Dulas 1.8 (S-B Brecon 1.8, BENHS 8:7): possibly immigrant.

**Dioryctria abietella* (1) SURREY Bramley 25.6 male, very large, wingspan 32mm: probably immigrant (R.F. Bretherton).

Pontia daplidice (1) SUFFOLK Coldharbour, Didlington 20.6 female watched on mignionette flowers by Miss V. Leathers (de Worms per E. Ellis Suff. NH 16: 375).

Colias hyale (5) KENT E. Sandwich Bay 28.7 one seen flying along foreshore dunes, 1.9 one seen flying north (C-H Kent 3:213). HERTS. near Hitchin 29.5 (Trans. Herts N.H.S. 28:29). Co. WATERFORD Clashmore n.d. two (by R.C. Bland, specimens preserved (INJ 19:356).

**Nymphalis polychloros* (3) SUSSEX E. Scaynes Hill 6.7 at least two, 23.7 one probable, in woodland (ER 87:62, CRP Sx:305): possibly immigrant.

Nymphalis antiopa (2) KENT W. Forest Hill 13.9 (Ent. Gaz. 26:28, 152). DERBYS. Priest Wood, near Kedleston Park 7.4 (B. Gillman, Derbys ES 34: 424). The specimen was presented to Derby Museum.

Arethusana arethusa (1) SURREY Ash Vale 21.8 male caught at rest on open heathland, among *Hipparchia semele* (teste D.J. Carter, BM Nat. Hist.) (A.J. Hedger, Ent. Gaz. 28:73). Possibly immigrant. First British record.

Danaus plexippus (2) KENT W. Eltham 15.9 one caught on flowers in a garden (Ent. Gaz. 26:38). It was suggested, though without direct evidence, that this and also the *N. antiopa* caught at Forest Hill, were releases from captivity (B.O.C. Gardiner, Ent. Gaz. 26:152). Co. DUBLIN Glenageary, n.d. one seen by Mrs C.W. Pearce (INJ 19:356).

Rhodometra sacraria (3) HANTS S. Minstead 11.9 (ER 87:55). KENT E. Dymchurch October (C-H Kent 3:265). Co. CORK CENTRAL Fountainstown 9.9 (A.A. Myers, pers. comm.).

Orthonama obstipata (8) DORSET Crewkerne 19.8 male (J. Reid, pers. comm.). HANTS S. New Forest 11.8 (BENHS 8:12). SUSSEX E. Northiam 25.5 (Hast. Nat. 12:197-200). Co. CORK CENTRAL Fountainstown 7.9, 11.9, 12.9 two, 16.9 (A.A. Myers, pers. comm.).

Agrius convolvuli (20) SCILLY Tresco 15/20.9 ten. CORNWALL W. Mullion 1.9 (per French); Downderry 14.8 (ER 87:58). DORSET Furzebrook 9.9 (DNHAS 96:76-89). HANTS N. Winchester 17.9 (per French). NORTHANTS Thrapston 7.10 (ER 87:56). WARWICKS Hampton Lucy 18.8 (ER 87:56). MERIONETH Aberdovey 22.8 (Ent. Gaz. 33:115). Lincs N. Cawthorpe n.d. (Trans. Lincs. Nat. Union 18:13). LANCS S. West Didsbury 5.9 one at rest (ER 87:59). Co. ANTRIM 7.9 (per French).

Acherontia atropos (11) KENT E. Sandwich Bay 18 and 19.7 eight (per French); Dungeness 20.7 (ER 87:168); Orlestone Woods 22.7 (ER 86:246). YORKS v.c. 63 Crofton, near Wakefield 20.6 at rest on a street lamp (YNU Rep., Naturalist 101:28).

Hyles gallii (9) for details see de Worms, ER 87:237, to which should now be added: FLINTSHIRE Taleare 13.6 one seen on the wing (M.J. Morgan, Ent. Gaz. 33:115). CHESHIRE Disley 18.6 male in perfect condition in trap (J. Muggleton & G. Kenyon, ER 86:247).

Hyles lineata livernica (1) SUFFOLK E. Great Bealings 14.8 (Suff. NY 6: 375).

Clostera anachoreta (1) KENT E. Dungeness 16.8 (W.L. Coster, BENHS 8.13, plate 3; ER 87:125).

**Lithosia quadra* (2) DORSET Furzebrook 19.7, 16.9 (DNHAS 96:76-84): probably immigrant.

Mythimna albipuncta (1) DORSET Swanage 11.9 (ER 87:170).

Mythimna vitellina (5) CORNWALL W. Downderry 15.8 (ER 87:58). DORSET Furzebrook (DNHAS 96:76-84). SURREY East Horsley 17.8 (BENHS 7:95). Co. CORK CENTRAL Fountainstown 7.9, 12.9 (A.A. Myers, pers. comm.).

Mythimna unipuncta (2) ESSEX S. Westcliff-on-Sea 20.7 female (ER 87: 60); BRECONS Llanfair Fawr n.d. (H.G. Parker per J. Heath).

**Senta flammea* (1) SUSSEX E. Peacehaven 12.6 (ER 87:64): 2nd county record, probably immigrant.

**Eurois occulta* (1) DENBIGHS. Rossett 13.6 (Ent. Gaz. 33:117).

Spodoptera exigua (5) SURREY Bramley 16.8 (R.F. Bretherton); Nutfield, August (L.N. 55:56). Co. CORK CENTRAL Fountainstown, n.d. three (INJ 20:301).

Helicoverpa armigera (2) BEDFORDS. Sandy 27.8 (I. Woiwood per V. Arnold, pers. comm.).

1975

With a fine and warm summer this proved to be a better but rather patchy season for immigrants, in which to judge from the scanty material available the south west of Ireland was more favoured than Britain. Of the scarcer species 23 were reported, 4 being also resident; but many of these were only in small numbers. Most notable was the largest influx yet known of *Mythimna loreyi* between late August and early October: a dozen were caught or seen on the English coast, mainly in Scilly and around the Lizard but with singles also in south Devon and Dorset, while in Ireland fourteen were taken at a single trap in Co. Cork, from some of which fertile eggs were obtained and the larvae described. The somewhat uneven timing of these captures gave rise to the suggestion that some or all resulted from local breeding from an earlier unnoticed invasion or from temporary establishment, as was previously suspected in Cornwall between 1964 and 1969. Rather later, mostly in October, there were also many records of *Mythimna unipuncta* along the south coast of England and in Co. Cork, ending with a dramatic appearance of four examples at light on the Isle of Canna, Inner Hebrides on December 4 and 5, in a south west wind and a temperature of 50°F.

Also particularly interesting were records of both larvae and adults of *Hyles gallii* for the fourth year in succession, and of single sightings of *Danaus plexippus* at Parknasilla, Co. Kerry and *Nymphalis antiopa* in Worcestershire; also of single captures of *Eublemma ostrina*, also in Co. Kerry, of *Daphnis nerii* in Hampshire and of *Catocala fraxini* in Norfolk.

There were only eight single records of adults of *Agrius convolvuli*, all in September and widely spread; but the twelve larvae found in Lincolnshire in September must have resulted from an early arrival, and an adult was seen in Co. Carlow on July 7. Of *Acherontia atropos* there were reports of only two adults; but six larvae were widely spread elsewhere, the most northerly being in Northumberland. Other scarce immigrants were also thinly recorded except for *Orthonama obstipata*, of which about 25 were noted in many different places reaching northwards to the Isle of Skye, but nowhere commonly.

In the records of the common immigrant butterflies there was a striking difference between Britain and Ireland. In England *Vanessa atalanta* was first seen at Hastings, Sussex, on April 20; but the early immigrations in May and June were small. It became fairly common and widespread from mid-August through September, probably more from small further immigrations rather than from much local breeding. The last specimens reported were in Dorset in early October. *Cynthia cardui* was not noted until June 26, at Peacehaven, Sussex. An immigration in August carried examples as far north as Anglesey, Derbyshire and Berwickshire, and a few were seen in September and one in Anglesey on October 8. It was nowhere common, and the total covered by the available records probably did not exceed 50. *Colias croceus* was no less scarce in Britain than in most recent years. The only early record was of one at Pett, Sussex on June 6. In August and September it was seen, usually singly, elsewhere in Sussex, Dorset and Devon, and well inland in Wiltshire, Warwickshire, south-west Yorkshire and Wigtonshire, with the last on the island of Rhum about September 26. The only evidence of a large influx was provided by about 40 seen at the Lizard, Cornwall, August 24/28.

In Ireland all three species were much commoner and more widespread than usual. Of *V. atalanta* about 1,900 were reported, beginning on May 24. Of these over one third were at Cape Clear Island in the extreme south west, but by August the species was common even in the north. The last were seen at Cape Clear on November 11. *C. cardui* scored a total of 530, beginning on May 24 at Yougal, Co. Cork, with a few larvae in July, large numbers of adults especially in the south east in August, and a final group at Cape Clear from October 22 to November 11, which may have represented either fresh immigration or a late home-bred generation. *C. croceus* scored even better with 580, of which 108 were at Cape Clear. Immigration began on June 6 and was very widespread in August and September, reaching even to Londonderry and Donegal. Specimens of *Colias hyale* (or *C. australis*) were said to have been closely seen at Castletownshend, Co. Cork, and elsewhere on August 25; but certainty is lacking that these were not misidentifications of *C. croceus* f.*helice*. Advantage also went to Ireland for the diurnal Hawk moth *Macroglossa stellatarum*, of which 32 were reported, mostly between August 24 and September 9, against about 20 in Britain at varying dates and fairly widely spread, reaching Westmorland and the Isle of Man in September. That the Irish advantage is not traceable for the other common immigrant moths may be only due to paucity of observers of them there. The relative superiority of Ireland in 1975 was probably due to meteorological causes. Most of the migrations which reached the British Isles came in south west winds to which Ireland was fully exposed but which tended to peter out against the anticyclonic conditions, with easterly or south easterly air, which ruled over most of Britain at the critical times, especially in early June, August and September.

The common diurnal moths on Britain had mixed records. *Autographa gamma* was rather above average, with a good June influx and massed arrivals noticed especially in Sussex in late July, late August and early September, with records lasting well into November. *Plutella xylostella* was also described as abundant in Sussex in August and in Denbighshire in mid-July. *Agrotis ipsilon* was generally rather scarce, although the first records came in March and there were "hoards" along with *A. gamma* on Durlston Head, Dorset on October 5. *Nomophila noctuella* was fairly numerous near the coast in August from Cornwall to Sussex, but was generally scarce elsewhere, and *Udea ferrugalis*, though widely spread, was in small numbers except in Cornwall and Devon. *Peridroma saucia* was very scarce, being noted only in the south west and in Wales, where a very late example was trapped at Bangor on December 26.

The pattern and timing of the larger migrations to Britain was as follows. Varied influxes in the first days of June brought in small numbers of *M. vitellina*, *O. obstipata*, *H. peltigera*, as well as many *A. gamma*, and a few *V. atalanta*; the two *Senta maritima* taken in the Isle of Wight and in Dorset on June 10 and two possibly immigrant *Nymphalis polychloros* in Sussex and Kent may have come across the Channel from France. In July arrivals were few, except of *A. gamma*, and of a few *M. stellatarum* at Sandwich, Kent about July 9. About August 6 came a small movement from the north east which brought several *H. gallii* and *Eurois occulta* and probably the only *N. antiopa* noted in the year. This was followed from August 16 onwards by a clearly southern or south western invasion which included *D. nerii*, *Spodoptera exigua*, *Rhodometra sacraria*, *Hyles livornica*, and the first two *M. loreyi* to West Cornwall, as well as the only noted large arrival of *C. croceus* and many *C. cardui*. The other *M. loreyi* seen in Britain were at the same times as the first group in Co. Cork, between September 3 and 9, to be followed shortly after by the few *A. convolvuli*. Early October was marked by the main invasion of *M. unipuncta*, the only *Cyclophora puppillaria*, a number of records of *O. obstipata* which may have been either immigrant or locally bred; and in Ireland only by a second group of *M. loreyi*. In a warm autumn records of some of these species and of a single *R. sacraria* continued from October 26 to November 8, and the only four *Heliothis armigera* formed a compact group on October 29 and 30. The season was ended by the capture of four *M. unipuncta*, as already mentioned, on the Isles of Canna on December 4 and 5.

Scarce Immigrants, 1975

**Margaritia sticticalis* (3) HANTS S. Minstead 15.7 (ER 88:156, BENHS 9: 8). SOMERSET S. Nettlecombe August (per French). YORKS. High Monothorpe August (per French).

Colias hyale (3) Co. CORK W. Castletownsend 25.8 one closely seen (INJ 19:356-8); Little Island 16.8 female taken; Sandy Cove 23.8 another seen, female (S. Fleming and N. Reardon, (INJ 18:314).

**Nymphalis polychloros* (2) KENT W. Marion Wilson Park, Charlton early June, one seen (ER 89:316). SUSSEX E. St. Leonards 7.6 (CRP Sx. 305 and pers. comm.).

Danaus plexippus (1) Co. KERRY S. Parknasilla 24.8, one described by Miss C. Oberhoffer (INJ 19:356-358).

Nymphalis antiopa (1) WORCS. Callow End 7.8, 10.8 one, possibly two seen in garden by Miss Shaw (J.E. Green, Butterflies of Worcs: 13, and pers. comm.).

Rhodometra sacraria (2) DORSET Arne 26.8 male (BENHS 9:24). ISLE OF MAN Andreas 6.9 pink male at light (ER 87:301).

Orthonama obstipata (24) DEVON S. Yarner Wood n.d. (RISR); Slapton Ley n.d. three (RISR). SOMERSET S. Nettlecombe Court n.d. (RISR). HANTS S. Minstead 2.10 (ER 88:156). SUSSEX W. Arundel 26.10 (CRP, pers. comm.). SUSSEX E. Peacehaven 26.10, 31.10, 1.11, males (ER 88:43); Ringmer n.d. two (CRP SX:309). SURREY Bramley 30.10 male (ER 88:135). CARDS. Cardigan n.d. (RISR). BRECONS. Pont-ar-Dulas 1.11 (S-B Brecon: 22). CAERNS. Rhostryfan 15.8 (Ent. Gaz. 33:119). LANCS S. East Didsbury n.d. (RISR). LANCS N. Leighton Moor n.d. (RISR). CUMBERLAND Sandwith 20.6 (per French). WIGTONS. Stranraer, 10.8 (ER 87:277). ROXBURGHS. Denholm 3.10 (Berw. NC 40:233). INNER HEBRIDES Glenbrittle, Skye 7.6 (per French); Carbost n.d. (RISR). Co. CLARE Killinabeg 10.6 (per French).

Agrius convolvuli (8 adults, 12 larvae) DORSET Studland 7.10; Swanage 7.10 (ER 88.154). HANTS N. Martyr Worthy 16/17.9 female (ER 87:277). WILTS S. Warminster 30.9 female at rest (ER 88:97). SUFFOLK E. Oulton 17.9 (Suff. NH. 17:122). CAMBS. Brabraham 15.10 (Ent. Gaz. 27:112). PEMBS. Tenby 11.10, at rest on a wall (ER 88:99). LINCS S. Freiston 26.9 twelve larvae (J.H. Duddington, pers comm.). Co. CARLOW Carlow 24.7 (INJ 19:359).

Acherontia atropos (2 adults, 6 larvae) DORSET Milton Abbas one larva n.d., moth emerged 10.11 (DNHAS 97:72-78). HANTS N. Vigne School, Basingstoke 30.9 BENHS 9:49). KENT E. Ham Street. n.d. (BENHS 9:6). GLOS N. Southrop 28.8, half grown larva (Ent. Gaz. 27:28). NORTHANTS. Hartwell 6.9, 12.10 two fully grown larvae (ER 88:19). NORTHUMBERLAND S. Morpeth 8.9 fully fed larva (E.R. 88:19). Co. CORK Cork n.d. one larva brought in (ER 87:302).

Daphnis nerii (1) HANTS N. Martyr Worthy 17/18.8 female in moderate condition (D.W.H. ffennell, ER 87:277).

Hyles gallii (5 adults, 4 larvae) SURREY Selsdon 14.8 female, fertile ova (ER 87.278). MIDDX. Harmondsworth 20.9 larva near fuchsia hedge (AES Bull. 35:124). SUFFOLK E. Ipswich September two larvae on fuschia, moths emerged June 1976 (Suff. NH 17:131). NORFOLK W. Thetford Chase 5.7 at viper's bugloss (AES Bull. 35:175). YORKS v.c. 62 Osgodby 4.8 caught by a cat (P.Q. Winter, pers. comm.). DURHAM Brancepath 12.8 female in trap (ER 87: 301). NORTHUMBERLAND S. Haydon Bridge 9.10 part grown larva on *Epilobium* (ER 88:19). INVERNESS E. Aviemore 6.8 female, ova (ER 87:231).

Hyles lineata livornica (2) CORNWALL W. Lizard 24.8, 25.8 (ER 87:276).

**Eurois occulta* (2) CAITHNESS Lybester 7.8 two in trap (J.H. Rosie in litt.).

Mythimna vitellina (1) SURREY Ranmore Common 1.6 male, in trap with four *A. gamma* (ER 87:258).

Mythimna unipuncta (*c*.25) CORNWALL W. Lizard 18/19.9 one at sugar, two at light (ER 88:186). DORSET Swanage 4.10 two (ER 88:92) Portland 5.10 (BENHS 9:25); Furzebrook 27.10 three (DNHAS 97:72-78). SUSSEX W. Aldwick Bay 2.10 (BENHS 11:7); Arundel 28.9, 29.10 (CRP Sx.: 325 and pers comm.). KENT E. Dungeness 4.10 (ER 87:303). KENT W. Higham 6.10 female (ER 88:282). INNER HEBRIDES Isle of Canna 4.12 three, 5.12 one at lighted window, 50°F, SW wind force 4 (ER 88:56). Co. CORK CENTRAL Fountainstown 4.11, 6.11, 8.11 (ER 87:302, pers comm.).

Mythimna loreyi (23) SCILLY 8.9 two males, 10.9 two females (A. Richardson, ER 87:301). CORNWALL W. Lizard 24.8 two (ER 87:301); 18.9 one at sugar, one at light (R. Baker (ER 88:86); Coverack 3.9 (B. Goater per B. Skinner). DEVON S. Salcombe 3.9 (R. Dyke, BENHS 8:114). DORSET Furzebrook 7.10 (DNHAS 97:77). Co. CORK CENTRAL Fountainstown 4.9/9.9 five, 18.9, 4.10/8.10 eight (A.A. Myers, ER 87:302 and pers. comm.).

**Senta flammea* (2) ISLE OF WIGHT Shanklin 10.6 (ER 87:212). DORSET Arne 10.6 (B.G. Withers, BENHS 9:17). Both probably immigrant.

Spodoptera exigua (4) KENT E. Dymchurch n.d. (C-H Kent 3:258). NORFOLK W. Snettisham Beach 19.8 (per French). Co. CORK CENTRAL Fountainstown 23.8 (ER 87:302). Co. CLARE. Burren 11/12.6 (B. Skinner, pers. comm.).

Helicoverpa armigera (4) HANTS S. Ringwood 30.10 two (ER 88:99). SUSSEX E. Ringmer 30.10 very worn (C.J. Hodge per CRP). GLOS N. Southrop 29/30.10 (Ent. Gaz. 27:122).

Heliothis peltigera (4) DORSET Studland 4.10 (ER 88:154). HANTS S. Minstead 13.6 (ER 88:156, BENHS 9:6). BUCKS. Princes Risborough 21.9 (Herts NHS 28:29). WARWICKS Charlecote *c.* 10.8 (ER 88:90). LINCS N. Little Cawthorpe n.d. (R.E.M. Pilcher, pers. comm.).

Eublemma ostrina (1) Co. KERRY N. Slea Head 15.6 female (B. Skinner, ER 87:277).

Trichoplusia ni (3) CORNWALL W. Kynance 28.8 (ER 87:276). Co. CORK CENTRAL Fountainstown 26.8, 8.9 (ER 87:302).

Catocala fraxini (1) NORFOLK E. Sheringham 18.9 (per French).

1976

The summer of 1976 is memorable as one of the driest and warmest of the century, followed (after the appointment of a Minister for Drought) by one of the wettest autumns. It is also memorable for the variety of its immigrant Lepidoptera. 32 "scarcer" species which are immigrant only and 21 which are resident but may also have been immigrant in 1976 are listed here. All of the common immigrant species were also present. Spectacular events were the greatest invasion of *Nymphalis antiopa* since 1872, of which a detailed account has been given by Chalmers-Hunt (ER 89:89-105, 248-9), along with many *Catocala fraxini* and other immigrants from eastern Europe. Three sightings of *Argynnis lathonia* and single captures of *Trigonophora flammea* and *Lithacodia deceptoria* in West Sussex, and of the rare pyralids *Antigastra catalaunalis* in Kent and *Hymenia recurvalis* in Dorset are especially notable. Two species were added to the British list: *Blepharita solieri* Bdv., trapped in Roxburghshire by Andrew Buckham, and *Herminia lunalis* Scop. trapped near Maidenhead, Berkshire by Wm. Parker.

Some comment is needed on the unusually long list of possible or probable immigrants of resident species. The unusually high night temperatures which were frequent and prolonged during this summer undoubtedly caused very wide movements of resident species of moths, and large attendances at light traps. It is possible that these circumstances, rather than immigration, account for some of the records of species far from their places of residence as so far known. On the other hand, in most of the cases listed the records of unexpected resident species coincide in date and often in place with those of undoubted immigrants, and sometimes the specimens are said to differ from the usual resident form.

The pattern of migrations which produced these results is an interesting one. The anticyclonic conditions which prevailed through May and June were unfavourable for immigration, presumably owing to the dominant easterly or northerly air currents broken only by very short spells of winds from the south-west or south. Except for *V. atalanta*, of which considerable numbers were recorded in the second and third weeks of June, all the usual common immigrants were scarce, and until the end of the first week of July, although a varied selection of the scarcer species were reported, they were found almost entirely singly. There appears to have been no large immigration, and, except perhaps for a single *Hyles livornica* in the Isle of Wight, they seem to have come only short distances from France or the Low Countries.

With great warmth and mainly east or south-east airs continuing to the end of July there were rather larger and probably longer distance movements from the east. These brought in a few *Spodoptera exigua, Hyles gallii* and *Orthonama obstipata*, the first *Agrius convolvuli*, and forerunners of *N. antiopa* which probably originated from further south than the main invasion in August. In the last week many *V. atalanta* and several more *C. cardui* were seen, mostly near the south coast. These may have been early offspring of May and June arrivals rather than primary immigrants. But records of *Cyclophora puppillaria, Lampides boeticus* and *Nola aerugula* show that some rather thin immigration from the south was taking place at that time, with some more species in early August.

In the first half of August the anti-cyclonic conditions with north-east or east winds continued over the whole of Britain; but after that they began to give way increasingly to pressures from the south and south-west, which finally became dominant after the first week of September. This produced a curious situation in which immigrations of widely different origin were arriving simultaneously. The main flux of Scandinavian *N. antiopa* arrived from August 20 to 26 across the east coast, midlands and south east, with probably a small supplement in the first week of September; some fifteen *C. fraxini* were reported, mainly near the east coast, between August 28 and September 9, with at least one *Lithomoia solidaginis*; and many *E. occulta* throughout the period. In the west and along the south coast the first large immigration of *A. convolvuli* was seen from August 24 onwards, accompanied by *M. vitellina, M. unipuncta, U. limbalis,* many *V. atalanta* and *C. cardui* and other usual autumn immigrants, with the novelties *B. solieri* and *H. lunalis,* probably from the Mediterranean area. At least 26 of the scarcer species and nearly all the commoners were seen during the second half of August.

From mid-September to the last week of October, with the anticylone finally gone and south westerly winds with much rain instead, there was a succession of immigrations: a second large influx of *A. convolvuli* from September 15, with the only *D. orichalcea* reported and *A. catalaunalis*, and in early and mid-October a few *Rhodometra sacraria, C. puppillaria, H. armigera*, more *M. vitellina* and *M. unipuncta*, and the single rarities *T. flammea, H. recurvalis* and *H. euphorbiae*. But the few records late in the month and in November were probably of earlier arrivals or of examples locally bred, and there was no further immigration.

Though eight species of the rare immigrant butterflies were reported, the commoners had a mixed history. *V. atalanta* did well, being helped by good arrivals in late May and early June, ideal conditions for breeding in the early summer, and a strong migratory reinforcement in August; it was certainly well above average in Britain, and despite the bad weather some were seen in November and two as late as December 12 in Sussex. The diurnal *M. stellatarum* had a similar pattern, with about 150 adults and many larvae covered by reports. But *C. cardui*, after poor initial immigration was never common except in the south-west in August, and *C. croceus* was only reported in eight counties in very small numbers. As in 1975, and probably for similar reasons, in all these species except *C. croceus* Ireland fared considerably better, and in addition received at least five *N. antiopa*, which very seldom reaches it.

A. gamma was not in much more than average numbers in most places, but high peaks were noted in traps on the south coast in Sussex and Devon in late July and in Cornwall on June 28 and about August 24, though spread inland seems to have been poor. *A. ipsilon* made a good start in June and was very common in the west and elsewhere from August onwards. *U. ferrugalis* was seen mainly in Cornwall, but was noted as scarce elsewhere, and *N. noctuella* and *P. xylostella* were little reported and in very small numbers.

Among the scarcer species *Nymphalis antiopa*, with about 300 seen in 61 counties in Britain from Shetland to Cornwall and in five counties in Ireland, was outstanding both in number and range. Of *Agrius convolvuli* about the same number were reported, but their range was restricted to 24 counties in Britain, reaching northwards only to Westmorland and Northumberland, with five in south and central Ireland. *M. vitellina* was extremely abundant in West Cornwall in a single influx about August 24 and in smaller numbers later along the south coast to Sussex and in Ireland; but it was recorded inland only in Surrey. *M. unipuncta* also had a worthy total of 22 records, half of them in Ireland, and the eighteen of *C. fraxini* were considerably more than in any year since the species ceased to be temporarily resident in Kent. Of *A. atropos*, though the number of adults seen was small, the distribution of these and of some 25 larvae and pupae reported included 14 English counties to Westmorland and two in Ireland.

Against this must be set some unexpected scarcities such as *R. sacraria*, of which only seven were recorded in a single small incursion to England in October and three in Ireland in September; of *O. obstipata* only a dozen widely spread in date and place, and of *S. exigua* only seven and *P. unionalis* only three. Nevertheless, it was a year probably more prolific in immigrant species and numbers than any since at least 1945, and not likely to be easily exceeded.

Scarce Immigrants, 1976

Uresipita limbalis (5) CORNWALL W. Lizard area 24.8 three, 25.8 two (Ent. Gaz. 28:81, ER 89:40).

**Eurrhypara perlucidalis* (1) KENT E. Aylesford 28.6 (ER 89:264): probably immigrant.

Antigastra catalaunalis (1) KENT E. Newington 28.9 (Mrs. V. Taylor per P.J. Jewess, ER 89:10, BENHS 10, pl. 9); one of the rarest immigrant Pyralidae, *c.* six previously recorded.

Diasemiopsis ramburialis (2) CORNWALL n.d. (BENHS 10:9). BEDS. Cockayne Hartley 1/2.10 (per French).

Hymenia recurvalis (1) DORSET Durlston Head 8/9.10 (P.H. Sterling, BENHS 10:10, ER 89:199). First recorded in 1951, few later records.

Palpita unionalis (3) CORNWALL W. Lizard 24.8 (ER 89:40). Co. CORK CENTRAL Fountainstown 2.9 two (INJ 20:301 and pers. comm.).

**Ectomyelois ceratoniae* (1) HANTS S. Southsea 18.6 (BENHS 10:9): probably immigrant, possibly introduced.

**Dioryctria abietella* (3) CORNWALL W. Lizard 24.8 two; Porthleven 30.8 (Ent. Gaz. 28:82).

**Heterographis oblitella* (many) CORNWALL W. Hayle 22.8; Kynance 24.8; St. Keverne 1.9 (Ent. Gaz. 28:56). DORSET Lulworth n.d. (BENHS 10:10).

S. HANTS. Southsea 25.6/24.7 seven (BENHS 10:9). SUSSEX E. East Dean 11.8 three (Ent. Gaz. 28:56). S. ESSEX Rainham 27.7 abundant in cabbage field and on saltings (Ent. Gaz. 28:56). HERTS Bushey 12.8, 20.9 (Ent. Gaz. 28:56). NORFOLK E. Hickling 4.7 (ER 88:282). SURREY Bramley 30.6, 11.8, 26.8 two, 29.9 two (ER 89:186). GLOS N. Waterlane 22.8 three (ER 90:140). Some or all of these may have resulted from spread from the area of residence on the Thames estuary.

**Papilio machaon* (1) KENT E. Pegwell Bay 9.7 one "tatty", taken and retained (C-H Kent 3:212).

Colias hyale or *C. australis* (2) CORNWALL E. Anthony early 8 (per French). SUSSEX E. Eastbourne 1.8 one seen flying (CRP Sx.:301).

Lampides boeticus (1) NORTHANTS Wellingborough 25.7 male, slightly worn, in garden. First county record. (J.H. Payne, ER 89:10).

**Nymphalis polychloros* (1) KENT E. Dover 14.9 female (ER 88:280).

Nymphalis antiopa (c. 300): see detailed account in Chalmers-Hunt, ER 89: 89, 248-9, to which should be added: BUCKINGHAMSHIRE High Wycombe date 24.8; Coombe Hill date 3.9; Penn 8.10 (Middle Thames NHS records per M. Albertini). DERBYSHIRE Dovedale, near Alstonfield 23.8, by H.J. Wain (Derbys ES 45:4-5). HERTFORDSHIRE Letchworth 26.9 (P. Waterton, Herts NHS 28:29). WARWICKSHIRE Warwick 28.8, by Miss G. Cooper (R. Smith & D.C.G. Brown, 1979, Lepidoptera of Warwickshire I:44). YORKS v.c. 62 Scotch Corner 12.9 (P.Q. Winter, pers. comm.). PERTHSHIRE Aberfoyle, near Loch Ard 26.7 one seen briefly round an oak tree (G. Thomson, ER 89:316).

Argynnis lathonia (3) DEVON S. Wembury 27.8 (per French). HANTS S. Bournemouth 15.8, 1.30 p.m., 70°F, flying in SE wind (A.H. Dobson, ER 89: 78). SURREY North Downs 12.7, seen again 18.7, photographed (K. Wilmott, ER 88:333, AES Bull 37:61-63).

Danaus plexippus (2) CORNWALL W. Prah Sands 21.8 two (per French).

Cyclophora puppillaria (6) HANTS N. Micheldever 3.10 female (ER 89, 107). SUSSEX W. Aldwick Bay 21.10 (ER 89:20); Arundel 13.10 (CRP Sx. 307). KENT W. West Wickham 30.7, female (ER 88:267). SURREY Addiscombe 8.10 male (ER 89:83); Bramley 10.11 worn male (ER 89:136).

Rhodometra sacraria (10) DORSET Arne 9.10 (DNHAS 98:126). SUSSEX W. Plaistow n.d. three (CRP SX: 308). KENT E. Canterbury 16.10 (C-H Kent: 265). SURREY Bramley 30.9 worn male (ER 89:186); Wormley 9.9, 10.10 (J.L. Messenger, pers. comm.). Co. CORK CENTRAL Fountainstown 31.8, 16.9, 17.9 (A.A. Myers INJ 20:301 and pers. comm.).

Orthonama obstipata (11) DEVON S. Beer 14.7 (G.S. Woollatt in litt.) DORSET Arne 16.7 (DNHAS 98:127). SUSSEX E. Peacehaven 30.10 (CRP pers. comm.). HEREFORDS Ledbury 22.8 male (ER 89:44). Co. CORK CENTRAL Roche's Point 28.8 (ER 89:74); Fountainstown 31.8, 1.9, 15.9 (A.A. Myers INJ 20:301 and pers. comm.).

**Ennomos autumnaria* (4) HERTS. Royston n.d. (BENHS 10:5); Totteridge 26.9 (L.N. 57:88). First county records. LINCS N. Gibraltar Point 30.8; Tothill Wood, near Alford 30.8 (ER 89:54). Probably first county records. Association with other species at this date suggests immigration; otherwise, the result of abnormal spread from areas of residence in Kent and Essex.

Agrius convolvuli (c. 300 moths, 6 larvae) CORNWALL W. Lizard 23/28.8 (31) (ER 89:30-40), 26.8/1.9 (19) (ER 88:235); Porthgwarra, near Land's End 19.9 2.30 p.m. one flying in from the sea (ER 90:236). DEVON S. Torquay area 24.8, 22.9; Babbacombe 25.9; Watcombe 30.9; Dawlish 2.10 (AES Bull. 36:73); Chillington 28/31.8 five (ER 89:88). Beer n.d. (16) (G.S. Woollatt, pers. comm.). DORSET Wareham 14.8 male, females (ER 89:18); Furzebrook 24/17.8 six, 21/25.9 four; Langton Matravers 24.8; Radipole 24.8; Swanage 26.8, 3.10; Broadstone 24.9; Queen's Park 30.9; Winfrith 1.10; Milton 2.10; Fordington 21.10, West Knight October; Bradford Peverell mid.10 (DNHAS 98:121-23 in all); Weymouth 24.8/1.9 six, 7.9, 25.9/1.10 – 7 males, 8 females in all (V.W. Philpott, pers. comm.); Studland 25.9 (ER 89:119). ISLE OF WIGHT Niton 26.9 two (BENHS 10:4). HANTS S. Romsey 1.9 (BENHS exhib. 1976); Lymington 8.9; Locks Heath 8.9 (BENHS 10:4), n.d. two (ER 80:53); Titchfield Haven 19.9 (ER 89:78); Hayling Is. 22.9, 24.9 (AES Bull. 36:87); Burridge 22.9 two (ER 89:159); Emsworth n.d. (Church per CRP). SUSSEX W. Friston Forest 23.8 male; Ratten Wood 1.9 at rest (ER 89:34); Worthing 22.9 (Odell per CRP); Arundel 29.9, 16.10 (J.T. Radford per CRP); Plaistow 2.9, 22.9 (S. Church per CRP); Aldwick Bay, 3.10, 24.10 two (ER 89:20). SUSSEX E. Peacehaven 6.7 worn male, 8/10.9 (17), 16/20.9 four, 28.9/3.10 three (CRP pers. comm.); Cuckmere 24.9 (Hodge per CRP); Littlehampton 2.9 female at rest (AES Bull. 35:172); Eastbourne 5.9 (BENHS 10:3), two n.d. (CRP Sx.: 314); Fairlight 28.9 (Hast. Nat. 62); Maplehurst Wood 2.10, on wall (Cootes per CRP); Beachy Head, September (ER 89:34); Brighton n.d.; Ringmer two n.d.; Pett n.d.; Telescombe n.d. (CRP Sx.:314). KENT E. West Marsh Levels, 24 & 25.8 three larvae, one pupa (ER 88:231); Westbere 20.9, 4.10 (BENHS 10:3). SURREY Virginia Water 27.9 (ER 89:80); Wormley 23.8, 26.8, 27.8 (J.L. Messenger pers. comm.); Tillingbourne Park 8.9 (J.D. Holloway pers. comm.); Reigate 16.9, female, eggs (ER 89:269); Selsdon 28.8 (BENHS 10:6, L.N. 59:85). ESSEX S. Little Baddow 25.8 (ER 88:304). HERTS. Barley October, one found dead (AES Bull. 36:24).BUCKS. Princes Risborough n.d. (Herts. NHS 28:29); Farnham Common 1.7 (Middle Thames NHS, per M.A. Albertini). SUFFOLK E. Walberswick 26.8/10.10 15 in all (ER 89:82); Aldeborough 30.8 (AES Bull. 36:87); Boytom; Oulton Broad; Minsmere 28.8/10.10 (Suff. NH 17:227). NORFOLK E. Hemsby 23.7 fully fed larva (AES Bull. 36:87). GLOS. S. Batheaston 14/16.8 seen for three nights at *Nicotiana* (AES Bulle. 35:172). HEREFORDS. Ledbury 19.9 (ER 89:44). WARWICKS Armington 23.9, Marton 22.9 (ER 89:84). BRECONS. Pont-ar-Dulas 25.8 (ER 89:56). STAFFS. Wistaston 20.9 at rest on milk bottle (ER 89:46). CAERNS. Pwllheli October (Ent. Gaz. 33:115). ANGLESEY Beaumaris October (Ent. Gaz. 33:115). LINCS. S. Boston 16.9 (Trans. Lincs. N.U. 18:69-72). LINCS N. Alkborough 12.7; Lincoln 16.9, 22.9; Scunthorpe August/October, ten brought to museum (Trans. Lincs. N.U. 69:72); South Thoresby 28.8/20.9 many; "at least 28 in Lincs." (ER 89:54). DERBYS. Hasland, near Chesterfield 3.9; Tipton Hall 23.9 (Derbys. ES 46:6). YORKS v.c. 61 Whitgift 23.9 two (Derbys. ES 46:6); Driffield 29.8; Bridlington 27.9; Spurn 29.8, 23.9. YORKS v.c. 62 Scarborough 6.9, 13.9, 16.9 at rest (J. Briggs pers. comm.). Crompton Forest early 10, at *Nicotiana*; Armthorpe September; Blacktoft Sands 23.9 (per P.Q.W.). YORKS v.c. 63 Sheffield (Derbys. ES 46:6). DURHAM Wreckenton 30.8; Gateshead, 24.9 male, 2.11 dead but not stiff (ER 89:11). NORTHUMBERLAND S. Jesmond male 27.8; Whitley Bay 15.9; Newbiggin 27.9 (ER 89:11). WESTMORLAND Crossthwaite 18.8 female (ER 82:152). Co. CORK CENTRAL Roche's Point 24.8 (ER 89:74); Fountainstown 3.8, 11.9 A.A. Myers, INJ 20:301 and pers. comm.). Co. CARLOW Carlow late 9; Co. WICKLOW Greystones early 9 larva; Co. DUBLIN Raheay c.28.9; Co. GALWAY W. Salthill n.d. (INJ 19:88-89).

Acherontia atropos (15 moths, 19 larvae, 7 pupae) DEVON S. Babbacombe 23.10, infertile female on pavement (AES Bull. 37:61). DORSET Overmoigne 2.8 larva; Dorchester 12.8 larva; Lulworth 2.9; Creech 6.9; Wareham 21.9; Fordington 18.10 (DNHAS 98:121); Blandford before 7.10 (BENHS 10:43). HANTS S. Bridgemary 2.10 on lawn (ER 89:78); Sway n.d. fully fed larva (ER 89:53). SUSSEX W. Aldwick Bay 22.9 (ER 89:20); Horsham n.d.; Wiston Park n.d. two pupae (CRP Sx.:315). KENT E. Barham 30.9 on stones in garden; Ash 13.10 one crippled in potato field (C-H Kent 3:229); Adisham n.d. (BENHS 10:4). SURREY Putney August larva on jasmine (L.N. 57:85); Normandy autumn, one attracted to bees' nest in chimney (ER 89:344). HERTS

St. Albans early 9; Stevenage larva reared (Herts NHS 28:29). NORTHANTS Daventry 12.8 larva on lettuce (AES Bull. 35:172). STAFFS Hopton September two larvae, one pupa (ER 89:41). WARWICKS Princethorpe 12.8 larva, 18.8 pupa, two larvae discarded (ER 89:84). BRECONS Llanbedr 12.9 two larvae, one male emerged 18.11 (S-B Brecon: 37). PEMBS. Haverford West 7.8 larva (AES Bull. 36:30). CAERNS. Madryn Castle, Lleyn, summer, two larvae on potatoes; Dyffryn Ardudwy late 9, early 10, two pupae (Ent. Gaz. 33:115). ANGLESEY Newborough Forest 10.9, one on a gate (Ent. Gaz. 33:115). WESTMORLAND Heversham 18.8 larva, 13.9 pupa (ER 89:152). Co. KERRY N. Dingle 25.9 larva (INJ 19:89). Co. CORK W. Cape Clear Is. 14/15.10 (INJ 19:89).

Hyles euphorbiae (1) MIDDX. London, Devonshire Square 13.10, at rest on ground (L. Smith in de Worms, L.N. 57:83).

Hyles gallii (20 moths, one larva) CORNWALL W. Lizard 24.8 (ER 89:40). DEVON S. Beer 14.7 two (G.S. Woollatt, pers. comm.). SURREY Virginia Water 7.7 (ER 89:79); Purley 22.8 (ER 88:320). ESSEX S. Westcliff-on-Sea mid 8; Shenfield, August (L.N. 57:87); Brentwood *c.* 5.9 (ER 88:320). BUCKS Newton Longville 17.8 (Middle Thames N.H.S., per M. Albertini). NORFOLK W. Thetford Chase 5.7, at flowers of *Echium* (AES Bull. 35:175). NOTTS. Mansfield 26.8 (Derbys. ES 46:6). DERBYS. Hilton 13.8 11 p.m., fresh female (ER 89:46). LINCS N. near Scunthorpe July, four taken (ER 89:54); Alkborough 20.8, 15.9 (Trans. Lincs N.U. 19:69). CUMBERLAND Skiddaw 24.7, larva almost full grown, on turf (ER 89:10). Co. CORK W. Old Head of Kinsale mid 7 two (INJ 19:89).

Hyles lineata livornica (5) CORNWALL W. Lizard, Coverack 24.8 fresh male, Housel Bay 24/25.8 (Ent. Gaz. 28:81, ER 89:40), Lizard 24.8 (B.K. West, pers. comm.). ISLE OF WIGHT Godshill 27.6 11 p.m. male (ER 89:140). SUSSEX E. Heathfield 2.9 male (ER 88:304).

**Euproctis chrysorrhoea* (3) YORKS v.c. 61 Muston 13.7 three (BENHS 10:6): possibly immigrant, otherwise from areas of residence on the coast further south.

Clostera anachoreta (3) ESSEX S. Bradwell-on-Sea 9.5 and 16.7, males in good condition (ER 91:284). SUFFOLK E. Southwold 4.8, male at rest near light (Ent. Gaz. 28:1).

Lymantria dispar (2) DORSET Arne 7.8 DNHAS 121. HANTS S. Bournemouth 18.8, female in good condition on tree in pier gardens (ER 88:268).

**Lithosia quadra* (1) KENT E. Folkstone Warren 23.6 (ER 89.11).

**Euplagia quadripunctaria* (1) CORNWALL W. Lizard, Kynance 24.8 (ER 89: 40). Probably immigrant, possibly stray from South Devon.

**Meganola albula* (4) SUSSEX E. Eastbourne, at light on coast 17.7 two (ER 89:42). LINCS N. Gibraltar Point n.d. two (Trans. Lincs. NU. 19:69). Possibly immigrants.

**Nola aerugula* (2) DORSET Radipole 25.7 (DNHAS 98:118-127). Probably immigrant. KENT E. Dover 18/19.7 (ER 88:267). Probably immigrant, though resident at Deal *c.* 1878/1892.

**Eurois occulta* (*c.* 70) HANTS S. Hayling Is. 8.7 female, a few ova (J.M. Walters pers. comm.); Ashurst 2.9 (J.C.A. Craik ER 89:188 and pers. comm.). SUSSEX E. Eastbourne 2.9 female, fertile eggs (BENHS 10:6). KENT E. Canterbury 14.8; Westbere 19.8, 21.8, 30.8, 5.9; Newington 30.8 (C-H Kent 3:244). SURREY Norwood 9.9 (L.N. 57:85). NORFOLK E. Hickling 28.8 two, ten others earlier and later (ER 89:266). WARWICKS Charlecote 28.8 grey, very worn (ER 89:84). LINCS N. South Thoresby 8.8 and seven later (R.E.M. Pilcher ER 89:54, pers. comm.). YORKS v.c. 61 Muston 20.8, 26.8; v.c. 62 Langdale Forest 23.8 (P.Q. Winter). DERBYS. Matlock 31.8 (Derbys. ES 46: 19). WESTMORLAND Beetham 22.8 3.30 a.m. male, 28.9 2.45 a.m. male; (J. Briggs, pers. comm.). ABERDEEN S. Causeyton 24.8/2.9 six (M.R. Young, ER 88:299, pers. comm.). ABERDEEN N. Udney 22.8/28.8 eleven (M.R. Young ER:88.299, R.M. Palmer, pers. comm.). INVERNESS E. Kinveachy Forest 22.8/1.9 f.*typica* in small numbers (ER 88:285). CAITHNESS *c.* 18.8 f.*typica* small numbers (ibid.); Lybster 21.8 male, grey; Berriedale 27.8 male (J. Rosie, pers. comm.).

Mythimna albipuncta (21) CORNWALL W. Lizard 24/26.8 five (ER 89:40, Ent. Gaz. 29:83). DORSET Studland 16.10 (ER 89:119). HANTS S. Ashurst 18.8 (ER 89:188); Hayling Is. 23.8 two (AES Bull. 36:27, pers. comm.). SUSSEX W. Aldwick Bay 11/25.10 five (ER 89:20, BENHS Exhib, 1976, 1977); Worthing 1.10 two (Odell per CRP). SUSSEX E. Peacehaven 14.8, 18.8; Southease 23.8; Eastbourne n.d. (CRP Sx. 324, pers. comm.). KENT E. Dover 14.8; Newington 11.10 (C-H Kent 3:246-7).

Mythimna vitellina (*c.* 430) CORNWALL W. Lizard area: Housel Bay 23.8 one male; Housel Bay, Coverack, Kynance 24.8 *c.* 200 in three traps; Housel B 25.8 smaller numbers; Coverack 25.8/2.9 *c.* 20 nightly (ER 89:39-40, Ent. Gaz. 28:81-84); Lizard 4.9 five (BENHS exhib. 1976) Mawnan Smith 25.8 male, 26.8 male (Ent. Gaz. 30:224); Mullion 26.8 at least twenty (ER 88:335, 89: 233), Cape Cornwall 3.9 four (BENHS 10:4). DORSET Furzebrook 23.8 (DNHAS 98:118-127); Swanage 17.9 female at sugar (BENHS 10:119). HANTS S. Lymington, August/September four (BENHS 10:4); Minstead 28.9 (BENHS 10:5). SUSSEX W. Aldwick Bay 28.8, 29.8, 3.10 (ER 89:20); Arundel 8/20.10 four (J.T. Bradford per CRP); Worthing 9/23.10 four (Odell per CRP). SURREY Bramley 13.10 female, 150 ova (ER 89:186); Nower Wood 15.10 male (ER 90: 55). PEMBS. St Govan's Head 24/26.8 one (ER 88:270). Co. CORK CENTRAL Fountainstown 31.8, 14.9, 17.9, 3.10 (A.A. Myers INJ 20:301, pers. comm.).

Mythimna unipuncta (22). CORNWALL W. Lizard: Kynance 24.8 three, Coverack 25.8 (ER 89:40, Ent. Gaz. 28:83); Cape Cornwall 23.9 (J.R. Langmaid Cornwall 3.9 (BENHS 10:4). SUSSEX W. Aldwick Bay 27.10 (ER 89: 20). SUSSEX E. Peacehaven n.d. (CRP Sx. 325). KENT W. Higham 6.10 female (ER 88:335). Co. CORK CENTRAL Fountainstown n.d. thirteen (INJ 20:301).

Mythimna loreyi (3) CORNWALL W. Lizard: Housel Bay 24.8 one escaped; Coverack 25.8 (ER 89:40, Ent. Gaz. 28:83); Cape Cornwall 23.9 (J.R. Langmaid pers. comm.).

**Lithomoia solidaginis* (1) NORFOLK E. Hickling 28.8, with *E. occulta* and *C. fraxini* (ER 88:266).

Blepharita solieri Boisduval (1) ROXBURGHS. Denholm 29.8 in light trap, det. E.C. Pelham-Clinton (BENHS 11:7, pl. 2), Andrew Buckham.

Trigonophora flammea (1) SUSSEX W. Aldwick Bay 13/14.10, in trap during south west gale (R.R. Pickering, BENHS 11:7, ER 89:9).

**Enargia paleacea* (1) BRECONS. Pont-ar-Dulas 26/27.8, in trap with *A. convolvuli* (ER 89:56). First county record; possibly immigrant; otherwise from areas of residence 50 miles distant in Worcestershire.

**Photedes extreme* (1) KENT E. Dungeness 2.7, very strongly marked: det. D.S. Fletcher (ER 89:252). First county record; probably immigrant.

**Photedes fluxa* (1) GLOS N. Southrop 6/7.7 in trap. First county record (E.W. Classey, Ent. Gaz. 28:2). Possibly immigrant.

**Oria musculosa* (2) HANTS S. Minstead 4.7 male (BENHS 10:5). SURREY Bramley 4.7 female, paler than usual British specimens (BENHS 10:22, ER 89: 186). GLOS N. Southrop, 7.8, 10.7, singles (Ent. Gaz. 28:22). Probably immigrants.

**Hoplodrina ambigua* (1). Co. CORK E. Youghal 20.8 one. Probably first Irish record (Rev. D. Agassiz, ER 89:74). Possibly immigrant from Britain, where it is now widely resident though also sometimes immigrant.

Spodoptera exigua (7) SUSSEX E. Peacehaven 11/13.8 three (CRP, pers. comm.). SURREY Bramley, 4.7 male (ER 89:186). BERKS Bracknell n.d. BUCKS Dorney Reach n.d. (Middle Thames NHS, per M. Albertini). WESTMORLAND Beetham

3/4.7 male (ER 89:17).

Helicoverpa armigera (6) CORNWALL n.d. (BENHS 10:4). DORSET Wareham 14.10 (ER 89:18). SUSSEX W. Aldwick Bay 14.10 (ER 89:29). SURREY Addiscombe 22.10 (L.N. 57:86). SUFFOLK E. Walberswick 7.10 (ER 89:82). WARWICKS. Charlecote 17.10 female, fertile ova (ER 99:74).

Heliothis peltigera (2) CORNWALL W. Lizard: Housel Bay 24.8 male (ER 89:40, Ent. Gaz. 28:84). SUSSEX W. Worthing 28.9 (CRP Sx. 330, pers. comm.).

**Heliothis viriplaca* (1) YORKS v.c. 61 near Filey n.d. First Yorks. record this century (P.Q. Winter, BENHS 10:6). Possibly immigrant, or stray from areas of residence in Norfolk and Suffolk.

Lithacodia deceptoria (1) SUSSEX E. Brighton 7.6 in a tungsten light trap; det. D.J. Carter (C.R. Pratt, ER 90:126). Only *c*.12 previous British records.

**Deltote bankiana* (3) SUSSEX E. Fairlight 30.6 (Hast. Nat. 12:64) near Eastbourne 4.7 two (ER 88:240). Probably immigrant.

Diachrysia orichalcea (1) SUSSEX W. Arundel 10.9 (J.T. Radford, CRP Sx. 331).

**Syngrapha interrogationis* (3) SURREY Bramley 10.8 male of the central European form ER 88:255, 89:186). MONMOUTHS. n.d. first county record (BENHS 10:4). KINCARDINE Banchory R.T. n.d. one ER 89:243. Possibly immigrant.

Catocala fraxini (20). DORSET Parkstone 11.9, at lighted window near sea (ER 89:10). NORFOLK E. Sea Palling 28.8; Hickling 28.8; Sutton 5.9, one found dead; Horsford 5.9, Norwich 5.9; Taverham 7.9; Cley-next-Sea 19/20.9 (ER 88:323, 266). NORFOLK W. Old Hunstanton 30.8 (per French). HEREFORDS. Ledbury 31.8/1.9 worn male (ER 89:44). LINCS N. South Thoresby 29.8, 7.9, Gibraltar Point 30.8 (ER 89:54); Great Coates 2.9 (Trans. Lincs. N.U. 19:69-72). YORKS v.c. 61. Spurn 29.8 (ER 89:10), Wass 3.9 (per P.Q. Winter). NORTHUMBERLAND S. Morpeth 21.9 male (ER 89:112). ROXBURGHS. Wells, near Denholm 21.9 (Berw. NC 40:232-3). ABERDEEN S. Ellon 3.9 (ER 88:299); Aberdeen n.d. (ER 89:243).

Herminia lunalis Scopoli (*tarsiplumalis* Hübner) (1) BERKS near Maidenhead, end August Wm. Parker, det. P.J. Baker. First British record (BENHS 10:110, ER 90:37).

1977

In this year the total of species listed, which includes 30 wholly immigrant and 8 probably or possibly so, was moderately good, though for most of them and for the commoner species the numbers of individuals were low. The immigrants compared favourably with the native species, for which a mild winter followed by a poor summer was generally unfavourable.

The most interesting occurrence was an early and certainly very long distance immigration which arrived in a warm south-west airstream on March 2 and 3. This gave records of *Rhodometra sacraria* (1), *Utetheisa pulchella* (1), *Heliothis peltigera* (2), *Eublemma ostrina*(3), *E. parva* (1), and of the commoner species *Nomophila noctuella, Cynthia cardui, Macroglossa stellatarum, Agrotis ipsilon, Autographa gamma, Plutella xylostella*. These were widely spread, most near the south coast from Cornwall to Sussex, but also inland to Oxford and through Wales from Glamorgan and Brecon to Anglesey. Some of them apparently lived for much of March; but there is no indication that any, except possibly *P. xylostella*, raised a generation here.

Other especially interesting records were of two *Hippotion celerio* in October, in Hampshire and Warwickshire, and singles of the rare pyralids *Paracorsia repandalis* in Dorset and *Diasemia repandalis* in Essex, *Lampides boeticus* in Surrey, *Coscinia cribraria* of the Continental form *arenaria* in the Isle of Sheppey, Kent, *Diachrysia orichalcea* in Sussex and *Macdunnoughia confusa* in Warwickshire. There were also unconfirmed reports of *Everes argiades* seen at Beachy Head and of *Minucia lunaris* elsewhere in Sussex. An example of *Danaus plexippus* identified in Gloucestershire on September 19 may have been either an immigrant or an escape or release.

Nymphalis antiopa made an interesting showing. Some fifteen seen between March 19 and May 22, and probably one very worn at Dunblane, Perthshire on July 7, had presumably over-wintered from 1976. Of those seen later, the first, in Derbyshire on July 28 may have been associated with a presumably eastern immigrant of *H. gallii*; those in Oxfordshire and Middlesex on August 16 and 27 fit well in date with the large influx of *Eurois occulta* at that time, and the one in West Kent on September 7 could have come with them. None were near places where over-wintered examples were seen.

Probable immigrants of *E. occulta* were more than the very large numbers of 1976. As recorded, they indicate several phases of immigration. Both the dates and the descriptions of four taken in Yorkshire, Hertfordshire and Monmouthshire suggest an unusual, probably south-easterly, origin. Records began again in south-east England and of large numbers in Lincolnshire from August 7 onwards until about August 16, accompanied by a few *S. interrogationis*. After this the focus moved to Scotland, with a still larger invasion from August 20 to 26, which included the fifth British capture of *Ochropleura fennica* and a probably immigrant *Apamea assimilis* in Aberdeenshire and extended to Inverness-shire and Orkney. All of these probably originated in Fenno-Scandia.

Mythimna vitellina, after some records in Devon in July, came in large numbers about October 9, mainly noticed in Hampshire and Sussex, although it extended in small numbers up the east coast, well inland to north Oxfordshire, and provided one record in Westmorland. There was also a further small wave in early November. The pyralid *Palpita unionalis* and the Geometer *Orthonama obstipata*, both above average numbers, shared in these invasions, the former being observed as far north as Westmorland and Inverness. *M. albipuncta* was also prominent in Sussex at same dates, and a dozen *Cyclophora puppillaria* mainly in Sussex but reaching to Oxfordshire between October 24 and 26. The other semi-scarce immigrants were, however, unusually scarce.

Almost all the common immigrants were much fewer than usual. *Vanessa atalanta* was hardly seen before July and seems to have been nowhere common except perhaps in late August in Cornwall; but in South Devon some lasted until the end of November, and at Torquay two were beaten out of a cypress hedge on Christmas Eve. *C. cardui* started brilliantly with records in five counties during and after the migration of March 2 and 3, but it was only once reported again until the last week of July, when there was a small influx which reached inland as far as Derbyshire. Five were seen, probably newly arrived with a single *Nymphalis polychloros*, at Folkstone, Kent on August 23, and a few, widely scattered, were seen in the next few days, when it was said to be common on the coast of Lincolnshire. The last records (very few) were in October. *Colias croceus* reports numbered less than twenty, thinly spread over seven southern counties between July 12 and October 20. *M. stellatarum* was seen in five places in four counties in the migration of early March, but thereafter only as scattered singles during the next four months. All four species were unusually scarce also in Ireland.

The common nocturnal moths were all below normal numbers except for *Phlogophora meticulosa*, of which migratory swarms of about 300 were reported in Oxfordshire on October 20 and of about 4,000 in four traps in Lincolnshire on October 13 to 15. It is noteworthy that trap records of all the other common species were highest either at that time or, as with *Udea ferrugalis*, in the first ten days of November.

The timing, content and origins of these immigrations may be summarised as follows. That of early March was an isolated episode, coming in sudden warm south-westerly air stream which succeeded a cold week in February; its content at this time suggests north Africa as its origin. Thereafter there was almost nothing of note before small numbers from July 5 to 10 and again in the middle and late in the month. These included the early *E. occulta* and *H. gallii*, possibly from the Ardennes or eastern France, *C. cribraria arenaria* and *Deltote bankiana* across the Channel to Kent, and also *Hyles lineata livornica, Agrius convolvuli, M. vitellina* and *Lampides boeticus* from further south. August was dominated in its middle weeks by the great invasion of *E. occulta* and its companions from north-east Europe; but in the last week there were also a few *C. cardui* and *A. convolvuli*. In September records were few and dates of arrivals not clear-cut; but they were mainly of insects of south western origin, including the only *D. orichalcea* of the year and some *A. convolvuli*. Much the largest immigration of the year came, probably mainly from the Mediterrean area and Iberia, in a long spell of south-east, south, and later south-west winds from October 7 to 31, and these influxes continued on a smaller scale in the very mild first ten days of November. In all they included some fifteen of the scarcer species and almost all of the commoners as a good conclusion to an otherwise limited and disappointing season.

Scarce Immigrants, 1977

Paracorsia repandalis (1) DORSET Radipole 8.10 (DNHAS 99:141). An extremely rare probable immigrant, of which there are old records of larvae on *Verbascum nigrum* in South Devon.

Diasemia ramburialis (1) ESSEX N. Writtle Agricultural College 25.10 (AME SmM Essex:143).

Palpita unionalis (*c*.20) DORSET Arne 18.10, 21.10 (DNHAS 99:141). HANTS S. Ashurst 25.10 (J.C.A. Craik, pers. comm.); Hayling Is. 19, 24, 27.10 (J.M. Walters, pers. comm.). SUSSEX E. Peacehaven 28.10 (C.R. Pratt, pers. comm.). SUSSEX W. Aldwick Bay 20/25.10 five (ER 90:7). KENT E. Dover 11.10 (ER 89:345). SURREY Wotton 24.10 (J.D. Holloway pers. comm.); Leigh 10.11 (BENHS 10:11). MONMOUTHS. Usk 16/20.10 six (BENHS 11:14). LINCS N. South Thoresby 21.8 male (R.E.M. Pilcher pers. comm.). WESTMORLAND Beetham 24/25.10 female (ER 90:81). INVERNESS W. Tornacarry, Glen Garry October (ER 90:261).

Lampides boeticus (1) SURREY Surbiton 29.7, seen in cemetery (R.E. Smith in L.N. 57:84).

Everes argiades (1) SUSSEX E. Beachy Head, Eastbourne n.d., caught by B. Whitby, (per M. Hadley, CRP Sx. 303 and pers. comm.).

**Nymphalis polychloros* (1) KENT E. Folkestone 23.8, seen with five *C. cardui* after strong south east wind (ER 89:348).

Nymphalis antiopa. 15 presumed over-wintered from 1976 (for 9 see Chalmers-Hunt (ER 89:248)). Add: PERTHSHIRE 5.7 Dunblane, one very worn, flying westwards (ER 89:316). SHROPSHIRE The Stiperstones, 1600 feet, 4.5; another (or the same?) seen near Ludlow (16 miles distant) 9.5 (ER 90:87). SURREY Netley 27.4 seen twice by John Cranham (ER 89:340). YORKSHIRE Burley-in-Wharfedale 1.5 seen on aubretia by J. Dixon (ER 89: 348). WORCESTERSHIRE Crews Hill, Alfrick 22.5, watched by J. Oliver, settled on bushes (J.E. Green, ER 89:348). 5 newly immigrant or possibly locally bred: DERBYSHIRE Elvaston Castle Country Park, 28.7 (M. Tong Derbys ES 47: 5). MIDDLESEX Northwood Golf Course 27.8 seen by a student (B. Goater, ER 89:348). KENT W. Orpington 7.9 seen in a garden (Mrs. E. Chandler ER 89:338). OXFORDSHIRE Chipping Norton 16.8 one seen on garden compost (P.J.D. Hugo, ER 92:154).

Danaus plexippus (1) GLOS S. Ryeford 17.9 one seen and identified (G.H. Mansell, pers. comm.). Possibly a release.

Cyclophora puppillaria (14) DORSET Radipole 19.10 (DNHAS 99:141); Wareham 18.10 ER 90:41). HANTS. S. Southsea 24.10 male (ER 90:56) Ashurst 23.10 (ER 90:140) Lymington n.d. (BENHS 12:3). SUSSEX W. Arundel 20.10, 24.10, 25.10, 26.10 (CRP Sx. 307). KENT E. Canterbury Field Centre 26.10 female, bright yellow form (ER 90:3). SURREY Bramley, 22.10 worn male (ER 90.157); Croydon, October (K.L.G. Evans pers. comm.). ESSEX S. Bradwell-on-Sea 22.10 male (ER 90.59). OXON. Caversham 24.10 (ER 90:64).

Rhodometra sacraria (7) SCILLY St. Mary's 25.10 (D. Agassiz, Lep. of the Isles of Scilly, 1981:12). DORSET Furzebrook 16.10 (DNHAS 99:141). SUSSEX W. Arundel 22.8 (J.T. Radford per CRP); Plaistow 16.8 (S. Church per CRP). KENT E. Olantigh 18.10 (C-H Kent 3:265). BERKS Botley 3.3 (ER 89: 126). WARWICKS Marton 28.10 ab. *labda* (ER 90:81).

Orthonama obstipata (58) DEVON S. Yarner Wood n.d. four (RISR). DORSET Furzebrook 28.10 two (DNHAS 99:141); Bridport 28.10 six males (J. Reid, pers. comm.). HANTS S. Ashurst 10.11 (J.C.A. Craik pers. comm.); Hayling Is. 17/27.10 six (J.M. Walters pers. comm.). HANTS N. Micheldever 12/27.10 two (ER 90:56), Crawley n.d. (ER 90:95). SUSSEX W. Arundel 8.10 two, 21.10, 22.10 (CRP Sx. 309, pers. comm.); Aldwych Bay 15/25.10 seven (ER 90:7). SUSSEX E. Peacehaven 18/27.10 six (ER 90:62); Northiam, n.d., three (CRP Sx:309). ESSEX S. Bradwell-on-Sea 17/27.10 four, two males, two females (ER 90.59). MONMOUTHS Usk 18.10 male (ER 90:136). WARWICKS Charlecote 21.10 female (ER 90:81). GLAMORGAN Oxwych n.d. nine (RISR). LINCS. N. Gibraltar Point 22.8 (R.E.M. Pilcher pers. comm.).

Agrius convolvuli (8) SCILLY St. Mary's 21.9, 23.9 (B. Skinner, pers. comm.). SUSSEX E. Peacehaven 2.9 female, 16.9 male at *Nicotiana* blooms (ER 90:62). HERTS. Cowheath Wood n.d. (Herts NHS 28(2):7). SHROPSHIRE Leighton, near Ironbridge 25.10 male (ER 90:85). LINCS N. Thoresby late 8, dead male on cattle grid (R.E.M. Pilcher, pers. comm.). ORKNEY Hoy, early October (R.I. Lorimer, pers. comm.).

Acherontia atropos (2) SURREY Wormley 27.4 female (ER 89:224). ESSEX S. Burnham-on-Crouch 6.6, trapped on apple tree grease band (ER 90:252). HERTS. Whitewell n.d. (Herts NHS 28:217).

Daphnis nerii (1) YORKS v.c. 62 Wilton, Teesside 23.9 R. Wilson (per P.Q. Winter).

Hyles euphorbiae (1) MIDDX. Feltham 20.8, female caught at dusk in garden by Garry Bean (P.W. Cribb, AES Bull. 37:25). Possibly first county record.

Hyles gallii (3 moths, 3 larvae). SUFFOLK E. Felixstowe 8.7 one seen (Suff. NH. 17:385-6). WARWICKS 26.7 Charlecote female (ER 89:283); Coventry early 9 three larvae (ER 90:81). LANCS S. Hoghton, 10.7 (ER 89:283).

Hyles lineata livornica (2) NORFOLK E. Hickling 3.8 (ER 89:342). LANCS N. Heysham 5.7 (BENHS 11:6).

Hippotion celerio (2) HANTS N. Micheldever 14.10 (ER 90:56). WARWICKS Marton 28.10 with *R. sacraria* (R. Allen per A. Gardner, ER 90:81).

**Lithosia quadra* (13) DORSET Bridport 28.10, six males (J. Reid, pers. comm.). HANTS S. Hayling Island 17/27.10 six singles (J.M. Walters, pers. comm.).

**Coscinia cribraria arenaria* (1) KENT E. Isle of Sheppey 5.7, (G.N. Burton, BENHS 11:4, pl. 1; ER 89:322).

Utetheisa pulchella (1) ANGLESEY Llanfair P.G., first week March, found dying in a garden (D. Jones in Mrs. M.J. Morgan, Ent. Gaz. 33:117).

Ochropleura fennica (1) ABERDEEN N. Barthol Chapel 20.8, with *Eurois occulta* (C. Marsden & M.R. Young, ER 90:84). Fifth British capture.

**Eurois occulta* (*c*.90) SUSSEX E. Peacehaven 8.8 (ER 90:62). KENT E.

Dymchurch n.d. (C-H Kent 3:244). SURREY 13.8 Purley worn male (ER 89: 283). HERTS Much Hadham 16/17.7 worn male (ER 90:68). NORFOLK E Cley-next-Sea 14.8 two (ER 90:87). MONMOUTHS. Abertillery 18.7 B. Goater, pers. comm.). WARWICKS Charlecote 17/18.7 (ER 89:283). SHROPSHIRE Pontesbury 15.8 (ER 90:85). LINCS N. South Thoresby 7/16.8 six; Gibraltar Point 11.8; near Lincoln 11/20.8 three (R.E.M. Pilcher pers. comm.). DERBYS Matlock 11.8, 28.8; Middleton-by-Wirskworth 14.8 (Derbys. ES 50:13). LANCS S. Hoghton 23.8 two pale grey (ER 90:19). YORKS v.c. 61 Malton 8.7 female: offspring reared, dark greyish; Filey 14.7 male parent of these (BENHS 12:5). WEST Lothian Winchburgh 13.8 two (BENHS 11:7). ABERDEEN S. Fintray 20.8 ABERDEEN N. Barthol Chapel 20.8; Udney 21/22.8 ten, 25/6.8 three C. Marsden & M.R. Young, ER 90:84); New Dee Rothampsted trap 15.8 four 21.8, 23.8 (R.M. Palmer pers. comm.). DUMBARTONSHIRE Gartlea, August, several of immigrant form (Christie: Lomond: 22). INNER HEBRIDES Isle of Canna 11.8 (J.L. Campbell pers. comm.). INVERNESS E. Cairngorms National Nature Reserve, large numbers of the pale four (ER 91:242). ORKNEY Scorradale 13.8 three pale, worn, and later – 27 in all (R.I. Lorimer, pers. comm.).

Mythimna albipuncta (*c*.20) CORNWALL Lizard *c*. 21.8 three (B. Goater pers. comm.). DORSET Furzebrook 16.6; 11.9 (DHNAS 99:140); Swanage, 18.9, two (ER 90:54). ISLE OF WIGHT Freshwater 10.7 (BENHS 11:6). HANTS S. Minstead n.d. with *M. vitellina* (ER 90:154). SUSSEX W. Aldwick Bay 8.10 (ER 90:7); Arundel 8/20.10 four, 2/9.11 five; Worthing 9/23.10 four (CRP Sx.: 324). SUSSEX E. Peacehaven 12.9, 28.9, 14.10 (ER 90:62); Eastbourne 15.9, male (ER 90:7). KENT E. Olantigh 23.10; Dover 11.10 (C-H Kent 3:247).

Mythimna vitellina (*c*. 70) DEVON S. Malborough 13.7, 14.7 (ER 90:7). HANTS S. Ashurst 4.10 (ER 90:140). Winchester 9.10 (ER 90:82). Hayling Is. 9.10 two, 10.10, 2.11, 6.11 three, 7.11 two (J.M. Walters pers. comm.); Minstead n.d. one (ER 90:154). HANTS N. Micheldever 12/27.10 six very pale (ER 90:56). SUSSEX W. Aldwick Bay 9/25.10 five (ER 90:7); Arundel 8/20.10 four, 2/9.11 five (J.T. Radford per CRP); Worthing 9/23.10 four (Odell per CRP). SURREY Nower Wood 15.10 male (ER 90:55); Thorpe 21.10 (BENHS 11:3). ESSEX S. Bradwell-on-Sea 14.10 male, 20.10 female (ER 90: 59). BERKS. Maidenhead 2.10 dark male (ER 90:152). OXON. Steeple Barton 22.10, 30.10, males, pale (ER 90:53). SUFFOLK E. Walberswick 16.10 (ER 91:24). NORFOLK E. Cley-next-Sea 30.10 two (ER 90:87). WESTMORLAND Beetham 21.10 male (ER 90:81).

Mythimna unipuncta (2) SUSSEX E. Peacehaven 16.10, 19.10 (ER 90:62).

**Apamea exulis assimilis* (1) ABERDEEN S. Udny 25.8 in farmland, trapped with *E. occulta*; possibly immigrant (C. Marsden & M.R. Young, ER 90:84).

Helicoverpa armigera (4) HANTS S. Ashurst 17.10 (J.C.A. Craik, pers. comm., ER 90:140). SUSSEX E. Eastbourne 19.10 (ER 90:74). SURREY Addiscombe 22.10 male (ER 90:55). SUFFOLK E. Walberswick 7.10 (Suff. NH 17:227).

Heliothis peltigera (2) Leigh 2/3.3, 4/5.3, two worn males, pale (ER 89: 126).

Eublemma ostrina (3) DEVON S. Beer 4/5.3 (ER 90:126, pers. comm.). SUSSEX W. King's Park Wood, Plaistow 3.3 (S. Curch per de Worms). BERKS Botley 3.3 (ER 89:126).

Eublemma parva (1) SOMERSET N. Weston-S-Mare 2/3.3 (C.S. Blathwayt, ER 89:126, identity confirmed by pers. comm.).

**Deltote bankiana* (1) KENT E. Dymchurch 23.7, one fresh (C-H Kent 3:259).

Trichoplusia ni (1) Co. CORK CENTRAL Fountainstown 8.10 (INJ 20:301, pers. comm.).

Diachrysia orichalcea (1) SUSSEX E. Ringmer 19.10 (ER 90:85).

Macdunnoughia confusa (1) WARWICKS. Marton 24.10 (G. Robson per

A. Gardner, ER 90:81). First county record.

**Autographa bractea* (1) SUFFOLK E. Needham Market 16.8 (Suff. NH. 17:285-6). Third Suffolk record.

**Syngrapha interrogationis* (2) ORKNEY Orphir 14/15.8 (R.I. Lorimer pers. comm.). LINCS N. South Thoresby 16.8 (R.E.M. Pilcher, pers. comm.).

Minucia lunaris (1) SUSSEX E. Stapleford, early June, one trapped but released: identified from illustration in South (T. Newnham, quoted ed. ER 90: 123).

TABLE 1

Summary of species and individuals recorded.

	Wholly immigrant species		*Probable Immigrants of resident species*		*Common immigrant species*
year	species	individuals	species	individuals	individuals of 11 spp.
1969	34	*c.* 4000	7	11	very many
1970	18	*c.* 160	6	21	average
1971	20	*c.* 85	6	11	few
1972	14	81	6	34	very few
1973	20	*c.* 460	12	38	many
1974	19	*c.* 85	5	9	few
1975	19	*c.* 115	4	9	average
1976	32	*c.* 1200	21	*c.* 200[1]	very many
1977	30	*c.* 250	8	*c.* 110[2]	few

[1] includes *Eurois occulta c.* 70, *Heterographis obitella c.* 100. [2] includes *Eurois occulta c.* 90.

In the whole period 60 wholly immigrant scarce species, and 28 probably immigrant resident species, are listed. The 11 common immigrants include *Phlogophora meticulosa*, also resident.

The records listed here are believed to give broad indications of the extent of the annual fluctuations of immigrants generally and of particular species, but little weight should be attached to precise numerical comparisons. This is because the levels of observation, recording and availability of records varied considerably during these years, being probably lower from 1971 to 1975 than earlier or later.

The author wishes to thank the many people who have helped him in the compilation of these lists, which are inevitably still incomplete. He hopes that readers who have or know of records of the scarcer immigrant species which are not mentioned in them will communicate their information to him, with a view to possible publication in a supplement.

ADDITIONAL ABBREVIATIONS

Macrolep. Glos.	A.R. Richardson, 1973. A third supplement to Donovan's *Catalogue of the Macrolepidoptera of Gloucestershire.*
Middle Thames NHS	Middle Thames Natural History Society records.
Trans. Lincs. N.U.	Transactions of the Lincolnshire Naturalists Union.
Suff. NH.	Suffolk Natural History.
YNU Rep., Naturalist	Reports of the Yorkshire Naturalists' Union (in The Naturalist).
n.d.	No exact date available.

THE REVIVAL OF THE SILK INDUSTRY IN THE BASSES-CÉVENNES

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INTRODUCTION

For the last ten years there has been a slow but steady revival of the defunct silk industry in the Basses-Cévennes, France. Following the collapse of the previous silk industry earlier this century with the advent of rayon and nylon, the local townships of Sumene and Ganges have become centres for manufacturing underwear and other garments using imported cotton and silk.

The current revival of silk production does not seek to compete with this local industry, but instead it seeks to produce quality silk products for the top end of the clothes market. It has the advantage that the silkworm-rearing rooms (magnaneries, see Feltwell, 1982) are still present in many of the farmhouses and that it can be revitalised as a cottage industry. The future market for quality silk products will undoubtedly determine the viability of Cévennes silk.

The silk societies

There are several silk societies (Table 1) which act as co-operatives or co-ordinators in the silk revival and considerable investment has already been made into elaborate plant for processing.

TABLE I Silk societies

A.D.S.	*L'Association pour le Développement de la Sericiculture en Cévennes*
A.T.I.S.S.O.F.	*Association des Tisseurs en Soie de France*
C.A.T.	*Centre d'Aide par le Travail*
S.I.C.A.	*La Societe d'Interet Collectif Agricole Soie-Cévennes*

At the village of Monoblet near St. Hippolyte du Fort A.D.S. has its museum which was first opened to the public in 1982. Here one can see visual aids on silk production and the manufacture of silk during certain months of the year, mostly during the spring and early summer. A.D.S. was founded in 1977 and encourages local people in each of the *départements* of Ardeche, Drôme, Gard, Herault and Lozere to produce cocoons for the factory. They produced 1½ tonnes in 1978 and the factory can now handle 20 tonnes of fresh cocoons each year.

In 1980 S.I.C.A. was established. It controls the price of silk each year. The society includes producers and weavers, with the producers in the majority. Membership of S.I.C.A. is currently 500 francs each year (1982). They are financially supported by the Ministry of Agriculture and the local *Conseil Regional Languedoc-Roussillon* and the *Conseil General du Gard*.

At the other market town of Le Vigan, C.A.T. caters for the local producers as well as having factories for *filature* and *dévidage* processes. It also possesses 10 ha of mulberry trees. Twenty different silk products are made in the factory and some of them are made from imported Italian silk at a cost of about 420 francs for a 1 kg cone. This is sufficient to make three ladies' pullovers which sell in the Paris market for five times this value. A.T.I.S.S.O.F. is based at St. Jean du Gard and represents a group of weavers.

There are considerable difficulties in establishing a silk industry in the face of cheap imported silk, but the creation of a tourist demand for pure French silk products plus the new possibilities with the more prolific mulberry varieties have made the project viable. The revival risks being labelled as an artisan indulgence and in one sense is not really a Cévenol revival as it is not necessarily run by

Cévenol people in the heart of the Cévennes. The true Cévenol people remember all too well the great time and energy expended in the *magnanerie* and are not likely to return to it lightly.

A NEW MULBERRY, LE KOKUSO 21, AND ITS IMPLICATIONS

A new variety of introduced mulberry has been responsible for stimulating the revival of the Cévenol silk industry. In 1956 the *Centre Agronomique de St. Christol-lès-Ales* started field trials with a new mulberry variety from Japan called *Kokuso* and one of the cultivars called *Kokuso 21* was chosen as it was most suitable for the climate of the mountainous Cévennes.

The *Kokuso 21* is a small bush tree which shows a great degree of versatility. It can be grown as a small tree (*haute tige*), as a goblet bush (*nain, gobelet*), as a cordon (*nain, cordon*) or as a bush (*prairie*) in which case they come into maximum productivity after 22, 10, 10 and 6 years after planting respectively. The number of specimens which can be planted per hectare is 204, 2,500, 2,500 and 20,000 respectively. Irrigation increases productivity from 12-14 tonnes per hectare to 16-18 tonnes per hectare and in some cases up to 50% more productivity can be achieved. Manuring at the rate of 20-30 tonnes per hectare also increases productivity. The trees are most usually raised from cuttings and are for sale in the Monoblet museum for 25 francs each (1982).

This new mulberry cultivar thus confers two main advantages on the revival of silk in the Cévennes: first, that there are now many more mulberry trees which can be put onto the available land and second, that as the trees are so much smaller than the conventional white mulberry it allows the same number of leaves to be picked in a quarter to a fifth of the previous time.

REARING SILKWORMS, THE NEW METHOD

The traditional *magnanerie* is still used in places where it is in a fit state. Production of cocoons is still run on a co-operative system with participating members paying an entrance fee, the silkworms being reared at home. There are though some new purpose-built buildings such as the one at *St. Christol-lès-Ales*. It is recommended that rooms that face north or east are preferable to other directions as the winds from these directions are 'healthy' (*sic*).

Disinfecting the room and apparatus is recommended with a formaldehyde preparation for each 20 m^3 which is burnt in the closed room for 24 hours; or disinfection with 10% javel water if the room cannot be sealed.

Controlled-temperature incubators have replaced the constant temperature of madame's bosom or the vagaries of the inglenook fireplace. The beds are now made of fine wire-netting stretched across a wooden framework instead of matted cane but they are arranged in the same tier system.

A higher rearing temperature of 21-24°C is recommended than in olden times as it decreases the development time and therefore decreases the period when the larvae might be susceptible to disease. In the fifth stage the temperature is reduced to 21-22°C. For the first instar the mulberry leaves are broken up into little pieces and laid on the silkworm beds; this is a new technique and is presumably designed to increase the surface area available to the larvae and decrease the number which would not otherwise start eating a leaf. Aeration of the rearing room is essential for the millions of larvae and the humidity must be maintained between 60-80% RH.

The time in the five instars, at the range of temperatures recommended (no accurate figures are given) is 4,3,5,6 and 8 days respectively, i.e. a total of 26 days for development.

At pupation the traditional 'hats' of heath have now been replaced by 'plastic hedgehogs' which look like plastic bristles on a coarse brush into which the larvae crawl and weave their cocoons. After pupation the cocoons are easily detached from the smooth plastic.

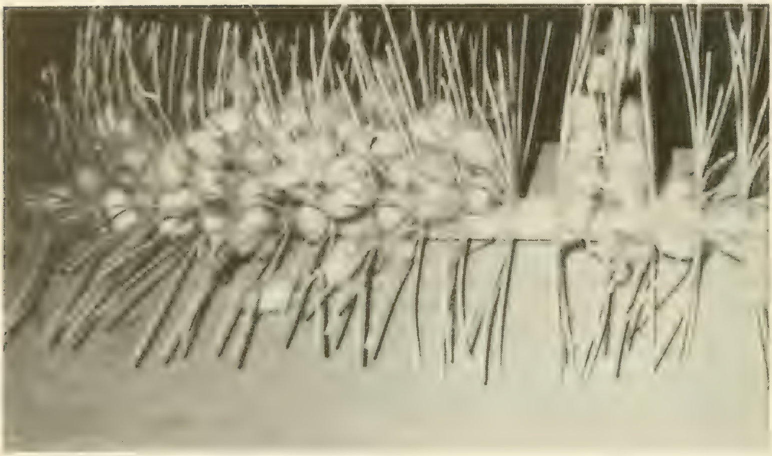

Fig. 1 Half of a "Plastic Hedgehog" containing cocoons.

Those who are interested in the statistics of keeping silkworms might find Zoë Lady Hart Dyke's figures from her silk farm at Lullingstone, Kent useful (Hart Dyke, 1949): One ounce of eggs contains about 35-40,000 eggs and every 100 full grown larvae will need three square feet of space. If 60,000 cocoons are being stored they will need 50 cubic metres of space. Critical problems can arise if not enough mulberry leaves are available to feed the larvae. In France it is said that 33 grams of eggs would require 2 tonnes of leaves and that it would take 8 days to collect 1,500 kg. First establish your mulberry orchard! In the Cévennes, the cooperative have increased the rate at which they will purchase your cocoons from 43 to 72 francs/kg from 1978 to 1982.

PROCESSING THE SILK

The modern method of processing the silk can be seen in action at the museum of *Sericiculture en Cévennes* at Monoblet where special machines have been imported from several countries. The different stages in the production of silk are shown in figure 2 and figure 3. Essentially the process of preparing silk follows the same processes used in the cotton industry in Britain.

Stage 1 Etouffage (steaming)

Sufficient cocoons of both sexes are put aside to assure next year's egg supply. The living pupae within the cocoons are killed off otherwise the imagines would break through and dissolve the continuous silk thread at eclosion. The pupae are killed by subjecting them to a temperature of 90-110°C in a chamber and then at 40-60°C for several hours in another during which they dehydrate to one third of their body weight. The cocoons can then be stored for future use.

Stage 2 Filature (collecting threads)

Collecting the fine silk threads from each of the cocoons involves three stages in this one process of *filature*. The cocoons are first plunged into warm water at 60-70°C, then into boiling water for two minutes, followed by beating with a battery of rotating brushes which are made out of dried bundles of rice stems. This is done in cold water. In old times rice stems were presumably unavailable (rice is now grown extensively in the Camargue) and Rye Grass, called *chiendent, (Lolium perenne)* may have been used. There are always loose bits of silk thread which detach themselves at this stage and these are collected and thrown away. This last part is called the *purgeage* and the waste silk is called the *frison.*

Stage 1	*Etouffage*	Killing off pupae by dehydration in hot air
Stage 2	*Filature*	Warm water bath at 60-70°C
		Boiling water bath
	Purgeage	Silk threads collected by brushes
Stage 3	*Dévidage (Enroulage)*	Unwinding silk threads on machine
Stage 4	*Décreusage* incorporating *Flottage* and *Bobinage*	Winding silk onto bobbins
Stage 5	*Moulinage* and *Assemblage*	Tensioning silk
Stage 6	*Teinture*	Dyeing
Stage 7	*Ourdissoir* and *Tissage (Tricotage)*	Weaving

Fig. 2 Preparing Silk from Cocoons

Stage 3 Dévidage (unwinding)

Having collected a handful of threads from several cocoons the worker places the cocoons in a long trough of water where the threads are taken up automatically and unwound (*enroulage*) (figure 3). Up to this stage the silk is raw and is known as *soie grège* and it is in the form of a hank.

Stage 4 Décreusage (winding)

The hank of silk is now put onto large wheels and run onto bobbins (*bobinage*). Three *fils de soie* are run together and twisted to make a *fil pour le tricotage* which is run onto bobbins. The *fil pour le tricotage* will have a certain thickness of *denier* which is measured in microns and this is directly related to its resistance to breaking. The *denier* value might be 12 at this stage. Each bobbin contains a kilogram of silk.

Stage 5 Moulinage (tensioning)

The bobbins of silk can now be put on a machine which tensions up the silk fibres and increases the *denier*. Between 150 and 1,000 twists per metre of silk can be applied.

Stage 6 Teinture (dyeing)

Dyeing can be carried out at three stages but whenever it is done it adds a micron or so to the diameter and thus increase the *denier*. Hanks of silk and the finished garment may be dipped in dyes or the *fil pour le tricotage* is passed from one bobbin to another via a vapouriser.

Stage 7 Ourdissoir – Tissage (weaving)

The tensioned silk is run onto smaller bobbins and onto a large drum (*ourdissoir*). If an article such as a scarf of 24 *denier* is required two bobbins of 12 *denier* would be run onto the drum to make the material ready for weaving. The prepared material is called the *métier à tisser*.

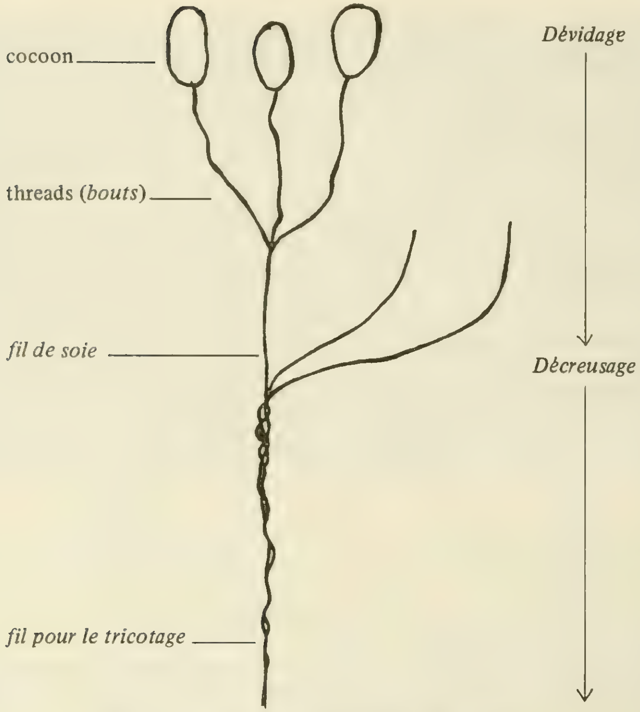

Fig. 3 Processes of *Dévidage* and *Décreusage*

CÉVENNES SILK PRODUCTS

The prices of the new Cévennes silk products reflect the demands of the tourists for whom they have been developed; 1,850 francs for a taffeta dress, 240 francs per metre for dress material (different colours), 170 francs for ties, 90 francs for bow ties, 180 francs for scarves, and 14 francs for reels of silk (225-400 *denier*) or 26 francs for 700-800 *denier*. One only hopes that in a world where cheap imported silk products are for sale in every high street and supermarket there is a place for original Cévennes silk.

ACKNOWLEDGEMENTS

I would like to thank Jacques Lhonoré and Patrick Ducros for explaining some of the processes of silk production and the staff of the Monoblet museum for answering some of my queries concerning machine production of silk.

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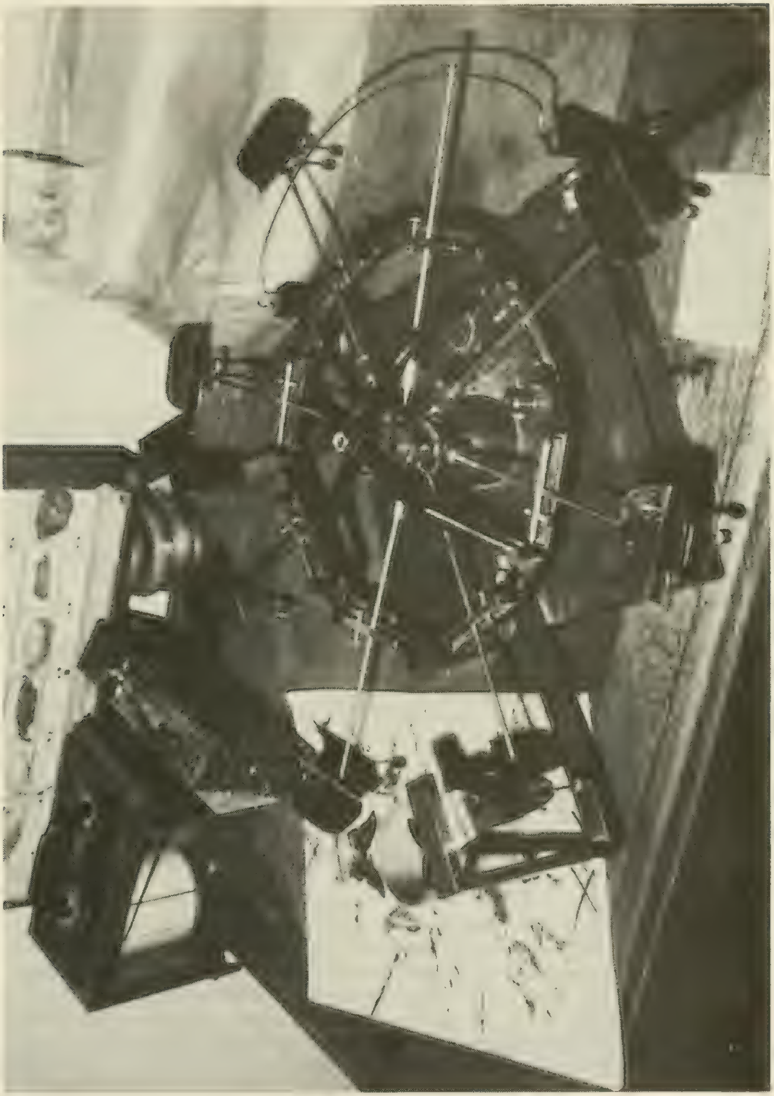

Fig 4 An ingenious apparatus calibrated to sex silkmoth pupae by weight: if the balance falls it's female. Used by six women sorters.

TRADITIONAL REARING OF SILKWORMS IN THE BASSES-CÉVENNES

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AIMS

This article seeks to explain how the annual rearing of silkworms was carried out in a typical farmhouse community in the Basses-Cévennes in France. Production of cocoons was an integral part of life on a Cévennes *mas* (a collection of buildings serving both domestic and animal purposes; equivalent to a farm) and it was fitted into the daily routine of looking after sheep, goats, rabbits, chickens, pigs, vines, potatoes and collection of fuel and timber. Some of these routines were inter-related.

The article presents a much more detailed account of what happened in each Cévenol *mas* than has been covered elsewhere, and is complete with everyday problems of production, superstitions and local customs.

PREVIOUS STUDIES

General accounts of silk production in the Cévennes have been given by Maurice Castanier in the local journal *Le Suménois* (based in the town of Sumene, Gard) and in the *Revue du Parc National des Cévennes*. Exhibitions of silk production can be found in the folk museum at Le Vigan, the new museum and silk factory at Monoblet near St. Hippolyte du Fort and the new *Musée des Vallées Cévennes* at *St. Jean-du-Gard*. The *Association pour le développement de la Sericiculture en Cévennes* (A.D.S.), which opened the museum in 1982, has also produced an updated edition of *Sericiculture en Cévennes* which, although it is very detailed, does not cover the finer details of family production of silk.

It is instructive to see from an historical point of view how production of silk locally in the Cévennes played such an important part in the gross national product.

HISTORICAL

The first mention of silk in the Cévennes is in the thirteenth century, but since then the industry has been revived twice; once in 1660 when mulberry trees were distributed free in the reign of Louis XIV following a decline caused by the Camisard wars, and again in the early 1700's after a severe frost in 1709 which killed thousands of chestnuts on which the people of the Cévennes were so dependent.

Between 1753-1761 415,000 mulberry trees were planted in the environs of Vallerauges below Mt. Aigoual and these helped to establish the Cévennes as the major producer of silk in France. The market town of Ganges was a principal site for silk production. Castanier records that in 1788 there were 36 factories containing 4,000 machines looked after by 12 chief mechanics assisted by 30 workers and 300 ladies who prepared the designs on the stockings. The introduction of the steam engine in the nineteenth century boosted production, which rose from 950,000 kg in 1820 to 26 million kg in 1853.

The Golden Age of silk in the Cévennes did not last long because of cheap imports from the East but at the same time the Cévennes silkworm stock was being weakened by various diseases, no doubt brought on with too much inbreeding, and in some valleys total mortality of larvae occurred.

Louis Pasteur, the expert on pathogenic diseases, was called in to help by a desperate Cévenol people. Some 3,574 people petitioned the Minister of Agriculture that Pasteur should visit them and in 1869 he came to St.

Hippolyte du Fort, not far from Ganges. One can still see the house and commemorative plaque showing where he resided. Pasteur showed that the disease was carried from one generation to the next via the egg. Later the disease was shown to be due to a protozoan pathogen called *Nosema bombycis* but Pasteur solved the problem by quarantining the gravid females and only allowing uninfected ones to breed.

Silk production in the Cévennes was soon to die off completely in the first half of this century. There are still many people in the Cévennes who can recount their experiences with the *ver a soie* and can remember vividly all the hard work it involved. Memories of the old system of silk production are still retained in the local schools and in many, silkworm eggs are still given out each year in class for all the children to rear at home. Many of the old mulberries survive, although thousands have been cut down for fuel and their gnarled and pollarded trunks are highly characteristic of the Cévenol *mas*. Today the broad leaves of mulberry serve as useful forage for the goats.

Now that economic production of silk in the Cévennes has been dead for nearly fifty years there is a revival of silk production which is gaining momentum. This is the subject of my next article.

THE MAGNANERIE METHOD

Silkworms were traditionally kept in a room called the *magnanerie* and every Cévennes *mas* had one. This modern name derives from the patois *lo manhan* which became known as *lou magnan* and thus *magnanerie*. The *magnanerie* may have been a converted outhouse or a converted chestnut-roasting room (a *clede à châtaigne*) which would have been unused after the frost of 1709. In other cases rooms were especially built on the *mas* to house silkworms; extra storeys were added but they were not always built very sturdily for today many of them have fallen in or are in bad repair.

All this accommodation for the silkworms was provided for the four to five weeks it took between hatching of the eggs to production of the cocoons. In a typical hamlet three adults would work for two hours each, three times a day, at morning, midday and evening, to produce about 90 kg of cocoons. The annual income from the cocoons represented about 60-70% of each household's livelihood; the remainder was made up from bartering goods. Some statistics of production which are quoted by A.D.S. are worth mentioning here; that a certain M. Olivier in 1843 produced 2,500 kg of cocoons on 340 silkworm beds each of 5 m^2 using only 60 ounces of eggs. After Pasteur's intervention production was able to rise from about 1.3 kg from each gram of eggs in 1886 to 2 kg of cocoons in 1924.

Several weeks before the eggs of the silkworm were received fumigation of the whole room and equipment was done using formaldehyde. The *magnanerie* was sealed for two days, then allowed to air for fifteen days afterwards.

Silkworm beds (*los canis*) (2½ x 1½ m) were purchased from craftsmen in the local weekly market. They were made of split bamboo, otherwise called *Canne de Provence (Arundo donax)*, which were woven in rows of four to make the body of the bed supported on chestnut sticks. The lip of the bed was made of a board about 8 cm high. The number and size of beds kept in a *magnanerie* depended on the size of the room but they were stacked about 45 cm apart, perhaps six beds from floor to ceiling with a small service space for walking between the stacks of beds. Each bed was supported on four pegs set into upright pieces of wood.

Silk was produced on a cooperative system. Packets of eggs were given to each household at a time when the mulberry leaf buds were about 2 cm long (about the beginning or middle of April) and according to the expected production of each household the eggs were given out free in units of an ounce. The eggs were then carefully wrapped in a handkerchief and placed in madame's cleavage so that they could incubate at a constant temperature. Alternatively the eggs could be placed in a small pouch which was tied around the neck; one is on view in the museum at *St. Jean-du-Gard.* At night they would be placed at the foot of the bed between the blanket and eiderdown. Incubation took about 15 days. Each day the eggs would be unwrapped from the handkerchief, a piece of gauze placed over them and the new larvae encouraged to walk through the gauze onto a mulberry leaf placed on top. The remaining unhatched eggs would be rewrapped and returned to the safety of madame's bosom. In other households the eggs were carefully stored in the warmth of the large Cévenol chimney.

The first-instar larvae were then kept on small beds on the floor of the warm kitchen until their first moult, after which they were transferred to the *magnanerie*. The fires were kept in at all times using green oakwood and a thermometer was used to ascertain that the temperature remained between 18-19°C. There was always the possibility of a late frost in the mountainous Cévennes and thus the danger of chilled larvae and of the young mulberry leaves being killed as well. Such a year was 1956 when all the larvae died and there was no income whatsoever from silk. This spelt the end of silk in the Basses-Cévennes.

At the start of the season mulberry leaves were individually plucked from the trees; a very tedious job, and were dropped into a large sack which was tied round the waist. If each leaf was twisted first to the right and then to the left it could be detached without damaging the nodal bud, which could produce another leaf. Later in the season all the leaves along one shoot could be removed in one action of sliding the finger and thumb up the stem; alternatively all the shoots of leaves could be cut off using a small sickle (a *serpete* or "*un boulam*" in patois). This last method was the least arduous and the branches were then laid across the beds. In some years some households did not have enough leaves for their own production and the rights to neighbours' mulberry leaves were sold off between families. In the 1840s 100 kg of leaves was worth about 25-30 francs of that period. During collection the leaves tended to warm up under the Midi sun and before feeding to the larvae they had to be laid out on the ground in the shade and turned to cool them. Three times a day mulberry leaves were collected and placed on the beds. Care had to be taken with putting the leaves on the larvae as on occasions the point of the leaves would pierce the body of the large larvae. Such an injured larva with its haemolymph leaking from the wound would die quickly. The sound of silkworms eating was quite astounding and a whole *magnanerie* full of them sounded like 'falling rain approaching over the canopy of chestnuts'.

All the frass of the silkworms was removed immediately after each of the four moults. In order to avoid throwing silkworms and frass away at the same time, fresh leaves were placed on the larvae and, when they had walked onto the leaves they were collected and removed temporarily from the beds. Perhaps 10% of the late developing larvae were accidentally removed at each stage. The frass was used as a fertiliser in the garden and was deemed especially good for the onions.

There were several diseases the silkworms could catch and in some years the whole stock succumbed and had to be thrown away with great effect on the livelihood of the Cévenol people. The three main diseases were the *pébrine*, the *grasserie* (caused by over-heating) and the *flacherie*, a kind of diarrhoea. The *pébrine* was a particularly nasty disease when the whole of the larvae would turn yellow and putrify with such foul smells that they are clearly remembered forty years later.

When the silkworms were becoming fully fed branches of *bruyère* – in actual fact the Tree Heath, *Erica arborea* – were interlocked on the beds in a hat shape so that there was plenty of room for the larvae to spin up. The heath had to be cut about 14 months before use and before it flowered so that it could be laid out and dried. After the larvae had pupated in the heath branches the cocoons were easily pulled off.

Attention had to be paid to mice which were particularly fond of pupae so that the household cat was allowed access to the *magnanerie* at night. Ants could also be a problem and these were dealt with by putting cinders down their holes or across their paths. The *maganerie* had to be bird and chicken tight and there was the occasional possibility that toads would gain access and eat larvae.

Cocoons were ready for sale on about the 23rd of June each year and on this day an agent from the cooperative would visit the village with his scales and wagon. Everyone would bring their sacks full of fresh cocoons in from the surrounding hamlets to be weighed. The 'soft' cocoons, i.e. those which had not been given enough time for pupation were weighed separately. All the cocoons were then taken away to the big factories in the Cévennes to be processed. The price of the silk was fixed at the grand fair of 24th August at Ales for the Cévennes and the 22nd July at Beaucaire for Provence. So in the Basses-Cévennes the producers had to wait five weeks for their money.

The 24th of June is a significant date as it is the fete of St. Jean. Thus the production of silk in the Cévennes was a springtime occupation which was completed by the 24th which signified the change from spring into summer. Traditionally large fires were burnt and women would leap across the flames from spring into summer.

One of the very local customs recounted was the action which had to be taken to avoid the reputed deleterious effects of thunder on the silkworms. A spade full of embers from the fire into which one or two spoonfuls of sugar had been sprinkled, had to be carried around the *magnanerie* so that the sweetness could be imparted into the silk. During thunderstorms the larvae would stop feeding and raise their heads. This would indicate that the larvae are sensitive to atmospheric pressure, a fact noted in other species. Another curious observation is that the silkworms do not like tobacco smoke and will stop feeding. This again is true of several other Lepidoptera.

ACKNOWLEDGEMENTS

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LARVAL COLOUR VARIATION IN *PHLOGOPHORA METICULOSA* (L.) (LEP: NOCTUIDAE). PART I: THE VARIATION, AND ITS CONTROL IN INSTARS 1–3.

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SUMMARY

One of the most widespread types of variation in the Lepidoptera involves the occurrence of both green and brown or blackish larval forms. Larval colour variation in the moth *Phlogophora meticulosa* was studied. The methods used to quantify the colour variation are described. All larvae in the 1st and 2nd instars are normally green, variation in the exact colour can be defined in terms of chroma, hue and shade. In the 3rd instar, six colour types occur, these being; third instar green, brown, olive, plain yellow, yellow-green and yellow-brown. In the 4th and 5th instars, the same six colour types occur with the exception that third instar green is replaced by another green colour type defined by different chroma, hue and shade limits. The proportions of the colour types in the later instars vary from one instar to the next. All larval colour changes in the later instars occur at ecdyses. Experimental evidence is given which indicates that 1st, 2nd and some of the 3rd instar colour variation is controlled by the colour of the food ingested. It is suggested that the variation in the later instars is controlled genetically. Evidence supporting this suggestion will be given in an ensuing paper.

INTRODUCTION

A great deal of experimental research has been carried out on variation in the colour and pattern of the imagines of Lepidoptera. In contrast, there has been relatively little experimental work on variation in the colour of their larvae, even though such variation has been noted in many species (e.g. Cockayne 1928, Ford 1955, Robinson 1971).

One of the most widespread types of larval polymorphism is the occurrence of both green and brown or blackish forms. This type of polymorphism is most common amongst the Noctuidae and the Geometridae. In many species of Geometridae with arborivorous larvae such variation is influenced by the background colour of their immediate surroundings. (Poulton 1885, 1886, 1887, 1892, 1893). However, Poulton found no indication that larval colour in the Noctuidae was influenced by surroundings.

The work described in this paper is part of a study aimed at investigating in depth the causes and consequences of larval colour variation in a species of noctuid moth which has both green and brown forms.

MATERIALS AND METHODS

The ecology and larval morphology of over eighty species of Lepidoptera were considered before *Phlogophora meticulosa* (L.) (the Angleshades Moth) was selected for this study. It was chosen because of:

> the larval variation it exhibits; the ease with which it may be obtained and bred in large quantities; and the lack of true diapause at any stage in its development, which meant that a relatively large number of consecutive broods could be reared in a short time.

The original stocks used in this study were obtained from females captured in a light-trap. All these females were taken either in the grounds of the Zoology

Department, Royal Holloway College, Englefield Green, Surrey, or on Picket Hill, near Ringwood, Hampshire.

The females were placed in circular acrylic boxes in which they readily laid eggs. Nine days after the first eggs were laid, a few leaves of common sorrel (*Rumex acetosa* L.) or sheep's sorrel (*R. acetosella* L.) were put in the box.

As soon as larvae hatched they were transferred to similar boxes, 25 larvae being put into each box. When the larvae reached the 5th instar a thin layer of soil and leaf litter was placed on the bottom of the boxes for larvae to pupate amongst. The larvae were fed on sorrel throughout, the foodplant being renewed every 12 to 48 hours depending on the temperature and humidity.

When significant colour changes occurred, so that a box contained larvae of two distinct colour-types, these were then separated so that reverse colour changes could be detected.

The boxes were kept in an insectary during the summer months and in a heated green-house during the winter so that the temperature did not fall below 5°C.

After the larvae had pupated, the pupae were removed and those which were required for further breeding purposes were placed in small wood and muslin emergence cages. These were specially designed with partitions, so that all the pupae and resulting adults would remain separate. Those which were not needed were placed in large emergence cages and the resulting imagines were marked with cellulose paint and subsequently released. Five times the number of pupae likely to be needed, were kept segregated to guard against pupal mortality and to make sure that sufficient numbers of both males and females were acquired.

After emergence, the adult moths were put into cylindrical hanging cages of muslin, supported by a wire frame. They were put in the cages as soon after emergence as two suitable moths became available.

The ground colour of fully grown *P. meticulosa* larvae varies from pale yellow, through ochre, green and olive to dark brown. Because of this, a constant and reliable method of scoring colour had to be developed, to discover the extent of the larval variation. Once the true nature of the variation had been determined, a constant method of scoring would also be needed to investigate the frequency of the various forms in the wild.

After careful consideration of the various techniques available, it was decided that simple visual scoring of larvae against a colour chart under constant conditions would be the easiest and most effective method to employ.

The techniques used by biologists to characterise colours of solid biological objects are very unsatisfactory, particularly when working in the field. There are a number of drawbacks and inaccuracies in all of these methods and some of those inherent in direct methods of colour matching have particular relevance to the system used in this study.

i) The larvae of *P. meticulosa* are not uniform in colour. To make an accurate visual comparison of a composite object with a homogeneous surface, such as paint on paper, is strictly impossible. However, by selecting one small specific unpatterned area on the larvae, a comparison can be made, although the result is at best a crude approximation.

ii) The incidence of light falling on an object, and the direction from which the object is viewed, may cause apparent variation in the colour.

iii) To compare two coloured surfaces satisfactorily, it is necessary that these should lie in juxtaposition, without the presence of another coloured surface between them and this is often difficult or impossible with any set of colour standards, such as the Munsell or Ridgeway colour charts, which are bound in book form. Furthermore, the appearance of any coloured surface, which is less than about 100 mm square will be liable to interference from the surrounding surfaces when viewed directly.

iv) Even with the extensive range of colours contained in the larger colour standard books, it is frequently impossible to exactly match a particular sample. This is because the human eye can detect far smaller differences in shade and hue than are portrayed in any of these books.

Sumner (1927) outlines the difficulties of direct visual colour-matching with reference to mammal pelages. He notes that some sort of quantitative method, whereby colour variations can be expressed in figures, is necessary for statistical studies and observes that this is impossible to accomplish through any system of matching standards.

Using an adaptation of Munsell's colour index, a system has been produced which it is believed bypasses this problem so that colour can be expressed in figures, and different samples can be tested for homogeneity.

The method employed was to make up an extensive colour chart, containing some 641 different colours. The chart was made up by mixing specific amounts of various green, yellow, brown, black and white paints. Each colour on the chart consisted of a 100 mm square patch of paint. 71 hues, (referred to as the Mj hues) were produced by making up quantities of 15 paints, which were to me, exactly equivalent in colour to a specific value and chroma index of the 15 Munsell chart hues†, between 1OR and 5G inclusive. Four equally divided intermediates between each of the adjacent Munsell base colours were then produced. Thus, hue Mj1 is equivalent to Munsell's 1OR4/8; hue Mj2 is a mixture of 4 parts 1OR4/8 and 1 part 2.5YR4/8; hue Mj3 is a mixture of 3 parts 1OR4/8 and 2 parts 2.5YR4/8, until hue 6 is purely 2.5YR4/8 and so on through each of the other 13 Munsell hues used. Nine "shades" were made of each of the 71 Mj hues by adding fixed amounts of black or white paints to each of these hues. Shade 0 is the undiluted Mj hue. Shade −1 is a mixture of 4 parts hue and 1 part black, similarly, shade −2, −3 and −4 involve mixtures of 4 parts hue and 2, 3 and 4 parts black respectively. The shades +1, +2, +3 and +4 were made up in the same fashion with white in place of black, shade +4 being the palest. The hue, value and chroma index numbers of the 15 Munsell "base colours" used are given in Table 1 together with the equivalent Mj index numbers.

When referring to colours from the chart, these are written with the hue first followed by an oblique line and then the shade number. The hue type may be represented by either the Munsell or the Mj notation, depending on which is more appropriate; thus, the darkest shade of the first hue may be written as either 1OR/−4, or Mj 1/−4.

The choice of Munsell value and chroma indices for the colours on which the Mj chart was based, was made with a view to ensuring that the colour variation exhibited by *P. meticulosa* larvae was covered as completely as possible, and no attempt was made to ensure that the difference between colours were consistent. If consistent differences had been required, then taking the same value and chroma indices for each of the 15 base colours may have produced more similar differences. However, picking Munsell colours in this way would have meant that the colour of many larvae would not have been represented on the chart. On the other hand, because the value and chroma indices of the base colours varied, the figures should not be supposed to give an accurate quantitative indication of one colour in relation to another, except when comparing shades of the same hue, or colours based on the same two Munsell base colours.

To reduce errors inherent in direct visual matching, all scoring was carried out under controlled conditions. The larva to be scored was gently rolled on a

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† In the Munsell colour system the hue of a colour indicates its relation to red, yellow, green, blue and purple; the value, its relative lightness or darkness; and the chroma its strength.

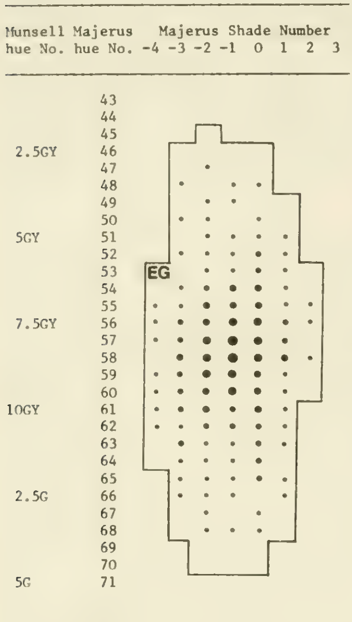
tissue to remove any moisture which might cause light to be reflected or refracted abnormally. The larva was then placed on a small piece of Perspex varying from 5 mm x 10 mm to 10 mm x 50 mm, depending on the size of the larva to be viewed. The Perspex was attached to a wire which was held in a clamp, and was manoeuvred so as to be 1 mm above the colour chart. Two 100 watt lamps were situated, one on either side of the larva, shining down on it at an angle of 45 degrees to be vertical and one metre distant from the subject. One of the chart colours was then selected and the chart moved so that the subject was directly over the centre of the colour square. Other colours were

TABLE 1 The Value and Chroma indices of the 15 Munsell hues upon which the Majerus colour chart was based.

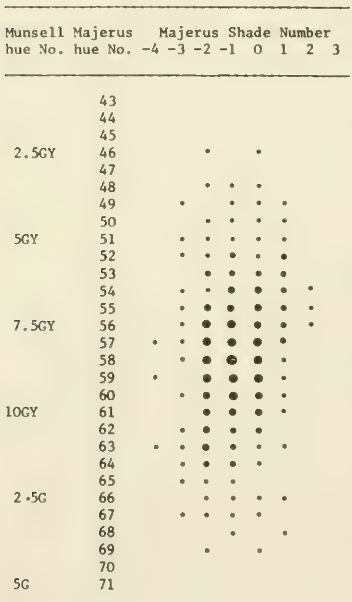
Munsell hue number	Value index	Chroma index	Equivalent Majerus colour
10R	4	8	Mj 1/0
2.5YR	4	8	Mj 6/0
5YR	4	6	Mj 11/0
7.5YR	5	8	Mj 16/0
10YR	6	10	Mj 21/0
2.5Y	8	12	Mj 26/0
5Y	8	12	Mj 31/0
7.5Y	8	10	Mj 36/0
10Y	8	12	Mj 41/0
2.5GY	7	8	Mj 46/0
5GY	7	10	Mj 51/0
7.5GY	7	10	Mj 56/0
10GY	6	10	Mj 61/0
2.5G	6	8	Mj 66/0
5G	5	8	Mj 71/0

TABLE 2 Results of tests to determine the nature of larval colour variation.

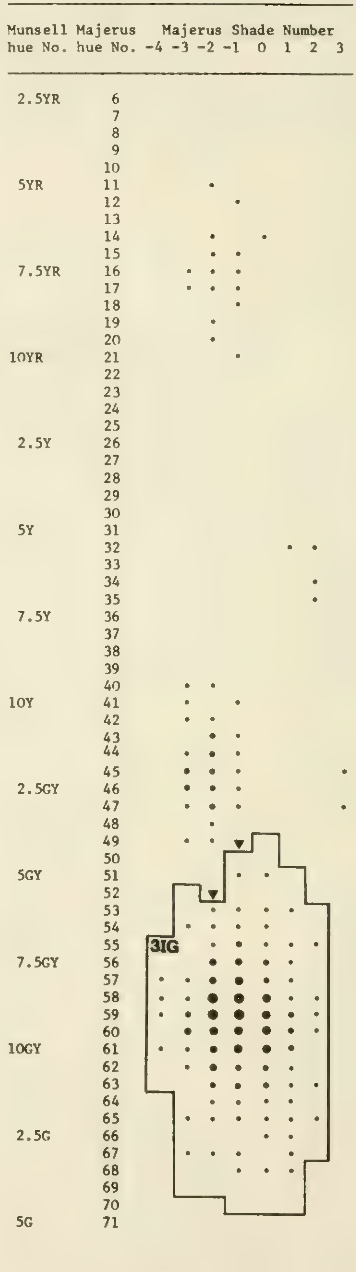
Part i - First Instar Colour Scores

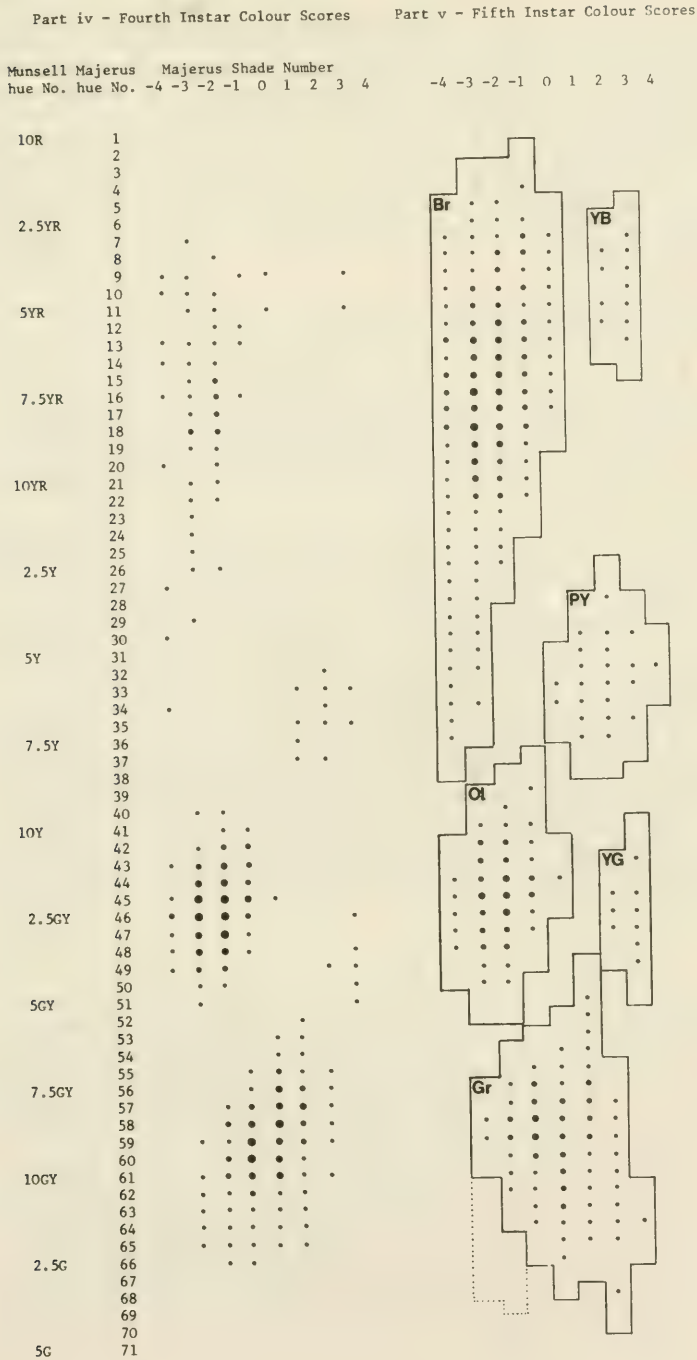


Part ii - Second Instar Colour Scores



Part iii - Third Instar Colour Scores




Part iv - Fourth Instar Colour Scores
Part v - Fifth Instar Colour Scores
Munsell hue No.
Majerus hue No.
Majerus Shade Number
-4 -3 -2 -1 0 1 2 3 4
-4 -3 -2 -1 0 1 2 3 4
10R
2.5YR
5YR
7.5YR
10YR
2.5Y
5Y
7.5Y
10Y
2.5GY
5GY
7.5GY
10GY
2.5G
5G
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
Br
YB
PY
Ol
YG
Gr

Key to Table 2.

For parts i - iv inclusive

(Sample size 1000)

- • 0 - 4 larvae
- • 5 - 12 larvae
- • 13 - 28 larvae
- • 29 -60 larvae
- • 61 + larvae

For Part v

(Sample size 3000)

- • 0 - 12 larvae
- • 13 - 36 larvae
- • 37 - 84 larvae
- • 85 + larvae

—— limits defined for each colour type.

.... adjusted to 5th instar colour type limits introduced to cater for 4th instar larval scores.

▼ The 3IG limits for the lower hue values of shades -2 and -1 should strictly speaking be Mj 51 and Mj 49 respectively, but these two values fall within the Ol main colour type limits. Consequently the 3IG limits were adjusted so as not to overlap with those of the Ol colour type whilst still containing all the larvae scored in the 3IG group. In fact no 3rd, 4th or 5th instar larvae have been recorded with a score of Mj 52/-2, Mj51/-2 or Mj49/-1.

then compared until a "match" was achieved. When matching, the larva was initially viewed as a whole to give a general impression, but for final scoring the dorsal surface on the left of the dorsal stripe of the 7th segment was used.

Even with the large number of colours in the chart, it was frequently impossible to exactly "match" a particular specimen, as its colour fell between two of the chart colours and in these cases, a closest approximation was given. When dealing with 1st, 2nd and 3rd instar larvae, a binocular microscope was used for viewing due to the difficulty of scoring such small larvae with the naked eye. This method could possibly cause anomalies in the scoring of 1st, 2nd and 3rd instar larvae, compared with the 4th and 5th instars, if light reflected from the larvae and the colour standards was differently affected by the microscope lenses. However, comparison of the scores given to the 5th instar larvae using the microscope and naked-eye methods showed that the two methods produced identical scores. Larvae were generally scored for colour at least 24 hours after their previous ecdysis to ensure that the full pigmentation applicable to a particular instar had been attained.

COLOUR ANALYSIS OF THE LARVAE OF *P. METICULOSA*

To investigate the type of variation which occurs in larvae of *P. meticulosa*, seventeen broods – the Colour Analysis Broods (CAB) 1 to 17 – from light trapped females, taken at Ringwood in September 1975, were studied. 3,517 first instar larvae resulted from these broods, a number which had dropped to 3,245 by the 5th instar due to larval mortality. 1,000 of these larvae taken at random from the stock during each of the first four instars and 3,000 5th instar larvae were accurately scored for colour.

The results from the 5th instar larvae (Table 2v), show that the distribution was discontinuous, with larvae falling into six definite groups. These were named the main colour types Green (Gr), Olive (Ol), Brown (Br), Plain Yellow (PY), Yellow Green (YG) and Yellow Brown (YB). On the basis of the results in Table 2v, definite limits were assigned to each of these main colour types by taking the limits as two Mj hues numerically higher or lower than the maximum or minimum Mj hue number which was represented by larvae in each shade of a group. These limits are indicated in Table 2v.

The results from 4th instar larvae (Table 2iv) again show a discontinuous distribution with six groups, and all larvae, apart from a few of the green colour, fall within the defined limits of the six main colour types. Indeed, the distribution for 4th and 5th instar larval colour are very similar when compared qualitatively. The main differences are the slightly closer limits that would be assigned to the main colour types if limits were defined from 4th instar results in the same way as for 5th instar larvae. This difference is probably due, at least in part, to the smaller size of the 4th instar sample. However, if the results are compared quantitatively quite obvious differences are evident. The proportion of the four main colour types Gr, Ol, PY and YG are all higher in the 4th instar sample, whilst those of the other two main colour types, Br and YB, are much higher in the 5th instar sample.

When the 3rd instar results (Table 2iii) were studied, again six groups were evident. However, the 3rd instar green larvae had a bias towards darker shades than the 5th instar green larvae. For this reason the 3rd instar green larvae were grouped in a new class; 3rd instar green colour type (3IG).

The frequency of larvae in the six colour groups was also quite different from that of 4th instar larvae, proportionally more larvae being assigned to the 3IG colour type than the Gr main colour type, and less to the five other main colour types than in the 4th instar.

The distribution of colour scores for 1st and 2nd instar larvae (Tables 2i and 2ii respectively) is radically different from those of the later instars. The distribution is continuous, with only one group. This group has a similar distribution to the 3IG main colour type, but with slightly wider limits.

Limits were set for this distribution, which was called the early green colour type (EG), using 1st instar scores as the distribution was slightly wider in the 1st instar than in the 2nd instar. These limits are shown on Table 2i.

It appears from these results that the system follows a pattern in which 1st and 2nd instar larvae are of a green colour which varies considerably in both hue and shade. A radical change takes place between instars two and three when five more completely distinct colour types arise, and of the remaining larvae, some fall close to but outside, the early green colour type. Further changes in the frequency of larvae assigned to the various colour types occur at the 3rd and 4th ecdyses.

This system indicates that the 1st and 2nd instar larval colour variation is continuous and so will probably be controlled either environmentally, or by a polygenic hereditary system. On the other hand, 3rd, 4th and 5th instar larval colour variation is discontinuous and is more likely to be controlled by environmental factors under the influence of a threshold switch effect or by a small number of major genes.

THE EFFECT OF FOOD PLANT ON LARVAL COLOUR VARIATION

The effect of four main groups of environmental factors were studied. These were temperature, larval density, light and food plant.

More specifically the experiments were designed to determine the effects of:—

(a) low temperature (constantly $4 \pm 1^{\circ}C$)
(b) high temperature (constantly $25 \pm 1^{\circ}C$)
(c) low variable temperature (ranging from $4 \pm 1^{\circ}C$ to $12 \pm 1^{\circ}C$)
(d) high variable temperature (ranging from $17 \pm 1^{\circ}C$ to $25 \pm 1^{\circ}C$)
(e) rearing larvae at various larval densities
(f) various background colours
(g) varying the duration of light per day
(h) varying light wavelength
(i) feeding larvae on a range of food plants.

Of these factors, only food plant had any appreciable effect on larval colour so I will confine myself to the experiments dealing with this factor.†

In common with the larvae of many other Noctuid species, the larvae of *Phlogophora meticulosa* are polyphagous. In the wild state they feed mainly on docks and sorrels (*Rumex* spp.), plantains (*Plantago* spp.), and grasses, but they may be found on most herbaceous plants (pers. obs.). In captivity, the larvae will also feed readily on the foliage of many deciduous trees, such as oak, birch and sallow. When given a choice of fresh leaves in captivity, larvae show a preference for common sorrel and sheep's sorrel over other docks or plantains which are, in turn, preferred to grasses. The larvae not only feed on the leaves of plants, but also accept the petals, sepals and seed pods of many plants. Therefore, a wide range of natural, coloured foods can be fed to larvae to investigate whether larval variation was affected by foodplant.

Initially, 100 larvae from each of 6 broods (EFB1-6 inclusive) from light-trapped females were split into four groups of 25 larvae. Each sample from each brood was given a specific suffix to the brood number, these being i or ii when the samples were fed on common sorrel, and iii or iv for samples fed on ribwort plaintain (*Plantago lanceolata*).

Rearing was carried out in Fisons growth cabinets set at a temperature of $8 \pm 1°C$ from 6 p.m. to 6 a.m., when the cabinets were unlit, and at temperatures of $16 \pm 1°C$ between 6 a.m. and 6 p.m. when the cabinets were lit by four 18 inch 15 watt Cryselco bulbs. The larvae were colour scored in the same way as the CAB broods.

To facilitate statistical analysis of the results obtained, groups of five Mj hues were classed together in such a way that 13 hue groups, corresponding to the Munsell base colours 2.5YR – 2.5G inclusive resulted.

Analysis showed that samples from the same brood, which were fed on the same foodplant, were homogeneous in all cases. Therefore the results of the two samples from each brood which were fed upon the same foodplant were added together. To simplify the results, scores for peripheral score groups which were represented with irregular frequency were added to the score of the nearest group which was represented fairly consistently, a shade of the same hue being considered closer than a hue of the same shade. These adapted colour scores are given in Table 3. A series of chi-squared tests for homogeneity were carried out. (The original data from these experiments and probability values from the chi-squared tests are given by Majerus 1978 pp. 100-111 and Appendix Table 3Bd/1).

The samples fed on sorrel were homogeneous for both the 1st and the 2nd instars. Similarly, the samples fed on plantain were homogeneous for each of these instars. However, sorrel-fed samples when compared with those fed on plantain showed a high degree of heterogeneity for both the 1st and the 2nd instars. This indicates that foodplant does affect larval colour in these instars.

Comparison of the results of the samples, fed on sorrel during both the 4th and 5th instar gave significant heterogeneity, as did the results of the 4th and 5th instar plantain-fed samples.

However, the scores from sorrel-fed samples were homogeneous to those from the plantain-fed samples in both the 4th and 5th instars, showing that whilst there was great variation between the colours from different broods, this was not affected by foodplant. It is also worth noting at this point that the colour of some samples changed completely between the 4th and 5th instars e.g. EFB5. This change is under genetic control and is further discussed by Majerus (1983).

Comparison of 3rd instar scores showed significant heterogeneity whether considering just the sorrel fed samples, just the plantain-fed samples or all the samples together. This indicates that, in the 3rd instar, not only is there variation

† Details of the experiments on the other environmental factors are described in full by Majerus (1978).

TABLE 3
Experiments to investigate the effect of foodplant colour on larval colour.

Part i – Colour Scores of 1st instar EFB samples.

Hue type	Samples	Fed on Sorrel Shade -3	-2	-1	0	Fed on Plantain Shade -3	-2	-1	0
7.5GY	EFB1	2	6	13	11	6	14	8	2
10GY		1	6	6	5	4	8	8	0
7.5GY	EFB2	1	7	11	11	6	16	9	3
10GY		1	6	7	6	3	6	6	1
7.5GY	EFB3	1	8	12	12	6	16	7	2
10GY		1	6	6	4	4	8	7	0
7.5GY	EFB4	2	7	11	12	9	15	9	1
10GY		0	7	5	6	3	8	5	0
7.5GY	EFB5	2	7	12	11	8	15	7	2
10GY		1	7	5	5	5	7	6	0
7.5GY	EFB6	1	7	10	14	6	13	10	1
10GY		1	6	6	5	6	5	8	1
7.5GY	TOTAL	9	42	69	71	41	89	50	11
10GY		5	38	35	31	25	42	40	2

Part ii – Colour Scores of 2nd instar EFB samples.

Hue type	Samples	Fed on Sorrel Shade -3	-2	-1	0	Fed on Plantain Shade -3	-2	-1	0
7.5GY	EFB1	1	6	13	10	8	17	7	1
10GY		1	11	3	5	4	6	7	0
7.5GY	EFB2	1	7	10	12	5	17	10	1
10GY		0	7	7	6	3	6	7	1
7.5GY	EFB3	0	8	8	16	5	22	7	0
10GY		2	7	7	2	5	4	7	0
7.5GY	EFB4	3	7	11	12	7	15	9	2
10GY		0	6	3	8	4	6	7	0
7.5GY	EFB5	1	8	15	8	4	19	11	1
10GY		1	3	9	5	4	4	6	1
7.5GY	EFB6	1	9	12	13	6	19	7	1
10GY		1	5	5	4	3	6	8	0
7.5GY	TOTAL	7	45	69	71	35	109	51	6
10GY		5	39	34	30	23	32	42	2

between the colours of larvae from different broods, but also that foodplant affects larval colour in this instar.

Further analysis showed that samples fed on the same foodplant from four of the broods, (EFB1, EFB2, EFB4 and EFB5), were homogeneous. These samples were also homogeneous to the sum of 2nd instar results of samples from the same broods fed on the same foodplant. However, comparison of the 3rd instar results from the sorrel and plantain-fed samples of these broods, showed significant heterogeneity, indicating that in these broods 3rd instar larval colour is affected by foodplant.

3rd instar samples from EFB3, when fed on sorrel, were significantly different from sorrel-fed samples from all the other broods. Similarly, plantain-fed samples from EFB3 were heterogeneous to all other plantain-fed samples. Conversely, 3rd instar, sorrel-fed EFB3 samples, were not statistically different from the EFB3 samples fed on plantain at the 0.05 level of probability. However as approximately half the larvae in these samples changed to brown in these instars, it may be that the smallness of the number of green larvae masks any difference. Indeed when the unadjusted scores were considered (Majerus 1978, Appendix Table 3Bd/1) the plantain-fed green larvae generally seem to be slightly darker in shade than those fed on sorrel. These tests, then, show that whilst foodplant may affect 3rd instar larval colour in samples from EFB3, the result of this influence is different from that produced by foodplant in any of the other broods, or in EFB3 2nd instar larvae.

Similar comparisons carried out on the results of the 3rd instar EFB6 samples, showed that the samples fed on sorrel were homogeneous to those of EFB1, 2, 4 and 5 broods fed on sorrel, whilst those fed on plantain were heterogenous

TABLE 3
Part iii – Colour Scores of 3rd instar EFB samples.

			Fed on Sorrel					Fed on Plantain				
Hue type	Colour type	Samples	Shade	−3	−2	−1	0	Shade	−3	−2	−1	0
7.5GY	3IG	EFB		1	8	12	8		10	13	7	2
10GY	3IG			1	6	7	7		6	8	3	1
7.5GY	3IG	EFB		1	8	12	11		10	12	8	3
10GY	3IG			0	2	6	3		4	8	4	1
7.5GY	3IG	EFB		0	2	6	3		2	4	4	0
10GY	3IG			0	3	6	5		3	7	6	0
			25 Brown larvae present					24 Brown larvae present				
7.5GY	3IG	EFB		1	9	11	13		9	10	10	2
10GY	3IG			0	5	7	4		6	8	5	0
7.5GY	3IG	EFB		0	8	10	11		9	14	10	1
10GY	3IG			1	6	7	7		4	7	5	0
7.5GY	3IG	EFB		1	7	10	10		0	10	7	7
10GY	3IG			1	8	8	5		2	5	12	7
7.5GY	3IG	TOTALS		4	42	61	56		40	63	46	15
10GY	3IG			4	32	42	34		25	43	35	9
	Brown		25					24				

to those of EFB1, 2, 4 and 5 fed on plantain. Furthermore, the EFB6 samples fed on sorrel were homogeneous with the EFB6 samples fed on plantain, indicating that the food plant did not affect larval colour in these samples. Plantain-fed samples from EFB6 were also homogeneous to the sum of sorrel-fed samples from broods EFB1, 2, 4 and 5. Moreover, the 3rd instar sorrel-fed samples from EFB6 were homogeneous with the 2nd instar sorrel-fed samples from the same brood, whilst comparison of the results from the 2nd and 3rd instar plantain-fed samples of this brood showed them to be heterogeneous.

TABLE 3
Part iv – Colour Scores of 4th instar EFB samples.

Hue type	Colour type	Samples	Fed on Sorrel				Fed on Plantain			
			Shade	-1	0	1	Shade	-1	0	1
7.5GY	Gr	EFB1		4	14	3		2	16	1
10GY	Gr			15	11	3		18	9	4
			Shade	-3	-2	-1	Shade	-3	-2	-1
7.5YR	Br	EFB2		5	3	0		2	4	0
10YR				2	0	X		2	0	X
			Shade	-3	-2		Shade	-3	-2	
2.5GY	01			12	18			10	19	
			Shade	-1	0	1	Shade	-1	0	1
7.5GY	Gr			1	3	0		2	5	0
10GY	Gr			4	2	0		3	3	0
			Shade	-3	-2	-1	Shade	-3	-2	-1
7.5GY	Br	EFB3		16	27	1		12	30	2
10GY	Br			5	1	X		3	3	X
			Shade	-3	-2		Shade	-3	-2	
2.5GY	01	EFB4		12	15			8	18	
			Shade	-1	0	1	Shade	-1	0	1
7.5GY	Gr			2	7	1		0	5	3
10GY	Gr			5	6	2		8	7	1
	PY		1				4			
			Shade	-1	0	1	Shade	-1	0	1
7.5GY	Gr	EFB5		2	11	5		5	14	3
10GY	Gr			16	13	2		13	9	2
			Shade	-1	0	1	Shade	-1	0	1
7.5GY	Gr	EFB6		6	17	4		2	13	5
10GY	Gr			11	11	1		17	9	4
			Shade	-3	-2	-1	Shade	-3	-2	-1
7.5YR	Br	TOTALS		21	30	1		14	34	2
10YR	Br			7	1	X		5	3	X
	PY		1				4			
2.5GY	01		Shade	-3	-2		Shade	-3	-2	
				24	33			18	37	
			Shade	-1	0	1	Shade	-1	0	1
7.5GY	Gr			15	52	13		11	53	12
10GY	Gr			51	43	8		59	37	11

From these results it was deduced that foodplant affects larval colour in the 1st and 2nd instars, but not in the 4th or 5th instars. In the 3rd instar, larval colour may be affected by foodplant, but the homogeneity of sorrel-fed samples from EFB6 with those from the same brood fed on plantain show that this is not always the case. Further experiments (see Majerus 1983) indicated that the

TABLE 3
Part v — Colour Scores of 5th instar EFB samples.

Hue type	Colour type	Samples	Fed on Sorrel				Fed on Plantain			
			Shade	−1	0	1	Shade	−1	0	1
7.5GY	Gr	EFB1		3	12	4		4	15	2
10GY	Gr			16	12	3		19	7	3
			Shade	−3	−2	−1	Shade	−3	−2	−1
7.5YR	Br	EFB2		16	12	3		20	9	4
10YR	Br			7	2	X		6	3	X
			Shade	−3	−2		Shade	−3	−2	
2.5GY	01			2	5			2	3	
			Shade	−1	0	1	Shade	−1	0	1
7.5GY	Gr			0	0	0		0	0	0
10GY	Gr			1	2	0		2	1	0
			Shade	−3	−2	−1	Shade	−3	−2	−1
7.5GY	Br	EFB3		23	14	2		17	18	6
10GY	Br			8	3	X		7	2	X
			Shade	−3	−2		Shade	−3	−2	
2.5GY	01	EFB4		13	16			10	18	
			Shade	−1	0	1	Shade	−1	0	1
7.5GY	Gr			2	4	1		3	7	2
10GY	Gr			8	5	1		6	4	0
			Shade	−3	−2	−1	Shade	−3	−2	−1
7.5YR	Br			18	12	5		18	15	4
10YR	Br			8	6	X		7	2	X
	PY		1				4			
			Shade	−3	−2	−1	Shade	−3	−2	−1
7.5YR	Br	EFB6		12	5	1		10	7	2
10YR	Br			4	1	X		5	3	X
			Shade	−1	0	1	Shade	−1	0	1
7.5GY	Gr			3	6	2		2	6	3
10GY	Gr			10	5	1		7	5	0
			Shade	−3	−2	−1	Shade	−3	−2	−1
7.5YR	Br	TOTALS		69	43	11		65	49	16
10YR	Br			27	12	X		25	10	X
	PY		1				4			
			Shade	−3	−2		Shade	−3	−2	
2.5GY	01			15	21			12	21	
			Shade	−1	0	1	Shade	−1	0	1
7.5GY	Gr			8	22	7		9	28	7
10GY	Gr			35	24	5		34	17	3

reason for this was that the mechanism controlling colour in the 3rd instar involves a switch-gene as well as foodplant.

Once evidence of a connection between foodplant and larval colour had been established, at least for the early instars, a further set of experiments was carried out.

These tests were designed to investigate the extent to which larval colour could be influenced by foodplant in the 1st and 2nd instars by using a range of foodplants of different types and colours. Furthermore by rearing some samples in total darkness, it was hoped that the experiments would ascertain whether the effect of foodplant was caused wholly as a result of the larvae ingesting the foodplant, or whether the foodplant colour may also cause an effect by stimulating the ocelli or some other sensory receptor.

The test design resulted in 14 samples of 75 larvae from the main CAB stocks being reared. Each sample was fed on a different foodplant. The samples were split into three equal parts, one-third (the A samples) were reared under the same conditions as the EFB samples. The other two thirds (the C and the D samples) were treated in the same way, but were not illuminated at any stage. Trying to rear larvae in complete darkness presented certain difficulties. The method used was to place developing ova in large boxes 470 mm x 205 mm x 110 mm with the required foodplant. These were then placed in an unilluminated growth cabinet. New foodplant was placed in the boxes by touch, each 24 hours.

A thick layer of blotting paper was placed on the bottom of each box to take up some of the moisture resulting from the decaying foodplant, and the frass that accumulated. Obviously, a special procedure for scoring these samples had to be developed. When the larvae were judged to be in the 1st instar, one of the C samples was removed from the cabinet and the contents of the box were spread out in a flat bottomed dish in another completely dark room. A flash photograph of the contents of the dish was then taken. Up to this point, the whole procedure was carried out in total darkness, except for the photographic flash. The larvae were then scored normally. After scoring, the larvae were again photographed using flash. The photographs were taken to compare the colours of larvae before and after scoring, to determine whether bringing larvae into the light for scoring induced any immediate change in colour. The process was then repeated for each of the other 13 C samples, and when larvae were judged to be in the 2nd instar the D samples were scored using the same technique.

The 14 foodplants used were:–

Yellow broom petals
Red and yellow broom petals
Dark crimson rose petals
Flame red rose petals
Pink rose petals
Pale pink rose petals
Pink-tinged yellow rose petals
Very pale pink-white rose petals
Navy blue pansy petals
Mauve rhodedendron flowers
Red and green dock seed pods
Pelargonium leaves lacking chlorophyll
Synthetic diet, lacking plant pigments.

Full details of these foodplants are given by Majerus (1978, table 3BD/3i).

Due to the wide variety of colours produced in larvae by these tests, many of the larvae could not be scored using the Mj colour chart, so all the larvae were scored using the Munsell colour chart. Because of the comparatively wide divisions between colours in this chart, the "matches" were often very approximate.

The results of these tests have been described in detail by Majerus (1978, table 3Bd/3ii).

The data from the A samples when compared with those from the C or D samples showed that the effect of foodplant on larval colour is the same in both light and dark conditions. So, it seems unlikely that visual stimulation influences larval colour.

With the exceptions of those fed on pansy, rhodedendron, very pale pink/ white rose, pelargonium and synthetic diet, the majority of the larvae in each sample assumed a colour similar to that of their food. The colour of the frass varied considerably, but in most cases seemed to be influenced by the colour of the foodplant.

Larvae fed on mauve rhodedendron assumed a dark green or turquoise colour, whilst those fed on pansy became pale green or yellow-green in colour. Those fed on very pale pink/white rose petals, chlorophyll deficient pelargonium leaves, or the synthetic diet assumed a very pale-ochre or yellow colour. Microscopic examination indicated that this coloration was due to cuticular and epidermal pigments.

Finally, a number of larvae from other stocks were fed on sorrel during the 1st instar, and transferred on to other foodplants about 24 hours after their 1st larval ecdysis. These larvae changed colour assuming a colour similar to that of the new foodplant soon after commencing to feed on it. The colour changes in these larvae began at the anterior end of the insect and proceeded down to the posterior end. This feature, coupled with the fact that the colour of fresh frass in most cases was more or less similar to that of the foodplant, indicates that larval colour in early instars is due mainly to the colour of the gut contents. Obviously, the overall appearance of the larvae will also be affected by the colour of the cuticular, epidermal and other pigments, but these are usually pale in colour, and at least partly translucent.

DISCUSSION

There is evidence of a very close correlation between foodplant and larval colour in the 1st and 2nd instars. This correlation also occurs in the 3rd instar, but not in all cases. Foodplant seemingly has little effect on 4th and 5th instar larval colour, and the results of the EFB samples, where variation in the later instars between broods kept under identical conditions was considerable, indicates that this variation is genetically controlled. The change from foodplant to genetic control of colour takes place at the 2nd or 3rd larval ecdysis.

In the light of the foodplant experiments, comparison of the distribution of 3rd and 4th instar colour analysis scores, and in particular the changes between the limits of the EG, 3IG and Gr colour types, leads to the deduction that the 3rd instar colour variation may be the result of a combination between the 2nd and 4th instar variation control mechanisms. The colour of the majority of 3rd instar larvae being influenced by foodplant, while the colour of a smaller number of larvae including all those in the Ol, Br, PY, YG and YB main colour types, and some of the larvae in the 3IG colour type are controlled by a different mechanism, probably similar to that controlling 4th instar larvae colour. Which of the two mechanisms controls variation in particular larvae is determined genetically. (See Majerus 1983.)

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An overlooked record of Rhagio annulatus Degeer (Dipt: Rhagionidae). – New characters on which this species can be satisfactorily distinguished from *R. tringarius* have recently been discovered by Dr. M.C.D. Speight (1981, *Proc. Trans. Br. ent. nat. Hist. Soc.* 14: 6-7). He had found the rarely recorded *annulatus* in marshy mixed deciduous woodlands in Dorset and Co. Westmeath. He knew of only one other recent find, by Mr. A.E. Stubbs, in a dry wooded chalk valley in Oxfordshire, incidentally a locality where *tringarius* L. and *strigosus* Meigen also occur.

Dr. Speight's paper led me to re-examine my series under the name *tringarius* and I was surprised to find two females of *annulatus*. These were collected at the Sheep Leas, Horsley, Surrey by sweeping at the edge of fields surrounded by beech woodland, when I visited this chalk locality with Mr. Stubbs on 9th June 1968. The habitat was similar to that in Oxfordshire, suggesting a diversity in soil conditions tolerated by the larvae in *annulatus* as well as in *tringarius.*

The local *R. strigosus*, which has occurred in several localities on the North Downs in Surrey, appears more tied to dry situations while the common *R. scolopaceus* L. is nearly always found near water. Both of these dappled-winged species settle facing downward on tree trunks while the clear winged species discussed above are found at rest on broad leaved herbaceous vegetation.

P.J. Chandler

HEMIPTERA AT THE CHELSEA PHYSIC GARDEN, LONDON

by B.N.K. DAVIS

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INTRODUCTION

Many Hemiptera are restricted to particular genera or families of host plants. Others are more catholic in their choice but may still favour grasses or herbaceous or woody plants. Cultivated gardens pose problems for the more restricted feeders, partly because most of the plants are exotic species and even exotic genera, and partly because there is usually too little of any one suitable host plant to sustain a resident population of most insects. Individual gardens in outer residential areas are usually quite small but together may cover extensive areas so there may be quite large quantities of the more popular garden plants. In central urban areas, individual private gardens are largely replaced by local residents' gardens which are quite isolated from each other and from the public parks. The Chelsea Physic Garden provides an exceptionally large oasis of herbaceous vegetation in central London. Furthermore, a substantial area is given over to beds in which representatives of more than 50 dicotyledonous families are grouped together and separated from each other by narrow paths. The larger families, like the Umbelliferae, Leguminosae and Compositae occupy 3-6 bed units whilst the smallest families only occupy half or less of a bed.

SAMPLING

Samples of Heteroptera and Homoptera Auchenorhyncha were collected on 4th August 1981 from twelve plant families following two earlier smaller samples in 1979 and 1980 which were summarized by Davis (1982). The petrol driven Dietrick (1961) vacuum net was used with a 1 ft^2 (0.9 m^2) head; this was placed over twelve different species of plants in the eight larger families but only six species in the smaller family beds. Most of the plants are European but a few are North American or Asian (Table 1).

RESULTS AND DISCUSSION

Table 2 gives the distribution of 26 Heteroptera and Homoptera Auchenorhyncha over these twelve plant families. The total number of species was low for this range of host plants and half of them were present in very small numbers indicating casual occurrence on the particular host plants sampled, e.g. *Liocoris tripustulatus* which occurs on nettles (*Urtica* spp.) and *Orthops cervinus* and *Aguriahana stellulata* which both occur on lime (*Tilia*) and other trees. Enquiries ascertained that some plants had been sprayed against aphids earlier in the season; this must have affected other groups of Hemiptera locally and could also explain some of the low numbers.

At the other extreme, the most abundant species were mostly widespread, polyphagous or predatory feeders, which supports the view that stenophagous insects are at a disadvantage in gardens. The Labiatae were clearly important for *Eupteryx* spp. especially *E. melissae* several of whose favoured food plants were sampled. The *Dicyphus* nymphs on Scrophulariaceae are likely to have been *D. pallicornis* since two European species of its foxglove host plant *Digitalis* were among those sampled in this bed. *D. errans* was more common and widespread in the July 1980 sample. The association of *Orthops campestris* with Umbelliferae might have been clearer in a later sample when more adults had appeared.

The Chelsea Physic Garden is the only British site from which *Empoasca* *pteridis* is as yet definitely known. Females of this genus are difficult to separate and a fuller analysis of this group is given by Davis (1983).

All the more numerous species were recorded in July 1980 except *D. pallicornis* and *H. planicornis* which would not have been adult then. A few may find suitable host plants nearby but it must be assumed that all of them find adequate resources within the Chelsea Physic Garden for population survival.

TABLE I Plants sampled from the herbaceous family beds at Chelsea Physic Garden.
B = native, (B) = naturalised British species, * = non-European species

	CARYOPHYLLACEAE		COMPOSITAE		CRUCIFERAE
	Agrostemma gracilis	(B)	*Aster nova-angliae*	(B)	*Alyssum saxatile*
	Arenaria saxatilis	*	*Bidens ferulifolia*		*Arabis procurrens*
B	*Cerastium arvense*		*Chrysanthemum* x *rubellum*	*	*Aethionema grandiflorum*
	Gypsophila paniculata		*Erigeron glaucus*	*	*Aubretia pinardii*
	Lychnis coronaria		*E. speciosus*	(B)	*Bunias orientalis*
	Petrorhagia velutina	*	*Grindelia camphorum*	*	*Cheiranthus* x *kewensis*
B	*Saponaria officinalis*		*Helianthus decapetalus*		*Erysimum aureum*
B	*Silene vulgaris*	*	*Inula squarrosa*	B	*Lepidium latifolium*
B	*S. maritima*	*	*Solidago canadensis*	(B)	*Lobularia maritima*
	S. frivaldszkyana	*	*Stokesia laevis*		*Lunaria annua*
B	*Stellaria holostea*		*Tanacetum macrophyllum*		*L. rediviva*
*	*Viscaria oculata*		*Xeranthemum annuum*		*Ptilotrichum spinosum*

	LABIATAE		LEGUMINOSAE		ROSACEAE
*	*Agastache foeniculum*	*	*Baptisia minor*		*Agrimonia* sp.
	Eremostachys laciniata		*Chamaespartium sagittale*		*Alchemilla lapeyrousii*
	Leonurus cardiaca		*Coronilla emerus*		*Aruncus dioicus*
*	*Marrubium catariaefolium*	(B)	*C. varia*	*	*Filipendula purpurea*
(B)	*Melissa officinalis*		*Galega orientalis*	B	*Geum* x *intermedium*
B	*Nepeta cataria*		*Genista hispanica*		*Potentilla detommasii*
	Perilla frutescens		*Lathyrus niger*	*	*P. megalontha*
	Rosmarinus sp.		*L. venetus*	*	*P. sericea*
(B)	*Salvia verticillata*		*Lotus* sp.		*Rosa pimpinellifolia*
	S. viridis		*Medicago arborea*	*	*Sanguisorba obtusa*
	Teucrium flavum	*	*Thermopsis mollis*		*Spiraea douglasii*
B	*T. scorodonia*		*Trifolium rubens*		*Waldsteinia geoides*

	SCOPHULARIACEAE		UMBELLIFERAE		BORAGINACEAE
	Antirrhinum latifolium		*Angelica* sp.		*Alkanna orientalis*
*	*Calceolaria chelidonioides*	(B)	*Astrantia major*		*Brunnera macrophylla*
*	*C. flabellata*		*Astrantia* sp.	B	*Buglossoides purpurocaerulea*
	Digitalis grandiflora	*	*Bolam glebaria*	(B)	*Pentaglottis sempervirens*
	D. thapsi		*Chaerophyllum aromaticum*		*Pulmonaria angustifolia*
*	*Hebenstretia integrifolia*		*C. hirsutum*		*Symphytum asperum*
(B)	*Mimulus luteus*		*Eryngium spinalba*		
B	*Misopates orontium*	(B)	*Falcaria vulgaris*		
*	*Nemesia versicolor*		*Ferula tingitana*		
*	*Penstemon confertus*		*Laserpitium siler*		
(B)	*Verbascum blattaria*	B	*Ligusticum scoticum*		
	Veronica paniculata	(B)	*Petroselinum crispum*		

	ONAGRACEAE		RANUNCULACEAE		SOLANCEAE
*	*Clarkia unguiculata*		*Aconitum vulparia*		*Datura innoxia*
	Epilobium dodonaei	*	*Aquilegia longissima*	*	*Hyoscyamus niger*
(B)	*Fuchsia magellanica*	*	*Clematis heracleifolia*		*Nicandra physalodes*
*	*Lopezia coronata*		*Helleborus lividus*		*Physalis ixocarpa*
*	*Oenothera campylocalyx*	B	*Thalictrum minus*		*Solanum cornutum*
	O. rosea		*T. aquilegifolium*		*S. sisymbrifolium*

TABLE 2 Occurrence of Heteroptera and Auchenorhyncha in family beds at Chelsea Physic Garden 4.8.81. Numbers collected from 12 different plants in suction samples except for small beds * where only 6 plants were sampled. + indicates male *Empoasca* spp. positively identified.

	Boraginaceae*	Caryophyllaceae	Compositae	Cruciferae	Labiatae	Leguminosae	Onagsaceae*	Ranunculaceae*	Rosaceae	Scrophulariaceae	Solanaceae*	Umbelliferae	TOTAL	Present in July 1980
HETEROPTERA														
Empicoris vagabundus (L.)				1									1	
Anthocoris nemoralis (F.)								1					1	†
A. nemorum (L.)	1		1	1				1		2			6	†
Orius minutus (L.)	1		9	1	4		2	2		3			22	†
O. niger (Wolff)												1	1	†
Plagiognathus arbustorum (F.)	4	6	1		22	5	2	2	2	2			46	†
Campylomma verbasci (Meyer-Dür)										1			1	†
Dicyphus errans (Wolff)	1									6			7	†
Dicyphus pallicornis (Meyer-Dür)										4			4	
Dicyphus nymphs	2		7		33				1	161	1		205	
Heterotoma planicornis (Pallas)		1	5	4	9	13	2	2	2	1		3	42	
Orthotylus ochrotrichus Fieber								1					1	
Liocoris tripustulatus (F.)										1			1	†
Orthops cervinus (H.-S.)							1						1	
O. campestris (L.)			1									5	6	†
Lygocoris pabulinus (L.)					1		1	1					3	†
Unidentified nymphs	3	1	1		19	10	16	1	26	9		17		
HOMOPTERA														
Aphrodes bicinctus (Schrank)									1				1	†
Empoasca spp.	2	18	51	2	20	57	5	106	113	81	14	90	559	
E. decipiens Paoli	+	+	+	+	+	+		+	+	+	+	+		†
E. pteridis (Dahlbom)		+	+		+	+		+		+	+	+		†
E. vitis (Göthe)			+		+	+		+	+	+		+		
Eupteryx aurata (L.)			13		31					5		29	78	†
E. florida Ribaut			7		66							1		
E. melissae Curtis		1	23		269					1			294	†
Aguriahana stellulata (Burm.)									1				1	
Hauptidia maroccana (Melichar)		1			2	1		2	15	15	3		39	†
Zygina flammigera (Geoff.)								1	2				3	
Criomorphini indet.		1											1	
TOTAL SPECIES	5	7	11	5	12	6	6	12	9	14	4	8		

ACKNOWLEDGEMENTS

I am very grateful to Mr. A.P. Paterson for permission to work in the Chelsea Physic Garden. I should also like to thank Miss Diana Chambers for help in collecting the samples.

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SPRING BUTTERFLIES IN CORFU

by I.F.G. McLean

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The recent excellent review of the butterfly fauna of Corfu by Baldock and Bretherton (1981) gave a comprehensive account of 79 species, of which 16 were listed as requiring confirmation. During a two-week holiday from 28 April to 12 May 1980, a total of 15 species of butterflies were noted while recording various groups of Diptera and Hymenoptera. Only one species, *Pyrgus malvae* L., was found as an addition to the list of Baldock and Bretherton. A summary of the species found is given below, nomenclature is that of Higgins and Riley (1980) and place names are those given on the map of Corfu published by Fairey Surveys Ltd., scale 1:100,000 (no date). Those species marked with an asterisk were identified in the field.

Artogeia rapae Beside track south west of Linia, 6.V.; Agios Spiridon Marsh 9.V.

Anthocharis cardamines Gastouri, 4.V.; Mt. Pantokrator 9.V.

**Gonepteryx cleopatra* Gastouri, 4.V.; Mirtiotissa 8.V.; Ag. Deka 11.V.

Leptidea sinapis Mirtiotissa 8.V.; Ag. Deka 11.V.

**Callophrys rubi* Benitses 29.IV; Kavos 1.V. (observed feeding on flowers of *Asphodelus aestivus* Brot.); between Perama and Gastouri 4.V., 10.V. and 11.V.; Mirtiotissa 8.V.; Kinopiastes 11.V.; Ag. Deka 11.V.

Glaucopsyche alexis Mirtiotissa 8.V.; between Perama and Gastouri 10.V.; Kinopiastes 11.V.

Pseudophilotes baton Benitses 29.IV.; Mirtiotissa 8.V.; between Perama and Gastouri 12.V.

Aricia agestis Beside track south west of Linia 6.V.; beside causeway at south end of Lake Halikiopoulou 8.V.

Polyommatus icarus Kavos 1.V.; Sidari 2.V.; beside track south west of Linia 6.V.; between Perama and Gastouri 10.V. and 12.V.

**Vanessa atalanta* Between Perama and Gastouri 4.V. and 10.V.; Paleokastritsa 5.V.; beside track south west of Linia 6.V.; Ag. Deka 11.V.

**Cynthia cardui* Sidari 2.V.; Gastouri 4.V.; beside track south west of Linia 6.V.; Pelekas 8.V.; beside causeway at south end of Lake Halikiopoulou 8.V.; Mt. Pantokrator 9.V.; Ag. Deka 11.V.; between Perama and Gastouri 12.V.

Coenonympha pamphilus Beside track south west of Linia 6.V.; between Perama and Gastouri 10.V.

**Pararge aegeria* Perama 28.IV.; Sidari 2.V.; between Perama and Gastouri 4.V.; Kinopiastes 11.V.

Lasiommata maera One male only at Mirtiotissa 8.V.

Pyrgus malvae malvae One male only in a flower-rich area of abandoned cultivated terraces between Perama and Gastouri 10.V., the identification and placement to subspecies based on examination of the genitalia and comparison with the illustration on p.36 in Higgins (1975). This is the first record for Corfu, map 342 in Higgins and Riley (1980) suggests this species is absent from the western coasts of Albania and Greece opposite Corfu, though present in Yugoslavia further north.

The commonest and most widespread species was *Cynthia cardui*, followed by *Callophrys rubi* which was frequent along roadsides and in glades within olive groves or scrub, where spring flowers crowded together in a profuse and colourful display. These splendid localities for insects contrasted sadly with the barren remains of a once lush ground flora in those olive groves where weed-killers had been used. Here monotonous clumps of parched stalks and brown leaves stood in silence where formerly there had been the vibrant hum of multitudes of insects. It is to be hoped that this short-sighted and destructive practice will not displace the traditional grazing by goats and donkeys, which allows such a wealth of wildlife to flourish in olive groves throughout most of the island. Some fine coastal habitats are also in danger of disappearing through the building of hotels and associated holiday developments. For example, the sand dunes beside Lake Korission in the south-west of the island proved to be a superb habitat for many insects, but this fragile plant community is vulnerable to the increased trampling from visitors which would result from a northward extension of Agios Georgios village.

Corfu still has plenty of interest for the visiting entomologist. Further studies of the insect fauna would be worthwhile, and should result in some interesting discoveries.

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A Practical Guide to the Butterflies of Worcestershire, by Jack Green. 34 pp., 8 colour photo plates, 2 maps. 1982. The Worcestershire Naturalists' Trust, the Lodge, Beacon Lane, Rednal, Birmingham. Price £2.80.

This excellent book, which was on display at the BENHS Exhibition, 1982, is aimed primarily at the non-expert observer; but it includes the results of much intensive field work, photography, and study of past history by the author. After some introductory pages and short notes on a dozen species recorded in Worcestershire only in the past, a distribution table sets out the abundance, present known distribution, and larval foodplants of 45 species. This is followed by a chronological table ingeniously arranged to show when and where each species is likely to be seen, and recognition features for it. There are concluding pages on conservation and future prospect. English names only are used, but an Appendix lists both up-to-date scientific and English names for all butterflies regarded as British.

On the plates 64 photos show the 45 species at rest in natural surroundings, in judiciously selected cases in both sexes and with wings expanded or closed to reveal the undersides.

Last minute printing difficulties unfortunately defeated revision of the colour of the photos, and the author was obliged to observe very strict space limitations. It is unfortunate that there are no photos or descriptions of eggs, larvae or pupae, and few hints on how to find them, and more space could well have been devoted to the evidence about species believed to have occurred in the past in a county the Lepidoptera of which, as the author points out, have been generally neglected in the present century. The appetities of many readers will be whetted, but not satisfied by the bare statements that "the last Large Blue was probably at Abberley Hill circa 1920" and that "the Black-veined White finally disappeared from Craycombe in 1923", for which the author has in fact good though not quite conclusive indications.

This book could serve as a model for other county recorders, and it is well worth its price, both to the beginner and to the expert. One may hope that it may be followed by a much needed, though necessarily larger, work on the moths of Worcestershire.

R.F.B.

INDOOR MEETINGS

BENHS Special Meeting 24.vi.1982 at the Alpine Club, 74 South Audley Street, London W.1. The President, Mr. J. HEATH, put to the meeting the proposal that Mr. Derek Stimpson should be appointed a trustee of the British Entomological and Natural History Society in place of the late Mr. J.L. Messenger. Nine votes were cast in favour of the proposal and none against. The Secretary reported that 34 postal votes had been received in favour of the proposal and none against it, making a total of 43 votes for the proposal and none against it.

The President declared Mr. Derek Stimpson to be duly appointed a trustee of the Society in accordance with Bye-Law 4a.

Mr. S.N.A. Jacobs will continue in his position as the other trustee.

BENHS Meeting 8.vii.1982.–*Exhibits.* Lt. Col. A.M. EMMET: (1) Larval mines of *Etainia sphendamni* (Hering) in keys of field maple (*Acer campestre*) collected at Chigborough Lakes NR, near Malden, Essex on 7.vii.82. Normally these mines occur at very low density, but at this locality almost every key was attacked, often with more than one mine in a key. The bunch of seven keys exhibited carried twelve mines. (2) Larval mines of *Phyllonorycter saportella* (Dup.) on oak, collected at South Lopham, Norfolk on 3.vii.82. The mine differs from those of all other British oak-feeding *Phyllonorycter* except *P.roboris* (L.) in the absence of frass in the construction of the cocoon. It differs from *P. roboris* in being situated on the margin of the leaf and in having numerous small creases in the lower epidermis which cause the leaf-edge to fold over; *P. roboris* has its mine in the centre of the leaf and the lower epidermis lacks visible creases. The number of mines found at South Lopham was very small in proportion to the number of adults observed resting on the trunks in May. This supports the tradition that the mines are mostly high up on the tree.

Mr. K. MERRIFIELD; Female hornet (*Vespa crabro*) found in a building at Mylor, Cornwall, 2.vi.82; a worker hornet was found there about 1962 and there have been reported sightings since. He also showed a male *V. rufa*, one of a number found in a mass trying to mate with one female; after this female flew away, the males kept searching for her: possibly they were covered with a pheromone.

Mr. J.M. CHALMERS-HUNT: E.J. van Nieukerken's account of New and Rare Nepticulidae in the Netherlands published in *Entomologische Berichten*, 1982, 42(7): 104-112, in which mention is made of the second known specimen of *Ectoedemia bradfordi* Emmet.

The PRESIDENT: A specimen of *Opsiphanes tamarindi* Felder (Lep., Brassolidae), bred viii.80 from a pupa in a bunch of bananas imported from Belize. It was found on a market stall in Ramsey, Cambs., by Mrs. G.D. Oliver, and is believed to be the first record of this species from Britain.

Communications: The Secretary said she had offered the larvae of the moth *Cydia nigricana* F. (which had been devastating her peas) to her pet spiders, which had relished them. Mr. Chalmers-Hunt stated that 1982 was exceptional for the Heart Moth, *Dicycla oo*, a great many specimens having been noted at light and at sugar at Ashtead, Surrey during the latter half of June and early July, including several of the scarce *f. renago* Haw. (*sensu lato*).

Lecture: The butterflies of Bernwood Forest, by Miss C. Peachey.

BENHS Meeting 22.vii.1982.–The PRESIDENT announced the death of Dr. J.A. Lorimer.

Announcements: The 4th European Congress of Lepidopterology will be held in Budapest in April 1984. Mr. J. Heath has details of the possibility of an organised visit from the UK.

The Society had been invited to the Royal Entomological Society's meeting of October 6th, when Prof. D. Spencer-Smith would speak on *The Butterflies of Florida: a study of rapid faunal change.*

Communications: Mr. R. SOFTLY reported 17 *Acentria nivea* in his mercury vapour light trap at Hampstead on July 18th, whilst at Ken Wood 30 had appeared, including a mating pair.

Lecture: Mr. M.W.F. TWEEDIE celebrated *Thirty years of photographing insects*, illustrated by coloured slides of the superb standard that members have come to anticipate from him.

BENHS Meeting 9.ix.1982.—The PRESIDENT announced the deaths of Mr. G.R. Sutton and Mr. Beowulf A. Cooper. He also announced the death of Mrs. Ivy Classey, who was well-known to many of us as the wife of our member Eric Classey.

Exhibits: Mr. R. SOFTLY: a specimen of *Noctua pronuba* with an abdominal outgrowth.

Dr. A.A. ALLEN: two Hymenoptera, Braconidae (1) *Heterogamus dispar* Curtis, female swept from bracken under oak, 4.ix.1982, Brownsea Is., Dorset, a rare species of unknown host preferences, and first Dorset record (the exhibitor had shown one from S. Devon a year ago); (2) *Meteorus unicolor* (Wesmael), female swept from a cliff-top lane, 16.viii.1982, Shaldon, Devon; this capture represents the first English record, though previously recorded from Wales; the species is apparently exceedingly rare and the present exhibit is only the sixth record in the Western Palearctic region; it has been bred from the Zygaenidae. The exhibitor gratefully acknowledges the help of Mr. T. Huddleston (BMNH) (an authority on *Meteorus*) in confirming the identity of the specimen. He also exhibited living examples of *Coleophora maritimella* Newman, obtained by gathering seed-heads of *Juncus* sp. on saltmarsh, Brownsea Island, Dorset, 5.ix. 1982.

Mr. P.A. SOKOLOFF: larvae of *Plodia interpunctella* Hbn. (Lep: Pyralidae) consuming moths unwisely left on the setting boards for too long: a female moth originally escaped in the house some six years ago, and larvae are occasionally found around the house.

Mr. P.J. JEWESS: a living example of an extreme ab. of *Aglais urticae*, seemingly *semiichnusoides* Pronin, captured today, 9.ix, on buddleia, Woodstock near Sittingbourne, Kent. The PRESIDENT, Part I of the Polish Insect Red-data book dealing with the butterflies (50 spp. listed as threatened) and burnets (12 spp. listed) the full bibliographic reference of which is: Dabrowski, J. & Krzywicki, M., 1982 'Ginace i Zagrozone Gatunki Motyli (Lepidoptera) W Faunie Polski'. Czesc 1. Nadrodziny: Papilionoidea, Hesperioidea, Zygaenoidea. Published by the Polish Academy of Sciences.

Membership: Messrs. M. Murphy, N. Nash, P. Smithers and M.A. Walker and Drs. A.G. Moss and F.H.N. Smith were elected.

Communications: Mr. R.K. Merrifield, a *Herse convolvuli* L. imago was found, Mylor, Cornwall, 31.viii.82. Mr. C. Hart, *Colias croceus* Fourc., one at Ranmore, Surrey seen lately. Mr. R.F. Bretherton, of two *Cynthis cardui* L. noted at Bramley, Surrey on 27.viii, one was still there this morning.

Lecture: The establishment of the British Butterfly Fauna, by Dr. R.L.H. Dennis.

BENHS Meeting 23.ix.1982.—The President announced that a Special Life Member, Mr. T.H. Court, had died more than four years ago, but that only lately had the Society been made aware of this.

Exhibits: Lt. Col. A.M. EMMET: larval cases of *Coleophora tamesis* from Woodwalton Fen, Cambs. They were collected from *Juncus articulatus*, 19th September. *C. taeniipennella* feeds on the same plant but its case is smaller, albeit similar, but does not normally appear before October. *C. tamesis* was discovered near Oxford by Prof. Waters and named by him in 1929. Its life history remained unknown until 1968-69, when the exhibitor found cases at Ballyconneely, Co. Galway and reared adults. There appears to have been no subsequent record of the rearing of this species, though adults have occasionally been taken in light-traps.

Mr. J.M. CHALMERS-HUNT, a full-grown larva of *Alispa angustella* from Dartford Heath, Kent, where the larvae had been very plentiful this September in the berries of spindle. He also showed a full-grown larva of *Simyra albovenosa*, Powdered Wainscot (Reed Dagger) from eggs laid by a female taken at Stodmarsh, Kent.

Dr. A.A. ALLEN, a female of the rare *Goedartia alboguttatus* (Gravenhorst) (Hym.: Ichneumonidae) swept 5.ix.1982 as it alighted on a rhododendron leaf on Brownsea Island, Dorset. Little is known at present about this species in Britain, but it has been bred from the pupa of the lymantriid *Dasychira pudibunda*. Lepidopterous larvae: (1) *Gastropacha quercifolia*, inadvertently swept from sallow 8.viii.1982, Dawlish Warren, Devon; (2) *Agdistis bennetii* (Curtis) (Pterophoridae) commonly swept when very young from Sea-lavender, 5.ix.1982, Brownsea Island, Dorset. The larvae were feeding well: they turned dull reddish before each moult – whereupon a green larva was obtained.

Communications: Several among those present remarked on the recent occurrence at light of a number of migratory Lepidoptera. Mr. Bretherton for instance observed that at Bramley, Surrey, he had had *Rhodometra sacraria*, *Spodoptera exigua* and *Palpita unionalis* in his trap. Col. EMMET recorded seeing at Elmdon, Essex, on the 18th September, *Agrius convolvuli* together with about 200 *Phlogophora meticulosa*, and on the same night Mr. K. EVANS said he had taken *Heliothis peltigera* at Addiscombe near Croydon, Surrey.

Discussion with demonstrations: Entomological equipment and techniques – past and present.

The PRESIDENT. (1) Lepidopterist's Waistcoat. A cotton garment with built-in haversack on back, large inside pocket and six pockets on front. (2) "Fanny" bag. A pouch with zip fastener and worn around waist; useful for full pill-boxes when used in conjunction with the waistcoat. (3) Alvah Peterson, 1949. *A Manual of Entomological Equipment and Methods*.

Mr. K. MERRIFIELD: (1) A sweep net with a sleeve of heavy polythene sheeting to prevent the net catching in brambles, etc. (2) A modification to a standard cylindrical pooter, where the gauze over the suction tube was replaced by a piece of cloth across the diameter of the tube. This enabled a container of ethyl acetate to be attached in order to anaesthetise the insects without the collector having to inhale ethyl acetate fumes. (3) An insect trap (used by Dr. A. Irwin) made by cutting off and inverting the top of a clear plastic 2 litre lemonade or cola bottle.

Mr. J.M. CHALMERS-HUNT: A reproduced Clap Net, and a demonstration of its use.

Mr. B.R. BAKER: An apparatus which had proved successful over the years for reaching larvae on high branches. This consisted of a 3-joint, threaded aluminium pole with an open-ferruled top joint, and a double hook attached to 16 ft. of strong nylon rope having foot loops thereon. By placing one of the hooks in the open ferrule the rope can be raised and placed by means of the second hook over any chosen branch up to a height of 15 ft. The pole is then withdrawn and the rope very gently pulled downwards, tension being held by placing one's foot in the appropriate loop. Both hands are then free to work a beating tray. Having used the tray, the hook can be retrieved by using the jointed pole and the 'free' hook.

It was stressed that great care should be exercised in choosing a branch of suitable diameter and pliability otherwise damage to the tree and/or the operator could result; the apparatus should also be used having due respect for the habitat.

BENHS Meeting 14.x.1982.—From the Chair, Mr. R. FAIRCLOUGH announced the death of Mr. J.E. Delhanty of Cardiff and of Mr. G.A. Mitchell.

Exhibits: Mr. R. FAIRCLOUGH, larval cases on *Sueda maritima*, of a *Coleophora* found 9th October 1982 on the Essex coast in good numbers. He noted that the cases have pink or red in their coloration, and are therefore not as stated for *C. suaedivora* in A.M. Emmet *A Field Guide to the Smaller British Lepidoptera*, p.94. [This species has been bred by Mr. N. Heal, but has not yet been named. Ed.]

Mr. K. MERRIFIELD: *Mutilla europaea* L. (Hymenoptera: Mutillidae), male 'velvet ant', New Forest, Hants., 9.x.1982.

Dr. A.J. HALSTEAD: a male and female *Alophora hemiptera* F. (Diptera: Tachinidae). The male was taken on a hogweed flower just outside the RHS Garden, Wisley, Surrey on 6.viii.1982; the female from a wild angelica flower on Wisley Common on 12.viii.1982. This species does not appear to have been bred in this country, but known hosts in Europe are the shield bugs *Palomena prasina* and *Pentatoma rufipes. A. hemiptera* differs between the sexes in the shape and coloration of the wings.

Lecture: The Invertebrate Site Register, by Mr. A.E. Stubbs.

BENHS Meeting 11.xi.1982.—*Exhibits:* Dr. A.A. ALLEN: a series of *Euplectrus bicolor* (Swederus) (Hym: Eulophidae) bred from a larva of *Cucullia chamomillae* (Lep: Noctuidae). The host larva was obtained, with others, in a cornfield near Reigate, Surrey, 4.vii.1982. The host had several greenish-grey ova embedded near the dorsal surface of the sixth segment. Within three days the ova had hatched. The bluish-green ectoparasitic larvae pierced the host's skin and drained the larva, which slowly shrank and became discoloured. The mature larvae spun their rudimentary cocoons of rather coarse silk, within which the deep brownish-black pupae were clearly visible. Cocoon formation is unique to this species among Chalcidoidea. Ten adults were reared on 26.vii.82.

Lt. Col. A.M. EMMET: (1) Leaves of common lime *Tilia*x*vulgaris* collected in Chelsea on 23.x.1982 during the Society's Annual Exhibition and showing mines, moulting cocoons and feeding of *Bucculatrix thoracella*. The species was first noted in the West End of London by R.J. Heckford in 1981 and seems to be a recent colonist. It is remarkable for its extreme abundance and the foodplant: it usually feeds on small-leaved lime (*T. cordata*) and is reluctant to accept common lime. (2) A sprig of oak with tenanted mines of *Phyllonorycter saportella*. It was picked by P.H. Sterling about 25 ft. from the ground at South Lopham, Norfolk, on 4.xi.1982. The mines were plentiful at this height but relatively scarce near the ground. The tradition that this species prefers the upper part of the tree is hereby confirmed.

P.A. Sokoloff: (1) freshly-emerged specimens of *Bedellia somnulentella* reared from *Calystegia sylvatica* collected at the recent field meeting at Addington, Surrey. (2) Several imagines of *Mompha fulvescens* found in a greenhouse at Orpington, Kent on 6.xi.1982. 5 *fulvescens*, 9 *Emellina monodactyla* and 5 assorted *Agonopterix* spp. were found hibernating there.

Membership: Miss C.A. Morris and Messrs. A.P. Middleton, P. Turner and A.G. McGregor were elected.

Impressions of the Annual Exhibition were contributed by the official recorders or their surrogates. The upsurge in exhibits of microlepidoptera and the collapse of apparent interest in the formerly popular Coleoptera were noted.

BENHS Meeting 25.xi.1982.—*Communications:* Mr. R.W.J. UFFEN said that *Bucculatrix thoracella*, exhibited at the previous meeting from Chelsea, had been absent from Chiswick and from Hyde Park between 1946-72. He was confident of this because of his interest in other Lepidoptera which were formerly abundant on lime trees and had latterly disappeared. The familiar London insects

Glyphipteryx linneella and *Lycia hirtaria* had vanished from Chiswick. Privet-feeding nocturnal moths no longer rested on the street side of fences. These changes were correlated with the introduction of all-night arc-discharge street lighting in side roads. Sodium lighting was deleterious and he was led to suspect that it inhibits flight in many moths.

Mr. R.F. BRETHERTON reported a male *Apocheima pilosaria* at his Bramley, Surrey, light trap on 12th November and an *Orthosia stabilis* as early as September.

Mr. M. BROWN thought his record of *Ptilophora plumigera* at Park Wood, Kent on 1st November also to be early. Its usual companion, the December Moth, *Poecilocampa populi*, was absent.

The advertised lecture on badger ecology, by Mr. P. Mallinson, had been cancelled at short notice because of political pressure on the speaker. This unprecedented occurrence was a matter of concern to members.

Transparencies were shown by: Mrs. F.M. MURPHY (field meetings), Mr. J. MUGGLETON (Stag Beetle larvae and pupa), Lt. Col. A.M. EMMET (photographs by D.J. Carter of the early stages of *Crombrugghia distans* (Pterophoridae), disagreeing with the published descriptions although the moths agreed with Zeller's type), Mr. D. YENDALL (aquatic insects and their larvae) and Mr. A. CALLOW (diverse insects in the field in Cyprus, France, England and Wales).

BENHS Meeting 9.xii.1982.—*Exhibits:* Rev. D.J.L. AGASSIZ: three specimens of *Gelechia sabinella* (Zell.) from Enfield, Middx., one on 15.viii.1971 and two on 23.viii.1971. One of the latter records was published as the first British specimen. The other two, rather better specimens, had remained misidentified until now. A.N.B. Simpson took a moth in Worcester in the later 1970's.

Mr. A.J. HALSTEAD: two cocoons and a male and female of *Opogona sacchari* Bojer (Lep: Hieroxestidae) bred from stem-boring larvae attacking a *Yucca ?aloifolia* grown as a pot plant. The woody part of the yucca stem contained one pupa and two larvae. The larvae made clearly audible gnawing noises as they tunnelled in the outer part of the stem. The cocoons were made of silk and fibres from the centre of the stem.

O. sacchari occurs in most of the islands off the east and west coasts of Africa, but it has also become established in the New World. It has been imported into Britain with bananas, potato tubers, ginger roots, rubber plants and *Hibiscus*. The yucca is believed to have come from Guatemala via Holland.

Membership: Messrs. D. Barr, M.D. Eyre, S.J. Falk, D. Heaton, P.J. Hugh, A. Spalding and G.T. Speke and Dr. D.R. Cowden were elected.

Lecture: Some aspects of spider ecology, by Dr. E.A. DUFFEY. Topics included records of species biting man, of which quite small British species have been proved capable. Aerial dispersal and disjunct habitat distribution entered into his concluding discussion of the ecology of *Leptorhoptrum robustum* and *Erigone longipalpis* and *E. arcticum* in sewage beds.

An identification guide to the British Pugs: a correction

Mr. Stig Torstenius has pointed out an error in the genitalia figures of females on Plate XIV of this book. The wrong species is shown for *E. egenaria*. We apologise for this mistake and a drawing from the correct slide is shown. Self-adhesive copies of this drawing are available free on application.

15 egenaria

FIELD MEETINGS

BENHS Field Meeting: Chobham Common, Surrey, 15th May 1982. Leader: P.J. Baker.—A hot sunny day greeted members at this meeting, the primary purpose of which was the seeking of larvae of the macrolepidoptera.

Gorse, broom and heather were worked for larvae of *Plebejus argus*. As with previous attempts this insect was not found, though the imago was very common in the area later in the year. The Leader would like to be advised as to the habits of this larva by one who is better informed.

The season appeared a little backward and larvae were not generally common. Working oak and birch produced among others:— *Agriopis aurantiaria, Epirrita dilutata, Operophtera brumata, Achlya flavicornis, Colotois pennaria, Euproctis similis, Hydriomena furcata.*

Gonepteryx rhamni was common in flight and was seen ovipositing on a patch of buckthorn. Other imagines seen in flight or flushed were:— *Pieris rapae, Anthocharis cardamines, Pararge aegeria, Inachis io, Aglais urticae, Coenonympha pamphilus, Ematurga atomaria, Pachycnemia hippocastanaria, Cabera pusaria, Eupithecia nanata, Petrophora chlorosata* and *Anarta myrtilli.*

The highlight of the day was undoubtedly the finding of a superb completely melanic lizard. Whether this was *Lacerta vivipara*, the Common or Viviparous Lizard, or the rarer *L. agilis*, the Sand Lizard, could not be determined due to the complete lack of markings. At about 16.5 cms long it could well have been the rarer species which tends to be larger than its commoner relative (both species reportedly occur on Chobham Common).

The melanic form of this animal has been seen on several previous occasions by the leader. Its habitat seems to be low-lying sandy areas which are flooded in winter. In spring they dry out and are coated with a black layer of dried algae. When stationary on a black background the lizard is all but invisible. When it moves it is easily seen as it crosses the sandy breaks in the black algal ground covering.

BENHS Field Meeting: Dungeness, Kent 5-6.vi.1982. Leader: Paul Sokoloff. —Eight members attended this meeting on a warm, sunny day followed by a clear but warm night. During the afternoon the vegetation was searched for larvae. All the expected species were present with Lackey (*M. neustria*), White Satin (*L. salicis*) and Brown-tail (*E. chrysorrhoea*) common. The most abundant larva was that of the Cinnabar (*Tyria jacobaeae*), present in all stages from freshly hatched to fully grown. Moths were also noted. Of the microlepidoptera only the sallow-feeding *Epinotia caprana* was common.

The moss-covered shingles near the old lighthouse swarmed with small moths. Examination showed five species were present, given here in approximate order of abundance: *Teleiopsis diffinis, Monochroa tenebrella, Olethreutes lacunana, Plutella xylostella* and *Olethreutes rivulana* (a very early date for this last species).

About twelve lights were run at night and although nothing exceptional was seen all the usual Dungeness specialities were noted. *Calophasia lunula* was well worn by now but *Hadena albimacula* was in pristine condition. It was pleasing to see reasonable numbers of the small noctuid *Earias clorana* and amongst the smaller moths the *Ethmia* species *terminella* and *bipunctella* were quite common. Apart from *xylostella*, no immigrant species were noted, although three *atalanta* seen flying purposefully inland by the Long Pond may have been new arrivals. Altogether 160 species of Lepidoptera were noted.

BENHS Field Meeting: Pamber Forest, Hants., 12.vi.1982. Leader: B. Skinner. —Twelve members and friends attended this night meeting. Unfortunately this annual event was once again marred by poor weather conditions for although over twenty m.v.lamps were operated at a number of well separated sites only a total of 68 species of macro-lepidoptera were recorded. The more interesting of these were *Mesoleuca albicillata* (L.), *Euphyia unangulata* (Haw.), *Eupithecia plumbeolata* (Haw.), *Angerona prunaria* (L.), *Boarmia roboraria* (D. & S.), *Dypterygia scabriuscula* (L.), and *Herminia strigilata* (L.). Thanks again go to the Pamber Forest Management Committee for permission to visit this potentially rich locality.

BENHS Field Meeting: Markway Bridge, Oberwater, New Forest, Hants., 19/20.vi.1982. Leaders: E.H. Wild, T. Pickles. – This was one of the four meetings organised for the N.C.C. survey of river valleys in the Forest threatened by drainage schemes. The Conservancy has a full list of the insects recorded.

Twelve members and friends assembled in a minor cloudburst which confined them to their cars. After half an hour the sun came out and insects were soon on the wing. North of the bridge the stream is bounded by woodland with wet heath on its borders and this was the richest area. To the south numbers of roe deer were seen on much grazed, wet grass flats, and further on very wet bogland was examined. At night 8 lights were set up. It became rather cool and misty, especially in the open flats. 70 species of Lepidoptera were recorded, plus a male glow-worm. A small collection of other orders was preserved in alcohol. These have been identified at the B.M. (Nat. Hist.).

The drainage south of the road is a serious threat to one species of rare dragonfly, *Ischnura pumilio. Platycnemis pennipes* and commoner damselflies were recorded by Mr. Davey.

BENHS Field Meeting: Cavenham Heath NNR and Tuddenham Heath NNR, 31.vii-1.viii.1982. Leaders: M. Hadley and I.F.G. McLean. – 19 members and friends attended this weekend meeting at two adjacent Breckland National Nature Reserves. Two warm and sunny days brought out many flower-visiting insects and a calm night proved successful for moths. Among the hoverflies visiting the umbels of wild parsnip beside the River Lark at Cavenham *Chrysotoxum festivum* was of interest in this area, occurring in company with the large tachinid fly *Tachina grossa*, which is also seldom seen in East Anglia.

Several rare or local aculeate Hymenoptera were found, notably *Gorytes laticinctus, Lasioglossum quadrinotatum* and *Omalus violaceus* at Tuddenham and *Lasioglossum brevicorne* at Cavenham.

13 species of butterflies were seen. During the night on dry grass heath at Cavenham, mercury vapour lights (supplemented by an actinic fluorescent light next to the River Lark) attracted 136 species of macro moths. The most notable species were *Amathes stigmatica, Euschesis orbona, Eustrotia uncula, Lophopteryx cucullina, Mesotype virgata, Nonogria dissoluta, Rhyacia simulans* and *Sterrha muricata*.

Altogether this was a very enjoyable meeting and a significant contribution was made to our knowledge of the insects on these two reserves.

BENHS Field Meeting: Horsell Common, Surrey, 29.viii.1982. Leader: R.F. Bretherton. – Only one member, mainly interested in Coleoptera, joined the leader on this autumn holiday Sunday. The morning was spent on the Common in good sunshine but with a rising south-west wind. The heather bloom was just past its best, and in this early season the more interesting Lepidoptera usually to be found here in August appeared to be over. Pupae of *Scoliopteryx libatrix* were found in spinnings on *Salix caprea*, and many larvae of *Anarta myrtilli* and of several geometers were swept from *Calluna vulgaris* and *Erica tetralix*. Coleoptera identified were *Platystethus arenarius, Scymnus suturalis, Chilocorus bipustulatus, Exochromus quadripustulatus, Cylindrinotus laevioctostriatus, Lochmaea suturalis, Lochmaea caprea, Derytomus rufatus*. These can be considered to be indicator species for this type of locality.

BENHS Field Meeting: Woodwalton Fen, Cambs., 25.ix.1982. Leader: A.M. Emmet.—The meeting was attended by nine members and friends in bright, sunny weather. Leaf-mining Lepidoptera were the main interest but records were also made of Diptera, Coleoptera and Arachnida.

In all, 99 species of Lepidoptera were recorded, at least seven of them apparently new records for vice-county 31 (Huntingdonshire). These were *Ectoedemia mediofasciella* (Haworth), tenanted mines on *Betula; Stigmella splendidissimella* (Herrich-Schäffer), vacated mines on *Rubus caesius; S. continuella* (Stainton), vacated mines on *Betula; S. centifoliella* (Zeller), vacated mines on *Rosa; Bucculatrix frangulella* (Goeze), vacated mines on *Frangula; Caloptilia robustella* Jäckh, vacated mines and cones on *Quercus*; and *Coleophora tamesis* Waters, tenanted larval cases on *Juncus articulatus*. The last species has been reared from the west of Ireland but it is believed that these larvae were the first ever to have been found in England.

Other species of interest included *Stigmella ulmariae* (Wocke), *S. regiella* (Herrich-Schäffer), *Tischeria angusticollella* (Duponchel), *Acrocercops imperialella* (Zeller), *Phyllonorycter cavella* (Zeller), *P. quinqueguttella* (Stainton), *Coleophora potentillae* Elisha, *C. albidella* (Denis & Schiffermüller), *Agonopterix propinquella* (Treitschke), *Ethmia funerella* (Fabricius) and *Epinotia sordidana* (Hübner). A full list of the species recorded has been sent to the Nature Conservancy, who administer the Fen and who kindly gave permission for the field meeting to be held.

Following the meeting, members were entertained to supper by the President and Mrs. Heath. Thus refreshed, several members spent the evening discussing the work involved in preparing *Moths and Butterflies of Great Britain and Ireland.*

BENHS Field Meeting: Featherbed Lane, Addington, Surrey, and West Wickham, Kent, 24.x.1982. Leader: J.M. Chalmers-Hunt.—In what has been described as the wettest October on record, the five members present, including the leader, were indeed fortunate to enjoy a dry, windless, pleasantly warm and sunny day. One of the main objects of this meeting was to look for the local microlepidopteron *Phyllonorycter scabiosella*, for which Featherbed Lane is the best known locality. The larva mines the radical leaf of *Scabiosa columbaria*, and it was not long before the first tenanted mine was spotted by Paul Sokoloff. This was followed by the discovery of many more mines of *scabiosella*, though it was often necessary to part the grass around the base of the plants in order to see them.

Other microlepidoptera noted were: *Coleophora lineola* (young cases on *Stachys sylvatica*), *C. albitarsella* (young cases on *Origanum vulgare*), *C. discordella* (a single large case on *Lotus corniculatus*), *C. paripennella* (small cases on *Centaurea nigra*), *Reuttia subocellea* (numerous cases on seedheads of *O. vulgare* found by Dr. John Langmaid), *Bedellia somnulentella* (larvae in mines in leaves of *Calystegia sylvestris*), *Bucculatrix frangulella* and *Stigmella catharticella* (larval mines of both species in *Rhamnus catharticus*), *Caloptilia auroguttella* (larval leaf cones on *Hypericum perforatum* found by Norman Hall) and a single freshly emerged male of *Diurnes phryganella*.

Among the butterflies, two *Vanessa atalanta* were noted on the wing as well as a single male *Gonepteryx rhamni*, this being one of the best years on record for the former. While looking for *scabiosella*, Norman Heal found a larva of *Ochlodes venata* (the early stages of which are very seldom encountered): it was full grown and spun up in a scabious leaf.

The second part of the meeting took place at West Wickham, where the leader showed the way to a special locality for the local and scarce *Coleophora orbitella*, and where after a brief search cases of this species were found on birch.

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Revision of MACROLEPIDOPTERA OF BUCKINGHAMSHIRE

Records of all species from all parts of the county are required, particularly those since 1968. Records should include at least species, date and location (map ref. if possible). Please also make contact if you have records but no time to collate them, or if you can suggest sources of records.

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Frequent Field Meetings are held at weekends in the Summer. Visitors are welcome at all meetings.

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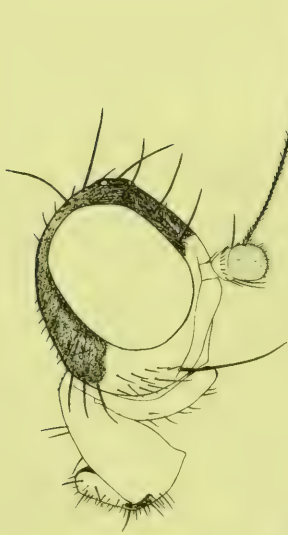

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1906–7 R. Adkin, F.E.S. (dec.)
1908–9 A. Sich, F.E.S. (dec.)
1910–1 W. J. Kaye, F.E.S. (dec.)
1912–3 A. E. Tonge, F.E.S. (dec.)
1914–5 B. H. Smith, B.A., F.E.S. (dec.)
1916–7 Hy. J. Turner, F.E.S. (dec.)
1918–9 Stanley Edwards, F.L.S., etc. (dec.)
1920–1 K. G. Blair, B.SC., F.E.S. (dec.)
1922 E. J. Bunnett, M.A. (dec.)
1923–4 N. D. Riley, F.Z.S., F.E.S. (dec.)
1925–6 T. H. L. Grosvenor, F.E.S. (dec.)
1927–8 E. A. Cockayne, D.M., F.R.C.P., F.E.S. (dec.)
1929 H. W. Andrews, F.E.S. (dec.)
1930 F. B. Carr (dec.)
1930 C. N. Hawkins, F.E.S. (dec.)
1931 K. G. Blair, B.SC., F.Z.S., F.E.S. (dec.)
1932 T. H. L. Grosvenor, F.E.S. (dec.)
1933 C. G. M. de Worms, M.A., PH.D., A.I.C., F.R.E.S., M.B.O.U. (dec.)
1934 T. R. Eagles (dec.)
1935 E. E. Syms, F.R.E.S. (dec.)
1936 M. Niblett (dec.)
1937 F. J. Coulson (dec.)
1938 F. Stanley-Smith, F.R.E.S. (dec.)
1939 H. B. Williams, LL.D., F.R.E.S. (dec.)
1940 E. A. Cockayne, D.M., F.R.C.P., F.R.E.S. (dec.)
1941 F. D. Coote, F.R.E.S. (dec.)
1942 S. WAKELY (dec.)
1943 R. J. Burton, L.D.S., R.C.S.ENG. (dec.)
1944 Stanley N. A. Jacobs, F.R.E.S.
1945–6 Capt R. A. Jackson, R.N., F.R.E.S. (dec.)
1947 L. T. Ford, B.A. (dec.)
1948 Col. P. A. Cardew (dec.)
1949 J. O. T. Howard, M.A. (dec.)
1950 Air-Marshal Sir Robert Saundby, K.B.E., C.B., M.C., D.F.C., A.F.C. F.R.E.S. (dec.)
1951 T. G. Howarth, B.E.M., F.R.E.S., F.Z.S.
1952 E. W. Classey, F.R.E.S.
1953 F. Stanley-Smith, F.R.E.S. (dec.)
1954 Stanley N. A. Jacobs, S.B.ST.J., F.R.E.S.
1955 F. D. Buck, A.M.I.PTG.M., F.R.E.S. (dec.)
1956 Lt.-Col. W. B. L. Manley, F.R.E.S.
1957 B. P. Moore, B.SC., D.PHIL., F.R.E.S.
1958 N. E. Hickin, PH.D., B.S;., F.R.E.S.
1959 F. T. Vallins, A.C.I.I., F.R.E.S. (dec.)
1960 R. M. Mere, F.R.E.S. (dec.)
1961 A. M. Massee, O.B.E., D.SC., F.R.E.S. (dec.)
1962 A. E. Gardener, F.R.E.S. (dec.)
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1966 J. A. C. Greenwood, O.B.E., F.R.E.S.
1967 R. F. Bretherton, C.B., M.A., F.R.E.S.
1968 B. Goater, B.SC., F.R.E.S.
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1972 Prof. H. E. Hinton, PH.D., B.SC., F.R.S., F.R.E.S. (dec.)
1973 J. M. Chalmers-Hunt, F.R.E.S.
1974 C. MmacKechnieJarvis, F.L.S., F.R.E.S.
1975 M. G. Morris, M.A., PH.D., F.R.E.S.
1976 W. G. Tremewan, M.I.BIOL.
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LARVAL COLOUR VARIATION IN *PHLOGOPHORA METICULOSA* (L.). PART II: GENETIC CONTROL IN INSTARS 3–5

by M.E.N. MAJERUS

Department of Genetics, Downing Street, Cambridge CB2 3EH

SUMMARY

Many species of Lepidoptera have both green and brown larval forms.

In the later instars the larvae of *Phlogophora meticulosa* exhibit wide discontinuous variation. Six distinct colour types occur, these being Green, Olive, Brown, Plain Yellow, Yellow Green and Yellow Brown.

The results of a large number of broods of *Phlogophora meticulosa,* reared to determine the mechanism of inheritance of this variation are described.

Due to colour changes between instars a total of sixteen phenotypes are involved in the system.

The larval variation is shown to be controlled by eleven alleles from five unlinked loci.

The way in which the eleven alleles interact through dominance and epistatic effects to produce the sixteen phenotypes is described.

The possible ways in which the genetic system may act to cause changes in larval colour between instars is briefly discussed.

INTRODUCTION

Many species of Lepidoptera are polymorphic for larval colour. Frequently both green and brown forms occur, particularly in the Noctuidae.

It has been shown that the larvae of the moth *Phlogophora meticulosa* exhibit wide colour variation particularly in the 3rd, 4th and 5th instars (Majerus 1978, 1983). In the wild all 1st and 2nd instar larvae are green, the hue and shade of green being determined by the colour of the food ingested. This is also true of the majority of the 3rd instar larvae. However, five other colour types occur in the 3rd instar. These have been named the Olive (Ol), Brown (Br), Plain Yellow (PY), Yellow Green (YG), and Yellow Brown (YB) main colour types, and their colour limits have been defined in terms of chroma, hue and shade (Majerus *loc. cit.).* These colour types together with a green main colour type (Gr) which has different limits to the green colour type found in the 3rd instar (3IG) also occur in 4th and 5th instar larvae.

The discontinuous nature of the larval variation in the later instars suggests that this variation is controlled genetically or by environmental factors under the influence of a threshold switch effect.

This paper describes work carried out to discover the exact mode of control of larval colour in the later instars.

METHODS

To investigate the control of larval colour variation in the later instars, 67 initial broods (IB), were raised from eggs laid by feral, fertilised females, the larval phenotype of which was unknown. 189 further broods from parents with known larval phenotypes were reared, these being called controlled crosses(CC or YCC). All broods were raised under similar conditions on common sorrel, *Rumex acetosa* L., using the breeding methods described by Majerus (1978, 1983). As the rate of development of the larvae in a particular brood was generally uniform and yet there was still wide variation in the colour of the 3rd, 4th and 5th instar larvae, both within a single brood and between broods, a genetic mechanism of control was indicated. Analysis of the results of the initial broods and subsequent control crosses has led to

TABLE 1a Parental details of some of the broods bred to determine the mechanism controlling the colours Green, Olive and Brown in the later instars.

Brood	Details of parent 1					Details of parent 2				
	Origin	Phenotype	Genotype			Origin	Phenotype	of Genotype		
			Alleles of genes:					Alleles of genes:		
			c	b	a			c	b	a
IB1	Wild	Unknown	$(c'c')$	$b'b^{o}$	$a'a'$	Wild	Unknown	(c^+c')	$b^{o}b^{o}$	$a'a'$
IB2	Wild	Unknown	c^xc^x	$b'b'$	$a'a'$	Wild	Unknown	c^xc^x	$b'b'$	$a'a'$
IB3	Wild	Unknown	(c^xc^x)	$b'b^{o}$	a^+a^+	Wild	Unknown	(c^xc^x)	$b'b^{o}$	a^xa^x
IB4	Wild	Unknown	$c'c'$	$b^{o}b^{o}$	a^+a^+	Wild	Unknown	$c'c'$	$b^{o}b^{o}$	a^xa^x
IB5	Wild	Unknown	c^xc^x	$b'b'$	a^+a'	Wild	Unknown	c^xc^x	$b'b'$	$a'a'$
IB6	Wild	Unknown	(c^+c^+)	$b'b'$	$a'a'$	Wild	Unknown	(c^xc^x)	$b^{o}b^{o}$	$a'a'$
IB7	Wild	Unknown	(c^+c^+)	$b^{o}b^{o}$	a^xa^x	Wild	Unknown	c^xc^x	$b^{o}b^{o}$	a^xa^x
IB8	Wild	Unknown	(c^+c^+)	$b'b'$	$a'a'$	Wild	Unknown	(c^xc^x)	$b'b^{o}$	$a'a'$
IB9	Wild	Unknown	(c^+c^+)	$(b'b^{o})$	a^+a^+	Wild	Unknown	(c^xc^x)	$(b^{o}b^{o})$	a^xa^x

Brood	Details of male parent					Details of female parent				
	Origin	Phenotype	Genotype			Origin	Phenotype	Genotype		
			Alleles of genes:					Alleles of genes:		
			c	b	a			c	b	a
CC1	IB1	3Gr401501	c^+c'	$b'b^{o}$	$a'a'$	IB2	3Gr401501	c^+c'	$b'b^{o}$	$a'a'$
CC2	IB2	3Gr4Gr5Gr	c^+c^+	$b'b'$	$a'a'$	IB3	3Gr4Gr5Br	c^+c^+	$b'b'$	a^+a^+
CC3	IB3	3Gr4Gr5Br	c^xc^x	$b'b'$	a^+a^+	IB2	3Gr4Gr5Gr	c^xc^x	$b'b'$	$a'a'$
CC4	IB2	3Gr4Gr5Gr	c^xc^x	$b'b'$	$a'a'$	IB3	3Gr4Gr5Br	c^xc^x	$b'b'$	a^+a'
CC5	CC2	3Gr4Gr5Br	c^xc^x	$b'b'$	a^+a'	CC3	3Gr4Gr5Br	c^xc^x	$b'b'$	a^+a'
CC6	CC3	3Gr4Gr5Br	c^xc^x	$b'b'$	a^xa^x	CC4	3Gr4Gr5Br	c^xc^x	$b'b'$	a^+a'
CC7	CC1	3Gr4Br5Br	(c^+c^+)	$b^{o}b^{o}$	$a'a'$	CC1	3Gr4Br5Br	(c^+c^x)	$b^{o}b^{o}$	a^xa^x
CC8	IB2	3Gr4Gr5Gr	(c^+c^+)	$b'b'$	$a'a'$	IB4	3Br4Br5Br	$(c'c')$	$b^{o}b^{o}$	a^xa'
CC9	CC8	3Gr401501	$c\ \overset{+}{c}'$	$b'b^{o}$	$a'a'$	CC8	3Gr401501	c^+c'	$b'b^{o}$	$a'a'$
CC10	CC9	3Br4Br5Br	$c'c'$	$b^{o}b^{o}$	$a'a'$	CC9	301401501	$c'c'$	$c'c^{o}$	$a'a'$
CC11	IB3	3Gr4015Br	(c^+c^+)	$b'b^{o}$	a^+a'	IB3	3Gr4015Br	(c^+c^x)	$b'b^{o}$	a^+a'
CC12	CC11	3Gr4Gr5Gr	(c^+c^x)	$b'b'$	$a'a'$	CC11	3Gr4015Br	(c^+c^+)	$b'b^{o}$	a^+a'
CC13	IB4	3Br4Br5Br	$c'c'$	$b^{o}b^{o}$	a^+a'	IB1	3Gr401501	c^+c'	$b'b^{o}$	$a'a'$

N.B. The suffix x used with the alleles in some of the genotypes indicates that the allele present was not known, nor could it be deduced from the information contained in this paper.

The use of brackets round some of the alleles indicates that the genotype of the parents with respect to these alleles could have been reversed.

TABLE 1b Colour type analysis of some of the broods bred to determine the mechanism controlling the colours Green, Olive and Brown in the later instars.

Brood	Third instar larvae of colour types:			Fourth instar larvae of colour types:			Fifth instar larvae of colour types:		
	Gr	Ol	Br	Gr	Ol	Br	Gr	Ol	Br
1B1	86	49	44	–	92	82	–	86	81
1B2	159	–	–	156	–	–	155	–	–
1B3	46	–	–	10	26	9	–	–	43
1B4	–	–	195	–	–	192	–	–	187
1B5	290	–	–	287	–	–	137	–	146
1B6	137	–	–	–	132	–	–	132	–
1B7	56	–	–	–	–	50	–	–	49
1B8	157	–	–	72	75	–	66	69	–
1B9	92	–	–	–	46	42	–	–	84

Brood	Third instar larvae of colour types:			Fourth instar larvae of colour types:			Fifth instar larvae of colour types:		
	Gr	Ol	Br	Gr	Ol	Br	Gr	Ol	Br
CC1	52	8	4	14	31	16	14	31	16
CC2	236	–	–	235	–	–	–	–	228
CC3	136	–	–	133	–	–	–	–	130
CC4	72	–	–	72	–	–	34	–	37
CC5	60	–	–	56	–	–	12	–	43
CC6	157	–	–	153	–	–	44	–	108
CC7	78	–	–	–	–	74	–	–	73
CC8	149	–	–	–	147	–	–	74	69
CC9	111	15	7	32	68	31	29	67	31
CC10	–	62	70	–	59	66	–	56	65
CC11	240	–	–	60	126	53	18	27	189
CC12	168	–	–	80	85	–	40	43	79
CC13	76	42	38	–	79	72	–	36	113

an explanation of the larval colour variation in later instars which is based upon five unlinked major genes, and involves a complex system of epistatic interactions.

RESULTS

To explain the constitution of the genetic mechanism only the results from 10 initial broods (IB1–9 inclusive and IB46), together with 31 of the control crosses (CC1–13 and YCC1–18), will be discussed in detail.

The parental details of broods IB1–9 and CC1–13 are tabulated in Table 1a, the colour types of 3rd, 4th and 5th instar progeny of these broods being given in Table 1b. Similarly the parental details of broods IB 46, and YCC1–18 are given in Table 2a, the colour types of the progeny in the last three instars being tabulated in Table 2b.

In all 1,391 broods were reared between 1975 and 1981 and all the results obtained agree with the conclusions outlined in the following text.

The method of scoring larvae was as that described by Majerus (1983). All larvae which fall within the limits of one or other of the colour types defined and limited by Majerus (1978, 1983) were assigned to that colour type. Only 49 larvae, out of a total of 55, 178 reared in the 1B and CC broods, fell outside these colour type limits. 35 of these had scores within one hue or shade of the limits of one of these colour types, and have been included with them. Never more than four appeared in a single brood. The other 14 larvae, all from the same brood, were green with a distinct pink tinge in the 4th instar. These larvae will be discussed later.

ANALYSIS OF RESULTS: THE Gr, Br, O1 COMPLEX

It was decided that splitting the colour types, found in the last three instars, into two groups would appreciably ease the explanation of the results and, as many broods contained no yellow larvae of any sort, the mechanism controlling the Gr, O1 and Br colour types will be outlined first.

When viewing the results of the initial broods which had no yellow larvae in their progeny (Tables 1a and 1b), a number of points were noted.

(i) A number of broods showed changes in the colour type of some, or all larvae, between the 2nd and 3rd instars.

(ii) Some broods showed changes in the colour type of some, or all larvae, between the 3rd and 4th instars.

(iii) In some broods changes occurred in the colour type of some, or all larvae, between the 4th and 5th instars.

(iv) Colour type changes within broods were often not confined to one ecdysis, in that changes occurred in some broods at all three of the later ecdyses e.g. CC13. Furthermore, individual larvae sometimes changed colour twice, changing either at the 2nd or 3rd larval ecdysis, and again at the 4th ecdysis e.g. IB3; however, none of the larvae changed colour at both the 2nd and 3rd ecdyses.

(v) No changes of colour from O1 or Br to Gr were observed.

(vi) No changes of colour from Br to O1 were observed.

(vii) All green to O1 changes observed, occurred at either the 2nd or 3rd larval ecdysis.

(viii) Changes from green to Br occurred at either the 2nd, 3rd or 4th larval ecdysis.

(ix) All O1 to Br changes occurred at the 4th larval ecdysis.

(x) Eight phenotypes were observed, excluding those involving any of the yellow colour types. Each phenotype was given a particular notation determined by the colour in each instar. For example larvae which were green in all the later instars were notated as 3Gr 4Gr 5Gr* whilst those which were green in the 3rd, olive in the 4th and brown in the 5th were given the notation 3Gr 4O1 5Br.

The control mechanism detailed below is the simplest hypothesis, and in fact the only hypothesis yet tested which is consistent with the data observed.†

The first gene to be identified was given the symbol a. This caused changes of colour between the 4th and 5th instars.

* The abbreviation 3Gr is used for 3rd instar green larvae in this explanation because, as will be shown later, the green colour type in the 3rd instar is made up of larvae of two genotypes which are not phenotypically distinguishable from one another or, due to the overlapping of the 31G and Gr colour types, from the green colour type found in the 4th instar larvae.

† For a discussion of some of the most likely other mechanisms tested see Majerus 1978 pp. 142–148.

It has been noted that all colour changes in the Gr, Br, Ol complex between the 4th and 5th instars are from either Gr to Ol to Br. These changes are controlled by a biallelic gene with complete dominance. One allele, a^+, causes larvae to be Br in the 5th instar, irrespective of their 4th instar colour. The other allele, a', causes no change in colour from the 4th instar. In CC2 and CC3 which were 4Gr 5Gr × 4Gr 5Br crosses, all progeny were 3Gr 4Gr 5Br, indicating that a^+ is dominant to a' and in these two crosses the 4Gr 5Br parent is homozygous for a^+. CC4, again a 4Gr 5Gr × 4Gr 5Br cross produced a 1:1 ratio of parental types, indicating that in this case the 4Gr 5Br parent was the heterozygote a^+a'.

All the 5Br progeny of CC2–4 inclusive, should have been heterozygous, as the 4Gr 5Gr parent must be homozygous recessive for gene a. Therefore, crosses between these 5Br larvae ought to give a 3:1 ratio of brown to green (non-brown) larvae in the 5th instar. CC5 and CC6 show that this does occur.

4th instar colour in the Gr, Br, Ol, complex is controlled by a biallelic gene, b. Its alleles b' and $b°$ exhibit incomplete dominance. From the progeny of IB3 which approximates to a 1:2:1 ratio of Gr:Ol:Br:, it was deduced that Gr and Br are produced by the two homozygotes $b'b'$ and $b°b°$ respectively, Ol being produced by the heterozygote $b'b°$.

4Gr × 4Gr crosses give all 4Gr progeny in broods CC2–6 inclusive, showing green to be pure breeding. Similarly 4Br × 4Br crosses produce all 4Br progeny, (e.g. CC7). 4Ol × 4Ol give a 1:2:1 ratio of Gr to Ol to Br 4th instar progeny (e.g. CC1, CC9 and CC11) whilst 4Ol × 4Gr and 4Ol × 4Br crosses give a 1:1 ratio of the parental types (CC12 and CC10 respectively). Finally, 4Gr × 4Br crosses give only 4Ol progeny (e.g. CC8).

We may now return briefly to the 14 abnormal larvae which were of a green pink colour. These larvae all came from brood IB61 in which the remaining 16 larvae were green in the 4th instar, all the larvae being Br in the 5th instar. The number of green-pink to normal Gr larvae in the 4th instar approximates to a 1:1 ratio. It seems probable that the green pink form is caused by a unifactorial dominant allele, which may be allelomorphic to b' and $b°$. Due to its rarity, the green pink form is not considered to be an important part of the polymorphism under consideration. Indeed only 12 of the 14 larvae in question attained the adult state. Of these 12 imagines, seven were severely crippled and would not mate, even using hand pairing techniques such as those described by Clarke and Sheppard (1956). The other five imagines (four males and one female) enlarged their wings fully and two of these seemed to pair successfully. The female laid 41 ova; however, none of these hatched. It seems that the allele producing green pink has strong adverse affects on some aspects of the physiology of the insects carrying it, so this allele is unlikely to be maintained in a population.

Colour changes between the 2nd and 3rd instars appear to be controlled by two biallelic genes, as the 3rd instar progeny of CC9 are 111 green, 15 olive and 7 brown, which approximates to a 13:2:1 ratio.

Consideration of the results of the IB and CC broods led to the deduction that one of the genes involved was gene b which has already been discussed. The second gene, named c, is biallelic with complete dominance. The dominant allele of gene c, c^+, produces larvae the colour of which, in the 3rd instar, is determined to a great extent by foodplant. The recessive allele, c', causes the effect of gene b to be instigated at the start of the 3rd instar. Thus, $c'c'b'b°$ larvae will produce 3Ol 4Ol larvae, whereas $c^+c'b'b°$ or $c^+c^+b'b°$ will give 3rd instar larvae which are green, the exact hue or shade being affected by foodplant, and olive 4th instar larvae.

On the basis of the hypothesis the progeny of IB4 must be homozygous recessive for c, as they are all Br in the 3rd instar. The progeny of CC8 must then be c^+c', as one of the parents (from IB4) is known to be $c'c'$, and yet all the progeny are green in the 3rd instar, but Ol in the 4th instar. On this basis, the parents of CC9 which were progeny from CC8 must have had the genotype $c^+c'b'b°$. Therefore, of the 3rd instar larvae of CC9, three-quarters would be expected to contain c^+, and thus be green;

1/16th would be c'c'b'b' and, again, be green due to b' being homozygous; 2/16th would be c'c'b'b°, producing olive due to b'b° being expressed phenotypically in the 3rd instar, and 1/16th would be c'c'b°b°, and thus brown due to b°b° being expressed in the 3rd instar. Thus a 13:2:1 ratio of Gr:Ol:Br larvae would be expected in the 3rd instar of CC9, as was observed. All the data from other broods support this genetic mechanism.

ANALYSIS OF RESULTS: THE PY, YG, YB COMPLEX

When viewing the results of broods IB46 and YCC1–18 inclusive, which are given in Tables 2a and 2b, the following points were noted.

(i) In broods YCC1–YCC8 inclusive none of the larvae were yellow at any stage.

(ii) Broods YCC9–YCC18 inclusive all contained some larvae of the yellow types, these larvae constituting approximately 1/16th of the total number of larvae in each brood.

(iii) In some broods the yellow larvae were all of one colour type (YCC11) whilst in others two of the yellow colour types were present (YCC9).

(iv) In some broods yellow colour types arose at the 2nd larval ecdysis (YCC9).

(v) In one brood (YCC15) the yellow colour types arose at the 3rd larval ecdysis.

(vi) In some broods some of the larvae of one yellow colour type change to another of the yellow colour types at the 4th larval ecdysis (e.g. YCC16). Such changes were always from PY to YB and changes of this type never occurred at the 3rd ecdysis, nor were any yellow larvae ever observed to change colour to Gr, Ol or Br.

In the light of these results a mechanism to explain the occurrence of larvae of the three yellow colour types was formulated.

As no yellow larvae occurred in broods YCC1–8 inclusive it appears that yellow is recessive to non-yellow. In the broods YCC9–18 inclusive yellow larvae in every case represent approximately 1/16th of 4th instar larvae. This indicates that the parents of these broods were heterozygous for the genes involved, and that yellow may be the result of a double homozygous recessive.

If the results of YCC9, YCC10 and YCC11 are considered, the parents, in each case were 3Ol 4Ol 5Ol progeny from YCC1, so the parental genotypes of these broods must have been c'c'b'b°a'a'. Although the total number of yellow larvae in these broods is always approximately 1/16th of the total number of larvae, the frequencies of the three yellow types in these three crosses are quite distinct. YCC9 gives ratio of YG to PY approximating to 3:1. Similarly the yellow larvae in YCC1 approximate to a 3:1 ratio of YB to PY, whilst in YCC1 all yellow larvae are of the PY type*.

If these ratios are considered in relation to the total number of larvae in each brood, then in YCC9, approximately 3/64th of the larvae are YG and 1/64th are PY, which indicates that at least three heterozygous loci are involved one of which may be b'b°. It seems then that at least two more genes, in addition to a, b and c are present in the system. If these are both biallelic and heterozygous in the parents of YCC9, then the observed ratio of 1:15, yellow to non-yellow larvae would be expected. However, this system does not explain the occurrence of two distinct types of yellow larvae in the brood. The situation is further complicated by the occurrence of 3/64th YB and

* As the number of yellow larvae in these broods is very small, statistical comparisons between observed and expected results will not be invoked at this stage. However, more extensive data will be introduced later in the paper.

TABLE 2a Parental details of some of the broods reared to determine the mechanism controlling the colours, Plain Yellow, Yellow Green and Yellow Brown in the later instars.

Brood	Details of parent 1				Details of parent 2			
	Origin	Phenotype	Genotype		Origin	Phenotype	Genotype	
IB46	Wild	Unknown	$c^xc^xb^xb^xa^xa^xd'd'$	$(e^{\circ}e^{\circ})$	Wild	Unknown	$c^xc^xb^xb^xa^xa^xd'd'$	$(e'e')$
YCC1	MS63	3Gr4Gr5Gr	$c^xc'b^{\circ}b^{\circ}a'a'd^+d^+$ or	e^+e^+	IB46	3PY4PY5PY	$c'c'b'b'a'a'd'd'$	$e'e^{\circ}$
YCC2	MS71	3Br4Br5Br	$c'c'b^{\circ}b^{\circ}a'a'd^+d^+$ or	e^+e^+	IB46	3PY4PY5PY	$c'c'b'b^{\circ}a'a'd'd'$	$e'e^{\circ}$
YCC3	IB46	3PY4PY5PY	$c'c'b'b^{\circ}a'a'd'd'$	$e'e^{\circ}$	MS71	3Gr4O15O1	$c^+c'b'b^{\circ}a'a'd^+d^+$ or	e^+e^+
YCC4	MS74	3O14O15O1	$c'c'b'b^{\circ}a'a'd^+d^+$ or	e^+e^+	IB46	3PY4PY5PY	$c'c'b'b'a'a'd'd'$	$e'e^{\circ}$
YCC5	IB46	3PY4PY5PY	$c'c'b^{\circ}b^{\circ}a^xa^xd'd'$	$e'e^{\circ}$	MS75	3Br4Br5Br	$c'c'b^{\circ}b^{\circ}a^xa^xd^+d^+$ or	e^+e^+
YCC6	MS76	3Gr4Gr5Gr	$c^xc^xb'b'a'a'd^xd^x$ or	e^xe^x	IB46	3PY4PY5PY	$c'c'b'b'a'a'd'd'$	$e'e^{\circ}$
YCC7	IB46	3PY4PY5PY	$c'c'b'b^{\circ}a'a'd'd'$	$e'e^{\circ}$	MS76	3Gr4O15Br	$c^+c^+b'b^{\circ}a^+a'd^+d^+$ or	e^+e^+
YCC8	MS79	3Gr4Gr5Gr	$c^xc^xb'b'a'a'd^xd^x$ or	e^xe^x	IB46	3PY4PY5PY	$c'c'b'b'a'a'd'd'$	$e'e^{\circ}$
YCC9	YCC1	3O14O15O1	$c'c'b'b^{\circ}a'a'd^+d'$	e^+e°	YCC1	3O14O15O1	$c'c'b'b^{\circ}a'a'd^+d'$	e^+e°
YCC10	YCC1	3O14O15O1	$c'c'b'b^{\circ}a'a'd^+d'$	e^+e'	YCC1	3O14O15O1	$c'c'b'b^{\circ}a'a'd^+d'$	e^+e'
YCC11	YCC1	3O14O15O1	$c'c'b'b^{\circ}a'a'd^+d'$	(e^+e')	YCC1	3O14O15O1	$c'c'b'b^{\circ}a'a'd^+d'$	(e^+e')
YCC12	YCC2	3O14O15O1	$c'c'b'b^{\circ}a'a'd^+d'$	e^+e'	YCC3	3O14O15O1	$c'c'b'b^{\circ}a'a'd^+d'$	e^+e'
YCC13	YCC4	3Gr4Gr5Gr	$c'c'b'b'a'a'd^+d'$	(e^+e°)	YCC5	3Br4Br5Br	$c'c'b^{\circ}b^{\circ}a'a'd^+d'$	(e^+e')
YCC14	YCC4	3O14O15O1	$c'c'b'b^{\circ}a'a'd^+d'$	(e^+e°)	YCC5	3Br4Br5Br	$c'c'b^{\circ}b^{\circ}a'a'd^+d'$	(e^+e')
YCC15	YCC6	3Gr4Gr5Gr	$c^+c'b'b'a'a'd^+d'$	e^+e°	YCC6	3Gr4Gr5Gr	$c^+c'b'b'a'a'd^+d'$	e^+e°
YCC16	YCC7	3Gr4O15Br	$c^+c'b'b^{\circ}a^+a'd^+d'$	e^+e'	YCC7	3Gr4O15Br	$c^+c'b'b^{\circ}a^+a'd^+d'$	e^+e'
YCC17	YCC7	3Gr4Gr5Br	$c^+c'b'b'a^+a'd^+d'$	e^+e'	YCC8	3Gr4Gr5Gr	$c'c'b'b'a'a'd^+d'$	e^+e'
YCC18	YCC6	3Gr4Gr5Gr	$c^+c'b'b'a'a'd^+d'$	e^+d°	YCC4	3O14O15O1	$c'c'b'b^{\circ}a'a'd^+d'$	e^+e°

N.B. The suffix x used with the alleles in some of the genotypes indicates that the allele present was not known, nor could it be deduced from the information contained in this paper.

The use of brackets around some of the alleles indicates that the genotype of the parents with respect to these alleles could have been reversed.

1/64th PY larvae in YCC10, and 1/16th PY larvae with no other yellow type larvae in YCC11.

To explain the occurrence and frequencies of the three yellow colour types, one of the two additional genes must be tri-allelic. The proposed control mechanism for the PY, YG, YB complex, is therefore based on five unlinked genes, of which three—a, b and c—have already been described. The other two genes have been named d and e. Gene d is biallelic with a dominant allele, d^+, which has no effect on larval colour, and a recessive allele, d', which gives rise to yellow pigment. Gene e is tri-allelic with a dominant allele e^+ which has no effect on larval colour except to suppress the action of d' when this allele is homozygous. The two other alleles, e' and e°, are recessive to e^+ and show incomplete dominance to one another. If e' is present in the genotype, either as a homozygote, or as a heterozygote with e°, then it prevents the phenotypic expression of b'. Similarly, if e° is present, b° and a^+ are not expressed phenotypically. Alleles e' and e° are hypostatic to d^+, and d' is hypostatic to e^+.

The non-yellow parent of YCC1 was known to be $c^+c'b^{\circ}b^{\circ}a'a'$. The progeny of YCC1 are in a ratio of approximately 1:1, 3Gr 4O1 5O1: 3O1 4O1 5O1. To give this ratio, the yellow parent from IB46 must have been $c'c'b'b'a'a'$. The progeny of YCC1 will, thus, be either $c^+c'b'b^{\circ}a'a'$ or $c'c'b'b^{\circ}a'a'$. The latter type which was recognisable by being olive in the 3rd instar, was used in the YCC9, YCC10 and

TABLE 2b Colour type analysis of some of the broods reared to determine the mechanism controlling the colours, Plain Yellow, Yellow Green and Yellow Brown in the later instars.

Brood	Number of third instar larvae of colour types:-						Number of fourth instar larvae of colour types:-						Number of fifth instar larvae of colour types:-					
	Gr	Ol	Br	PY	YG	YB	Gr	Ol	Br	PY	YG	YB	Gr	Ol	Br	PY	YG	YB
IB46	-	-	-	139	-	-	-	-	-	138	-	-	-	-	-	137	-	-
YCC1	67	59	-	-	-	-	-	119	-	-	-	-	-	117	-	-	-	-
YCC2	-	95	90	-	-	-	-	92	89	-	-	-	-	91	87	-	-	-
YCC3	94	37	16	-	-	-	31	74	36	-	-	-	30	73	36	-	-	-
YCC4	91	92	-	-	-	-	88	91	-	-	-	-	87	89	-	-	-	-
YCC5	-	-	227	-	-	-	-	-	225	-	-	-	-	-	221	-	-	-
YCC6	152	-	-	-	-	-	148	-	-	-	-	-	146	-	-	-	-	-
YCC7	43	-	-	-	-	-	13	18	9	-	-	-	4	8	26	-	-	-
YCC8	218	-	-	-	-	-	208	-	-	-	-	-	200	-	-	-	-	-
YCC9	47	104	45	2	10	-	46	102	45	2	9	-	41	97	44	2	9	-
YCC10	66	119	58	4	-	11	66	113	57	4	-	11	65	113	56	4	-	11
YCC11	41	82	38	9	-	-	40	82	38	9	-	-	40	81	38	9	-	-
YCC12	77	163	75	5	-	5	75	160	75	5	-	15	73	157	74	5	-	14
YCC13	-	136	-	9	-	-	-	135	-	9	-	-	-	134	-	9	-	-
YCC14	-	84	82	12	-	-	-	82	82	11	-	-	-	82	80	11	-	-
YCC15	91	-	-	-	-	-	84	-	-	-	5	-	82	-	-	-	5	-
YCC16	237	43	20	-	-	3	69	143	67	5	-	14	19	38	220	1	-	18
YCC17	146	-	-	6	-	-	137	-	-	11	-	-	67	-	69	6	-	5
YCC18	200	72	-	8	-	-	128	131	-	17	-	-	127	130	-	17	-	-

YCC11 broods. As all the progeny of IB46 were PY their genotype must be either $d'd'e'e'$ or $d'd'e'e^\circ$, as e' must be present to prevent the phenotypic expression of b'.

Assuming that the insect from IB46 used as a parent of YCC1, had the genotype $c'c'b'b'a'a'd'd'e'e^\circ$, and that the non-yellow parent of YCC1 was $c^+c'b'b^\circ a'a'd^+d^+e^+e^+$, then considering only genes d and e, a 1:1 ratio of $d^+d'e^+e'$ to $d^+d'e^+e^\circ$ should be present in the progeny of this brood. In YCC9, if both parents were $d^+d'e^+e^\circ$ 1/16th of the larvae should have been $d'd'e^\circ e^\circ$, and thus, of one of the yellow colour types. Of these, as both parents were olive, and therefore heterozygous for gene b, a 1:2:1 ratio of the genotypes $b'b'$, $b'b^\circ$ and $b^\circ b^\circ$ should be present. The former two of these genotypes would give YG larvae, due to the presence of b' producing green pigment, $d'd'$ producing yellow pigment, and e° preventing the expression of b° in the $b'b^\circ$ larvae. The third group, with $b^\circ b^\circ$, will produce PY larvae, due to the lack of b' to produce green pigment, and the presence of $e^\circ e^\circ$ preventing the expression of b°.

The results of YCC10 may be explained in a similar way if both parents are $d^+d'e^+e'$. Then 1/16th of the larvae would be $d'd'e'e'$, and again of these a quarter should have contained $b'b'$, half $b'b^\circ$, and quarter $b^\circ b^\circ$. In this case, the former group will give PY, due to the absence of any brown producing allele, and the presence of $e'e'$ to prevent the expression of b'. The other two groups will both give YB larvae, due to the presence of b° and $d'd'$ producing brown and yellow pigments respectively.

The results of YCC11 are as would be expected if one parent was $d^+d'e^+e'$, and the other $d^+d'e^+e^\circ$, so that all progeny which are yellow must be $d'd'e'e^\circ$. This would result in neither the green producing allele b', nor the brown producing alleles, b°

TABLE 3 Results of specific cross types, reared from parents with known genotypes which had some yellow progeny.

Cross type	Genotype of parent 1	Genotype of parent 2	No. of broods	Phenotypes of progeny: Larval instar and colour	No. of Larvae	Larval instar and colour	No. of Larvae	Chi-squared values and probabilities: Chi^2	p
1	$b'b'a'a'd^+d'e^+e'$	$b'b'a'a'd^+d'e^+e'$	23	4Gr	4719	4PY	307	0.1712	0.7-0.5
2	$b'b'a'a'd^+d'e^+e^o$	$b'b'a'a'd^+d'e^+e^o$	18	4Gr	4053	4YG	259	0.4364	0.7-0.5
3	$b'b'a'a'd^+d'e^+e^o$	$b'b'a'a'd^+d'e^+e'$	14	4Gr	2937	4PY	203	0.2476	0.7-0.5
4	$b'b'a'a'd^+d'e^+e'$	$b^ob^oa'a'd^+d'e^+e'$	26	401	5030	4YB	322	0.4983	0.5-0.3
5	$b'b'a'a'd^+d'e^+e^o$	$b^ob^oa'a'd^+d'e^+e^o$	23	401	4921	4YG	330	0.0105	0.95-0.9
6	$b'b'a'a'd{+}d'e^+e^o$	$b^ob^oa'a'd^+d'e^+e'$	17	401	3490	4PY	218	0.8702	0.5-0.3
7	$b^ob^oa'a'd^+d'e^+e'$	$b^ob^oa'a'd^+d'e^+e'$	21	4Br	3847	4YB	273	0.9952	0.5-0.3
8	$b^ob^oa'a'd^+d'e^+e^o$	$b^ob^oa'a'd^+d'e^+e^o$	16	4Br	3162	4PY	228	1.3046	0.3-0.2
9	$b^ob^oa'a'd^+d'e^+e^o$	$b^ob^oa'a'd^+d'e^+e'$	13	4Br	2441	4PY	170	0.3034	0.5-0.3
10	$b'b'a'a'd'd'e'e'$	$b'b'a'a'd'd'e'e'$	5	4PY	997				
11	$b'b'a'a'd'd'e^oe^o$	$b'b'a'a'd'd'e^oe^o$	7	4YG	1213				
12	$b'b'a'a'd'd'e^oe^o$	$b'b'a'a'd'd'e'e'$	6	4PY	1209				
13	$b'b'a'a'd'd'e'e'$	$b^ob^oa'a'd'd'e'e'$	6	4YB	1305				
14	$b'b'a'a'd'd'e^oe^o$	$b^ob^oa'a'd'd'e^oe^o$	4	4YG	877				
15	$b'b'a'a'd'd'e^oe^o$	$b^ob^oa'a'd'd'e'e'$	5	4PY	966				
16	$b^ob^oa'a'd'd'e'e'$	$b^ob^oa'a'd'd'e'e'$	7	4YB	1505				
17	$b^ob^oa'a'd'd'e^oe^o$	$b^ob^oa'a'd'd'e^oe^o$	6	4PY	1126				
18	$b^ob^oa'a'd'd'e^oe^o$	$b^ob^oa'a'd'd'e'e'$	8	4PY	1772				
19	$b'b'a^+a^+d^+d'e^+e'$	$b'b'a^+a^+d^+d'e^+e'$	13	4Gr	2830	4PY	202	0.8285	0.5-0.3
20	$b'b'a^+a^+d^+d'e^+e^o$	$b'b'a^+a^+d^+d'e^+e^o$	16	4Gr	2931	4YG	209	0.8835	0.5-0.3
21	$b'b'a^+a^+d^+d'e^+e^o$	$b'b'a^+a^+d^+d'e^+e'$	11	4Gr	2167	4PY	128	1.7723	0.2-0.1
22	$b'b'a^+a^+d'd'e'e'$	$b'b'a^+a^+d'd'e'e'$	9	4PY	1858				
23	$b'b'a^+a^+d'd'e^oe^o$	$b'b'a^+a^+d'd'e^oe^o$	7	4YG	1325				
24	$b'b'a^+a^+d'd'e^oe^o$	$b'b'a^+a^+d'd'e'e'$	7	4PY	1502				
19	See above	See above	13	5Br	2768	5YB	200	1.1269	0.3-0.2
20	See above	See above	16	5Br	2881	5YG	201	0.7484	0.5-0.3**
21	See above	See above	11	5Br	2128	5PY	126	1.6754	0.2-0.1
22	See above	See above	9	5YB	1817				
23	See above	See above	7	5YG	1309				
24	See above	See above	7	5PY	1470				

* Note, all parents were homozygous for the recessive allele of gene c.

** A 15:1 ratio of Br:YG was taken as the expected for this test; however initially the presence of YG larvae was not expected. See text.

and a^+, being expressed phenotypically, as both e' and e° are present in these larvae, and therefore they would all be of the PY type.

Three further points may be noted from the results of the YCC broods. Firstly, in several of the broods (e.g. YCC18), the number of yellow type larvae increases between the 3rd and 4th instars. In YCC18 this seems to be because c^+ is present in the genotype of one of the parents with the result that half the progeny of YCC18 would contain c^+. As the number of yellow larvae approximately doubled between the 3rd and 4th instars, it may be deduced that the genes d and e are both hypostatic to gene c in the 3rd instar—that is to say the alleles d′, e′ and e° are expressed in the 3rd instar only when the allele c′ is homozygous.

Secondly, the results of brood YCC17 show that some larvae change from PY in the 4th instar, to YB in the 5th instar. This seems to be because their genotype is $b'b'a^+a'd'd'e^\circ e^\circ$, so that in the 4th instar, they are PY due to suppression of the phenotypic expression of b′ by e°, and the lack of the brown producing allele b°. In the 5th instar, a^+ expresses itself and adds brown pigment to the yellow produced by d′d′.

Thirdly, if the yellow larvae are ignored, the ratios of the remaining Gr, O1 and Br larvae in these broods are consistent with the hypothesis proposed to explain the control of the Gr, Br, O1 complex.

The results of the broods tabulated in Tables 2a and 2b all concur with the hypothesis put forward. However, the infrequency of the yellow colour types in these broods means that statistical tests comparing this observed data with expected results have little validity. Later during the study large numbers of larvae were reared for investigations into the evolution and the maintenance of the polymorphisms involved. Consequently, large numbers of broods in which parents were of known genotypes (on the basis of the controlling mechanisms outlined previously) were reared. Of these over 200 had some progeny of the yellow colour types. The colour types of larvae from all the brood of each relevant type of cross are given in Table 3. In many of these crosses both parents were homozygous for both c′ and a′ and consequently the colour type of larvae was constant throughout the 3rd, 4th and 5th instars. In these broods only 4th instar results are given.

Where relevant, heterogeneity chi-squared tests were carried out on all broods from a particular type of cross. In each case the broods for a specific cross type were homogeneous. The total results from each cross type were then compared with expected ratios using a simple chi-squared test. The results of these tests are given in Table 3. In only one of the tests is there evidence of a significant difference between the observed and expected results.

In crosses which should have produced some larvae which were homozygous for b′, a^+, d′ and e°, (e.g. cross type 20) it was expected that larvae with the genotype $c'c'b'b'a^+a^+d'd'e^\circ e^\circ$, would change colour from being YG in the 4th instar, due to the presence of b′ and the absence of e′, to being PY in the 5th instar, because of the absence of any gene to produce green in the 5th instar and the presence of e° to prevent the phenotypic expression of a^+. However, in crosses of this type approximately 1/16th of the larvae were YG in both the 4th and 5th instars all other larvae being 4Gr, 5Br. It must be assumed, therefore, that the allele e° not only prevents the phenotypic expression of a^+ in the 5th instar, but also prevents the loss in this instar of green pigments produced by b′ in the 4th instar.

DISCUSSION

A summary of the mechanisms which control larval colour in *P. meticulosa* is set out in Tables 4 and 5. Table 4 outlines the factors controlling each of the colour forms found in each instar, and Table 5 shows the interactions between the eleven alleles involved in the control of larval colour.

The precise way in which the genetic system acts is open to several theoretical interpretations. As major colour changes always occur at larval ecdyses, it seems likely that the concentration or balance of the hormones, ecdysone and juvenile hormone are involved in the system—a possibility which is particularly relevant to the action of the alleles of gene c, and to the similarity in the phenotypic expression of $b^\circ b^\circ$ and a^+.

It must be remembered that the colour types are all variable. Mather (1943) notes that polymorphic genes have a switching role only, the alternatives which they switch being determined by adjustment of other genes. If this is true, then the variation in the main colour types is probably caused by a polygenic system. The expression of a

TABLE 4 Summary of factors controlling each of the colour forms found in each larval instar.

Instar	Colour	Method of Control
First	Early Green (EG)	Foodplant. (Other colours may be produced when larvae are fed on non-green food). See Majerus 1978, 1983.
Second	Early Green (EG)	Foodplant. (Other colours may be produced when larvae are fed on non-green food). See Majerus 1978, 1983.
Third	3rd instar green (3IG)	Made up of green larvae under two methods of control. (i) if c^+ is present, colour is under the control of foodplant. (ii) if c' is homozygous, the green is due to b' being homozygous.
	Olive (Ol)	Produced when c' is homozygous, b' and b^o and either d^+ and/or e^+ are present in the genotype.
	Brown (Br)	Produced when both c' and b^o are homozygous, and either d^+ and/or e^+ are present in the genotype.
	Plain Yellow (PY)	Produced in any one of three ways, all of which involve the alleles c' and d' being homozygous. Coupled with these two homozygotes, if both e' and e^o are present, or if e' and b' are homozygous, or if e^o and b^o are homozygous, PY larvae will result.
	Yellow-green (YG)	Produced when c', d' and e^o are homozygous and b' is present.
	Yellow-brown (YB)	Produced when c', d' and e' are homozygous and b^o is present.
Fourth	Green (Gr)	Produced when b' is homozygous if d^+ and/or e^+ are present.
	Olive (Ol)	Produced when b' and b^o are present if d^+ and/or e^+ are present.
	Brown (Br)	Produced when b^o is homozygous if d^+ and/or e^+ are present.
	Plain Yellow (PY)	Produced in any one of three ways, either when d' is homozygous and e' and e^o are present, or when d', e' and b' are homozygous, or when d', e^o and b^o are homozygous.
	Yellow-green (YG)	Produced when d' and e^o are homozygous and b' is present.
	Yellow-brown (YB)	Produced when d' and e' are homozygous and b^o is present.
Fifth	Green (Gr)	Produced when b' and a' are homozygous if d^+ and/or e^+ are present.
	Olive (Ol)	Produced when a' is homozygous and b' and b^o are present if d^+ and/or e^+ are present.
	Brown (Br)	Produced when a^+ is present and/or b^o is homozygous, if d^+ and/or e^+ are present.
	Plain Yellow (PY)	Produced in any one of three ways; either when d is homozygous and e' and e^o are present, or when d', e' and b' and a' are homozygous, or when d', e^o and b^o are homozygous.
	Yellow-green (YG)	Produced when d', e^o and b' are homozygous.
	Yellow-brown (YB)	Produced when d', and e' are homozygous and b^o and/or a^+ are present.

particular set of genes from this system will be controlled by the presence, or absence, of one or more of the alleles of the major genes involved.

When this is considered in relation to the situation in *P. meticulosa*, the possibility arises that some of the alleles, particularly b^o and a^+, may have identical actions on the polygenic system, except for the instar in which they act. This possibility is supported by the results of CC11, (Tables 1a and 1b) which was a cross between two 3Gr 4Ol 5Br larvae with genotype $b'b^oa^+a^x$, (where a^x may be a^+ or a'). At least

TABLE 5 Basic effects of the eleven alleles of the five major genes which control larval colour, and the interaction between these alleles.

Allele	Instar in which the allele may act	Basic effect of the alleles and their interactions
a^+	5th	Causes larvae to be brown in the 5th instar.
		Dominant to a'.
		Epistatic to alleles of gene b.
		Hypostatic to d' when d' is homozygous and e^+ is absent.
		Hypostatic to e^o, when neither d^+ nor e^+ are present.
a'	5th	Causes larvae to retain their 4th instar colour through the 5th instar.
		Recessive to a^+.
b'	3rd, 4th and 5th	Causes green pigment to be produced.
		Incompletely dominant to b^o.
		Hypostatic to d' when d' is homozygous and e^+ is absent.
		Hypostatic to e' when neither d^+ nor e^+ are present.
		Hypostatic to allele c^+ (only in the 3rd instar).
		Hypostatic to a^+ unless both d' and e^o are homozygous. (Only in the 5th instar).
b^o	3rd, 4th and 5th	Causes brown pigment to be produced.
		Incompletely dominant to b'.
		Hypostatic to d' when d' is homozygous and e^+ is absent.
		Hypostatic to e^o when neither d^+ nor e^+ are present.
		Hypostatic to c^+ (only in 3rd instar).
c^+	3rd	Causes 3rd instar colour to be dependant on foodplant.
		Dominant to c'.
		Epistatic to all alleles of genes b, d and e.
c'	3rd	Causes 4th instar colour to arise in the 3rd instar.
		Recessive to c^+.

3/16th of the progeny from this cross should have had the genotype $b^\circ b^\circ a^+ a^\times$. This genotype would produce brown 4th and 5th instar larvae. Unless $b^\circ b^\circ$ blocks the effect of a^+, then the colour of the 4th instar will be that produced by those genes in the polygenic system which are "switched on" by $b^\circ b^\circ$, whilst the 5th instar colour will be that produced by the genes "switched on" by a^+. Thus, if the genes "switched on" by $b^\circ b^\circ$ and a^+ are not identical, the shade of brown in the 4th and 5th instars of some of the 4Br 5Br larvae from CC11 should vary. However, observation on CC11 and other similar broods indicated that there was no significant change in the shade of the brown between the 4th and 5th instars. So, it seems that the phenotypic expressions of b° and a^+ are identical, either because they affect the same genes in the polygenic system, or because, although they each affect a different set of polygenes, the difference in the action of the two sets was too small to be detected with the methods being used to score colour variation (See Majerus 1978, 1983). The fact that the allele e° prevents both b° and a^+ being expressed phenotypically also indicates that b° and a^+ may have similar actions. The possibility of $b^\circ b^\circ$ blocking the expression of a^+ is also unlikely as a discernable difference should then be noticeable in the 5th instar brown colours of 4Gr 5Br and 4Br 5Br larvae, unless the actions of $b^\circ b^\circ$ and a^+ are identical. No such difference has been observed.

On the other hand, the similarity in the phenotypic expression of $b^\circ b^\circ$ and a^+ could be due to these having similar effects on the hormonal system of moulting, and there

TABLE 5 *(continuation)*

Allele	Instar in which the allele may act	Basic effect of the alleles and their interactions
d^+	3rd, 4th and 5th	Causes colour to be dependant on alleles of genes a, b and c. Dominant to d'. Hypostatic to c^+ (only in the 3rd instar). Epistatic to e' and e^o.
d'	3rd, 4th and 5th	Causes yellow pigment to be produced. Recessive to d^+ Hypostatic to e^+. Hypostatic to c^+ (Only in the 3rd instar).
e^+	3rd, 4th and 5th	Causes colour to be dependant on alleles of genes a, b and c. Dominant to e' and e^o. Hypostatic to c^+ (only in the 3rd instar). Epistatic to d'.
e'	3rd, 4th and 5th	Prevents the phenotypic expression of b'. Recessive to e^+. Incompletely dominant to e^o. Hypostatic to d^+. Hypostatic to c^+ (only in the 3rd instar). Epistatic to b' in the 3rd instar if c^+ and d^+ are absent. Epistatic to b' in the 4th and 5th instars if d^+ is absent.
e^o	3rd, 4th and 5th	Prevents the phenotypic expression of b^o and a^+. Recessive to e^+. Incompletely dominant to e'. Hypostatic to d^+. Hypostatic to c^+ (only in the 3rd instar). Epistatic to b^o in the 3rd instar if c^+ and d^+ are absent. Epistatic to b^o in the 4th instar if d^+ is not present. Epistatic to b^o and a^+ in the 5th instar if d^+ is absent.

is no reason to suppose that the effect on the hormonal system must involve polygenes. This is not to say that a polygenic system may not then cause slight variation in the hormonal system, independantly of the major genes. These slight variations might then manifest themselves phenotypically as slight variations in the shade or hue of the main colour types.

The variation could also be explained by environmental factors having an effect on the shade within colour types, and the similarities in the shades of colour types between the 3rd, 4th and 5th instars could be due to the effect being caused by the environment at a critical phase in the development, if this point precedes the 4th instar. However, no evidence to support this possibility was obtained from the large series of environmental experiments described by Majerus (1978).

Finally, it may be that the variation within colour types is affected by the quantity and type of pigments in the larval food plant, although the lack of a difference in the shades of 4th and 5th instars, fed on sorrel and plantain in the foodplant experiments described by Majerus (1983) opposes this view.

ACKNOWLEDGEMENTS

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A PALAEOMORPH OF *ARTOGEIA?*—F. *FUNEBRIS* LORKOVIĆ (LEP: PIERIDAE)

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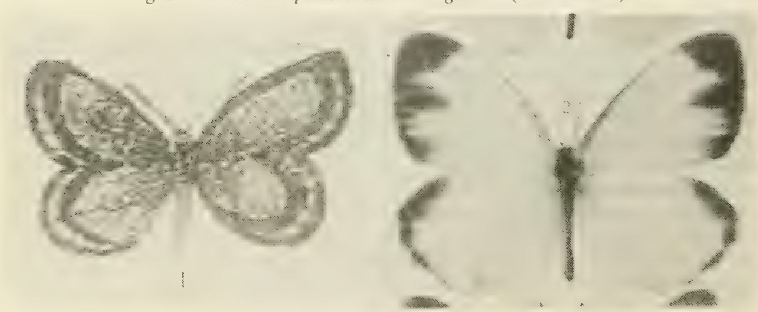
A reader of Müller and Kautz's monograph on *Pieris bryoniae* Ochs. and *Pieris napi* L. (1939) will remember their obsession with Rückschlagsformen, regression-forms, which they considered valid indications of what the primitive *napi-bryoniae* must have looked like. They supposed this precursor to have been yellow with a great deal of melanic marking; the appearance of any *napi* form departing from type in this direction was to be taken as confirmation of the hypothesis. On the other hand every unusually light form anticipated the future—an orthogenetic heresy not altogether free from circular reasoning. Males, they remarked, remained always in the lead in these historic changes. To some extent their scheme was parallelled by Verity's (1922) system of grades, but the latter, being merely descriptive, supported no deductions of past or future.

Fig. 1. Reconstruction of the Ur-*napi* (Kautz 1955).
Fig. 2. "*P. canidia palaerctica* ab. *marginalis*" (Avinoff 1910).



Kautz's last paper (1955) introduced the term "Zukunftsformen" for the supposedly anticipatory light forms. Naturally, he inferred that the ultimate form of *napi* would be all-white and markingless above and below. In fact, a close approach to such a phenotype is already realized in the summer emergence of the North American *Artogeia (napi) oleracea* Harris and especially of its (artificial) hybrid with *A. virginiensis* Edwards, but this is irrelevant to Kautz's argument: he knew little of the Nearctic forms. In the same paper he roughly sketched a reconstruction of the ancestral or ur–*napi* (reproduced here as fig. 1) but he envisaged also the possible running-together of its marginal and pre-marginal bands.

One recalls Bateson's (1894) dictum, that "it would probably help the science of biology if the word 'reversion' and the ideas which it denotes, were wholly dropped", but though Kautz's reasoning may appear unsound his conclusions were not necessarily mistaken. The unformulated basis of his argument could have been that black pigment can now be laid down only in areas that were dark in ur–*napi*, that these areas are still predisposed to become black, and are now kept normally white by subsequent genetic changes.

A fair approximation to Kautz's hypothetical ur–*napi* in fact lately (1967) appeared in Lorković's (1971) f. *funebris*, illustrated here in figs. 3 to 6. Even more than Kautz's vision, it does resemble what are thought to be the more primitive Coliadine patterns of *Eurema, Colias* and *Leptophobia*.

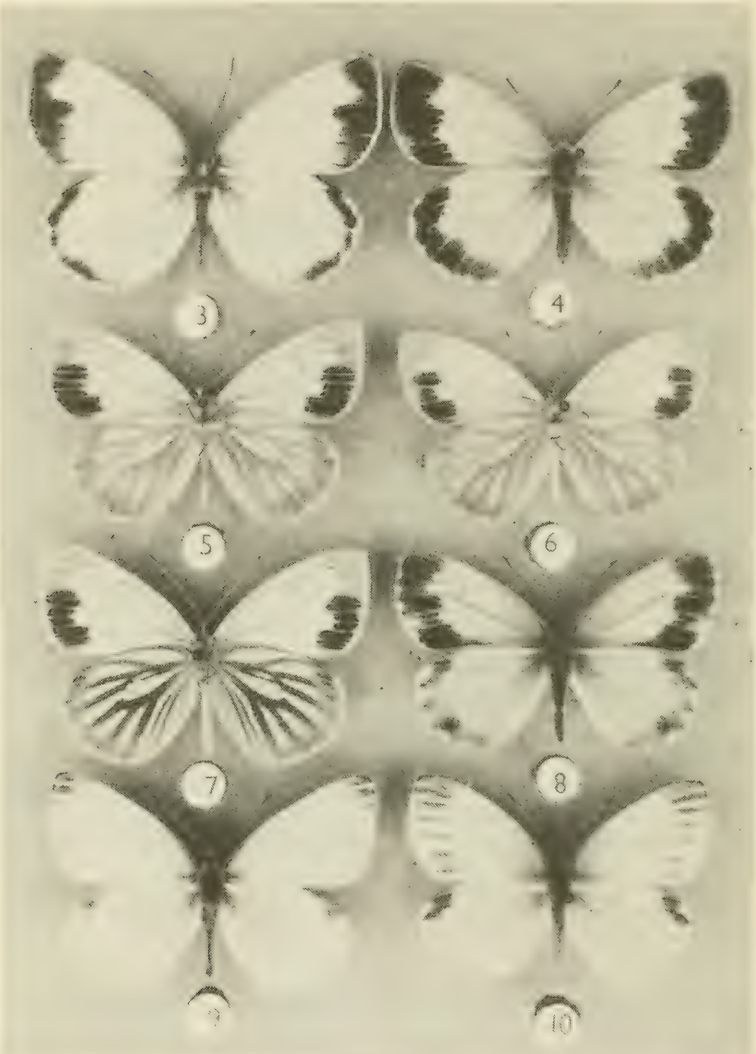
Lorković's illustrated account (1971) of the origin of *funebris* is in the Serbo-Croat language, with English abstract and a German summary. One female of the morph appeared in the eighth generation (five broods reared together) of a cross between *A. (napi) oleracea* from New Hampshire (U.S.A.) and Jugoslav *A. napi*, back-crossed twice to *napi* but with selection throughout of *oleracea*-like phenotypes. When he wrote, it was not appreciated that *oleracea* is distinguished from European *napi* not only by a recessive gene "restricta" reducing or eliminating forewing spotting, but also by a dominant "acuta" producing sharply marked underside veining in the diapause emergence (cf. Bowden 1979). Acuta, but not restricta, occurs also in such Asiatic species as *A. melete* Ménétriès. The two closely linked genes can occur, together or separately, in combination with *funebris*, producing appropriate modifications of the phenotype (see below).

A second female *funebris*, eclosing from the overwintering part of Lorković's same mixed brood, was paired with a sib (?) male to produce in the F_2 one-quarter *funebris* phenotypes of both sexes. The morph, which turns out to be a simple recessive in the genetic background of ssp. *napi*, has since been bred in large numbers by Lorković, Bowden, H. Descimon and others.

The *funebris* phenotypes will, I hope, be treated in more detail in a further paper dealing with seasonal wing-patterns of *Artogeia*. Here it will be sufficient to refer to the non-diapause forms illustrated in figs. 3 to 6, the somewhat reduced markings following diapause (fig. 8), the hindwing-underside when *funebris* is combined with acuta (fig. 7) and the variable but always considerable reduction produced by homozygous restricta (figs. 9, 10). Note particularly the peculiar remaining markings of the restricta male.

At an early stage of breeding, broods with particularly heavy marking included insects of *napi* type, but with a sprinkling of black scales between discal spot and margin; these were identified by Lorković as *funebris* heterozygotes. However, these heterozygotes are generally indistinguishable.

The only known natural occurrence of f. *funebris* (Altai Mts., western Central Asia) was referred to *Pieris canidia* ssp. *palaearctica* Staudinger by Avinoff (1910). Its reference in that case to the species *canidia* Sparrman may or may not be correct, but the name *marginalis* Avinoff cannot be used for Lorković's form in *A. napi*, as it is pre-dated in that superspecies by *marginalis* Scudder (1861). The solitary Alai specimen (fig. 2, illustrated also by Verity 1911) presents a problem in any case. It is so nearly identical with fig. 3 that it must surely have been very close genetically, though apparently so remote in occurrence. It is unfortunate that we have no figure



KEY TO FIGURES

3.	♂ '71d4	*funebris*				*non-diapause*
4.	♀ '68y4	"				"
5.	♂ '71h24	"			underside	"
6.	♀ '71h29	"			"	"
7.	♂ '71j^{u}4	"	+	acuta	"	"
8.	♀ '70F146	"				diapause
9.	♂ ×72b1	"	+	homozygous restricta,		non-diapause
10.	♀ '72b43	"	"	" "		"

of the underside of Avinoff's specimen, but evidently there was little or no hindwing veining.

One circumstance which may (or may not) be of importance, but is not mentioned in the published account, is that Lorković's second back-cross was to a male which was not pure Zagreb *napi* but derived partly from *bryoniae* of Les Fonds (Htes. Alpes) and the rather diluted *bryoniae* of Krško (eastern Slovenia) (Lorković, *in litt.*). Differences between *napi* and *bryoniae* do not go as deep as is sometimes supposed (cf. Geiger 1981). However, *bryoniae* females of the summer form *supermeta* Kautz may approach the *funebris* pattern on the upperside (compare Bowden 1979 fig. 5 with fig. 8 of this present paper), though the significance of this is problematic and Lorković (*in litt.*) does not regard the *bryoniae* element as important here. His original (1971) conjecture was that "the morph *funebris* is probably not a mutation but a rare recombination, possibly connected with some gene repressive of the synthesis of melanin in the American taxon *oleracea.*"

Initially, the simplest explanation for *funebris* was indeed that it was a scarce recessive native to some population of *oleracea*, but not previously detected there because even when homozygous it was not visible in the presence of *oleracea's* constantly double-dose restricta. However, breeding experiments soon showed that in *napi* hybrids restricta did not completely suppress *funebris*, and up to now lack of fully suitable material has prevented the present writer from returning (?) *funebris* to nearly pure *oleracea* (which may contain additional suppressors).

EXPERIMENTAL—*FUNEBRIS* IN *OLERACEA* GENOTYPE

In August 1981 a *funebris* female was paired with an *oleracea* male; a large brood (1981-*r*) resulted but 36 males only emerged, mostly in the same year: about 40 pupae, presumably female, are lying over a second winter and may never eclose. This result differs from that of NO pairing 1964-*n*, using a sulphurea female, in which, too, most of the males were non-diapause, but females emerged after one winter and produced good F_2 and F_3 broods. In June 1982 two *funebris* males were caged with two pure *oleracea* females, but although the butterflies lived about a week no mating was seen and no eggs were laid. With better stock of both *oleracea* and *funebris*, it is hoped in 1983 to obtain this pairing and thereafter cross back repeatedly to *oleracea*.

EXPERIMENTAL—*FUNEBRIS* FROM *OLERACEA* HYBRIDS?

An alternative approach seeks to reproduce some of the conditions of Lorković's original breeding, preferably with closer control of the make-up of separate broods. I consider that *A. napi napi* need not always be used, since *A. (napi) bryoniae* probably lacks no feature of *napi* essential in this case.

The BO brood 1965-*n*, from two or three Swiss females, comprised nearly 200 F_1 butterflies showing no disturbance of sexual sequence, but gave a small F_2 only with difficulty, and back-crosses to *oleracea* in both sexual directions were moderate and poor.

Not until 1981 was an OB pairing made; resulting F_1 males were crossed back separately to 3 Swiss *bryoniae* and one English *napi* female. The back-crosses of both sexes were paired up in 1982 to give (usually small) broods. Another BO pairing in the same year produced a large F_1, which will be bred further in 1983.

Funebris has not yet appeared in any of these experimental broods.

DISCUSSION

Even if any positive result is obtained from either series of experiments, it remains difficult to account for the Altai specimen except as an independent mutation revealed by natural in-breeding. If it was a consequence of hybridization, we certainly do not know between what populations.

Riedl (1978) remarks, quite generally, that in hybridization, features of a common ancestor are sometimes expressed. On his view of the course of evolution, as I understand it, this can occur by the restored activation of an earlier gene-system which has been overlaid in development by incompatible processes evolved in the two taxa.

"There must be a pigeon-hole in the genotype in which old instructions are kept and there must be a mechanism that can switch them on again . . . Every organism is a historical being and can only be understood by remembering everything that it once was . . . [In spontaneous atavism] a change in a single decision (i.e. a point mutation) triggers the production of phenes which are . . . lacking in the normal recent organism and appear to be meaningless for it, but were represented in its ancestors."

This is little better than speculation, but perhaps such a mechanism could be supposed in the present case, though one does not know of any other such instance in the Lepidoptera. Presumably there is a critical degree of disparity between the parents: if it is slight, as between most subspecies, there will be no disturbance; if it is too great there will be no hybrid.

An interesting consequence of this hypothesis of relict homoeostasis is that it should be possible by hybridization of other subspecies of the same monophyletic superspecies or genus to produce the identical palaeomorph. Did this happen to *canidia* in the Altai Mts?

What is the nature of the past and present marking-changes in the phylogeny of a genus? Selection does not provide a complete answer. The actual genetic change in the present rare case is quite obscure and evidently deserves full investigation by whatever techniques become available. Meanwhile living stock of *funebris* must be maintained—by the methods usual for *A. napi*, with occasional outcrossing to wild *napi*. I have therefore appealed to breeders to make themselves responsible for this. Pupae are generally obtainable from the writer.

Finally one may quote Darwin's (1882) opinion: "A new variety raised by man will be a more important and interesting subject for study than one more species added to the infinitude of already recorded species."

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SOME NEW APHID ARRIVALS TO BRITAIN'S FORESTS

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FOREST COMPOSITION AND OPPORTUNITIES FOR COLONISATION

If an entomologist was asked to choose a type of woodland that was likely to be good for collecting insects he would probably choose the oak wood. The oak is native, deciduous and has the long established reputation that of all our trees it has the greatest variety of insect species that feed upon it. It seems likely that only when the deciduous woodlands were relatively well documented would the conifers receive much attention.

Several of the familiar broadleaved trees that are grown in avenues and parklands around our cities and towns are not truly native to Britain, and contribute relatively little to the composition of British woodlands. On the other hand there are substantial areas of exotic coniferous species that until recently have been overlooked by naturalists but now contribute to the enlarged area of Britain's forests (see Table I). Several of the conifers, although recently introduced, have a far richer insect fauna than many of the broadleaved species, even some of the native ones.

There have been a number of attempts to explain the differences between the numbers of insect species on various tree species in Britain. In an early study Southwood (1961) compared the insect faunas of various tree species in Britain and other countries, and showed a correlation between the number of insect species of the major plant-feeding orders on a tree species and its abundance in recent geological history (the Quaternary period). Strong (1974) compared the numbers of insect species and present-day host-plant distribution from the maps in the Botanical Atlas (Perring & Walters, 1962), but these areas do not truly relate to the extensive forest areas of certain species nor to the age class of the trees (which is significant for some insects that require young shoots or thick bark and even essential for the specialist species requiring flowers and seeds). Southwood (1960 & 1961) has carefully pointed out that even among our native trees some are eminently more favoured by insects as a food source than others. This can readily be seen from the way in which, for example, certain Lepidoptera (although tending to be polyphagous) have readily taken to Sitka Spruce in Britain. Although Sitka Spruce was introduced into Britain from N. America only 150 years ago and was not widely planted until the 1930/40 period, it has acquired from the British list at least 30 species of Lepidoptera and some 38 parasitic Hymenoptera associations (Winter, 1974).

Man has introduced the greater proportion of our tree species; two thirds of the 30 major forest tree species listed in Table I are not native to Britain. Some introductions date back to Roman times; by 1600 AD at least 30 exotic species had been brought here as seed and were established (A. F. Mitchell, private communication). We should perhaps be reminded that certain of the larger broadleaved trees that we associate as components of our landscape are thought to be introductions. Examples are the elms (*Ulmus*) of lowland England; the Holm Oak (*Quercus ilex*) round our coasts; the Common Lime (*Tilia* × *europea*) of our avenues and country estates; the Sycamore (*Acer pseudoplatanus*) often the dominant broadleaved tree in northern England; and the London Plane (*Platanus* × *acerifolia*) of our towns and parkland. Recently there have been introductions of the commercially important Western American conifers in British forestry. For example Douglas Fir (*Pseudotsuga menziesii*) in 1827, Grand Fir (*Abies grandis*) in 1831 and Sitka Spruce (*Picea sitchensis*) in 1832. The latter species occupied 5.5% (120,000 acres) of the total woodland area of England by 1965. 70% of the coniferous forest area is composed of introduced species compared with only 14% in the case of broadleaved species.

TABLE I. Comparison of forest tree species composition of woodland areas in 1947 and 1965 in England, Forestry Commission and private woodlands combined. (See footnote below).

Species	*Area of Woodland (thousand acres)* 1947	1965	*Introduction date*
Scots pine	163.7	245.4	Native
Sitka spruce	48.2	120.5	1831
Norway spruce	42.9	100.5	c1500
European larch	76.8	84.5	c1625
Japanese & hybrid larch	22.9	75.9	1861
Corsican pine	31.5	74.6	1759
Douglas fir	17.7	58.9	1827
Lodgepole pine	0.8	24.4	1855
Western hemlock	0.2	11.9	1851
Red cedar	0.4	8.0	1853
Grand fir	0.1	2.0	1832
Lawson cypress	0.3	4.0	1854
Noble fir	0.1	0.6	1830
Silver fir	0.2	0.1	1630
Other conifers & mixtures	5.6	18.7	
	411.4	830.0	
Oak	618.8	410.5	Native
Beech	122.8	139.5	Native
Ash	115.0	111.4	Native
Sycamore	58.9	75.8	Roman
Poplar	3.0	19.9	Native/Intro
Birch	154.3	215.1	Native
Elm	18.9	17.7	Pre Roman
Sweet chestnut	39.0	48.1	Roman
Alder	10.0	22.3	Native
Lime	1.3	1.9	Native/Intro
Hazel	55.6	78.9	Native
Willow	5.1	1.3	Native/Intro
Hornbeam	15.4	2.1	Native
Other Broadleaved spp. and mixtures	35.6	156.6*	
	1253.7	1301.1	
	1665.1	2131.1	

* Contains a substantial amount of Thorn.

The two sets of figures are not directly comparable in that the 1947 Census figures relate to woods of 5 acres and over whilst the 1965 Census figures relate to woods of 1 acre and over. Both sets, however, include productive and unproductive wooded land. Some of the areas classed as scrub or felled in the 1947 Census would have been upgraded by 1965 thus accounting in part for the increase in area of a fast growing colonising species like birch. The increase in the area of hazel is likely to have resulted from the removal of the overstory from coppice with standards crops.

In the case of woodland composed of coppice with standards the total area has been allocated between species on the basis of the principal species of standard. This results, particularly with the 1947 Census data when the category amounted to some 228,000 acres, in a substantial under-estimate in the figures in the table for species such as hazel and Sweet Chestnut when compared with the later assessment where the area was little more than a tenth of the previous total. (Basic data from Forestry Commission (1952–53) and Locke (1971)).

Contrary to what is often stated the total area of broadleaved forest in England has changed relatively little since the end of the second world war; Forestry Commission census figures are 1253,700 acres in woods of 5 acres and over in 1947 to 1301,100 acres in woods of 1 acre and over in 1965. The area of oakwood has reduced but it should not be assumed that this has been due to conversion to conifer plantations. Replacement of oak by other broadleaved species such as sycamore, ash and birch and land use changes such as agricultural reclamation, new roads and building have all played a part. In contrast the overall area of coniferous forest in England alone more than doubled over a period of 18 years (see Table I). So the most significant change has not been the loss of broadleaved forest but an extensive conifer afforestation programme of new land that has changed the proportion. In fact the British forest cover has now increased to 8% of the land surface from 4% one hundred years ago. This has happened mainly by planting (afforestation) of poor marginal agricultural land occurring on hill farms and moorlands and also of mining spoil, open-cast, refuse tips and other sites reclaimed from industrial activities. On these types of land several conifers have been found to thrive and they enrich the habitat by developing a characteristic woodland type of flora. Results now show that by the end of a rotation of most exotic trees when growing in the lowlands a plant community develops similar to that occurring in an oak plantation (Anderson, 1979).

The increased usage of the infertile high rainfall uplands for forestry in the post-war period has resulted in using various trees originating from the coniferous forest areas of the Northern Hemisphere. Although some of these have come some distance they have in a very short time acquired some very specialised insects as well as their parasites, these being the same insects or close relatives of these found on those host trees in their native lands. As a result new habitats with their own characteristic insect faunas are being established surprisingly quickly over a wide area of Great Britain.

TABLE II. Adelgid species recorded from the principal coniferous trees now grown in Britain.

Adelgid species	Scots pine	Corsican pine	Lodgepole pine	Weymouth pine	Arolla pine	Norway spruce	Sitka spruce	Oriental spruce	Silver fir	Grand fir	European larch	Japanese larch	Douglas fir	*earliest date recorded*	*Present status in Britain*
Adelges laricis	.	.	.	.	.	+	.	.	.	.	+	.	.	1871	Widespread & common
A. cooleyi	.	.	.	.	.	.	+	.	.	.	.	.	+	1913	Widespread & common
A. viridana	.	.	.	.	.	.	.	.	.	.	.	+	.	1949	Local, few records
A. viridis	.	.	.	.	.	+	+	.	.	.	+	.	.	1883	Widespread but local
A. abietis	.	.	.	.	.	+	.	.	.	.	.	.	.	1922	Common
A. nordmannianae	.	.	.	.	.	.	.	+	+	.	.	.	.	c1880	Widespread but infrequent
A. piceae	.	.	.	.	.	.	.	.	+	+	.	.	.	1895	Widespread but local
Pineus strobi	.	.	.	+	.	.	.	.	.	.	.	.	.	1923	Local, few records
P. orientalis	+	.	.	.	.	.	.	+	.	.	.	.	.	1924	Very local
P. pini	+	+	+	.	.	.	.	.	.	.	.	.	.	probably native	Common
P. pineoides	.	.	.	.	.	+	.	.	.	.	.	.	.	1969	Local, few records
P. similis	.	.	.	.	.	.	+	.	.	.	.	.	.	1971	One record
P. cembrae	.	.	.	.	+	.	.	.	.	.	.	.	.	1981	One record
Species total	2	1	1	1	1	4	3	2	2	1	2	1	1		

Most of the exotic trees produce fertile seed and many naturally regenerate themselves in Britain. This has enabled flower, cone and seed-dwelling specialist insects to become well established in certain older stands, for example, the seed wasps *Megastigmus spermatrophus* on Douglas Fir and *M. pini* on Noble Fir. Furthermore they are both accompanied by their parasites and they all are from North America. Older stands of trees with suppressed growth or windblown stems are suitable breeding material for Scolytid beetles. Several of these species have become established from Europe e.g. *Ips cembrae, Ips sexdentatus* and more recently *Dendroctonus micans* (Bevan and King, 1983).

ADELGID COLONISTS

Turning to the Aphidoidea quite remarkable changes have taken place. There is only one species of the Adelgidae native to Britain, namely *Pineus pini*. The remaining 12 species because of their limited host range could not have existed here prior to introduction of their host plants, and five of these require trees of two different genera to complete their life-cycle (see Table II). The earliest record of the most travelled species, *Adelges cooleyi*, from Western North America, on Douglas Fir in Britain was in 1913, but it was not until 1936 that galls were found on Sitka. *Pineus orientalis* from SE. Europe requires Oriental Spruce to form galls to complete its holocycle and was first recorded here in 1924. *Pineus similis* from N. America was found to have become established in Northumberland in 1971 (Carter, 1975). Three other species occur in the coniferous forests of Europe and are now both widespread and common. For example, European Larch (*Larix decidua*) is seldom to be found without *Adelges laricis* on the needles; *Adelges abietis* is a regular problem to Christmas tree growers as it makes clusters of pineapple galls and disfigures the shoot growth of Norway Spruce (*Picea abies*); and *Adelges nordmannianae* caused such intense dieback of European Silver Fir that it precluded this tree from the class of high volume producers to be grown in Britain and was withdrawn as a species that could be recommended for commerical forestry in 1920.

To this list of oviparous aphids on conifers the only parallel on the broadleaved trees that can be made is one phylloxera species *Moritziella corticalis*, to add to oak. It as first recorded from Sussex in 1970 (Barson and Carter, 1972).

LACHNID AND OTHER COLONISTS

The aphids in the genus *Cinara* present an equally impressive list as the Adelgidae (see Table III) for it is probable that only 4 of the 22 recorded species are native to Britain (Carter and Maslen, 1982). It is perhaps significant that most of the species feed on either *Pinus, Picea, Abies* or *Larix* spp, and it is of these genera that the coniferous forests of Europe are composed. The most recent species to be recorded is a closely related aphid *Cedrobium lapportei* on *Cedrus atlantica:* it appeared to spread rapidly across Western Europe from North Africa within a decade. In its wake it caused widespread damage to shade trees in Spain, Italy and France. It arrived here in the South of England in 1974. In a further two years it reached S. Wales and Lincolnshire.

Most of the aphids found on coniferous trees belong to the family Lachnidae. None of these require an alternate host plant to complete their life cycle so their establishment could be regarded as straight-forward. However, *Cinara kochiana* and *C. stroyani*, have never as yet been found in the absence of the wood ants *Formica rufa* and *F. aquilonia*, whilst *C. pini* and *C. escherichi* produce good-sized colonies when ant-attended. This may account for why some species have a very fragmented distribution as is the case of *C. kochiana i.e.* the New Forest, Yorkshire Moors and County Waterford. (Carter and Maslen, 1982).

Some stages of growth of trees are much more attractive to colonists than others. Two polyphagous species *Aphis fabae* and *Aulacorthum circumflexum* will feed in the shoot apices of young seedling conifers (Carter and Eastop, 1975). These are the only two native aphids that have 'captured' conifers as a new host.

Three species of root-feeding Pemphigidae have been found on conifers in Britain. All three have been recorded on their primary hosts. These are aspen leaves for

TABLE III. Aphid species recorded from the principal coniferous trees now grown in Britain.

Aphid species	Scots pine	Corsican pine	Lodgepole pine	Norway spruce	Sitka spruce	Silver fir	Grand fir	European larch	Japanese larch	Douglas fir	Cedar	Cypress	Red cedar	Juniper	Western hemlock	*earliest date of occurrence*	*Present Status in Britain*
LACHNIDAE																	
Eulachnus agilis	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1881	Local S & E
" bluncki	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.		Widespread, local
" brevipilosus	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1881	Local S & E
Cedrobium lapportei	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1975	Widespread, local
Schizolachnus pineti	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	1881	Common
Cinara acutirostris	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1950	Rare, S England
C. brauni	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1968	Rare, S England
C. cedri	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1971	V. rare
C. confinis	.	.	.	.	.	+	+	.	.	.	+	.	.	.	.	1913	Widespread, local
C. costata	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	1847	Local, England
C. cuneomaculata	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	1847	E Britain
C. cupressi	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	1879	Rare, S & SW Eng.
C. escherichi	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1967	Rare, S Eng.
C. fresai	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1956	Local, S England
C. juniperi	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	1847	Common
C. kochiana	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1847	Rare
C. laricis	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	1847	Common
C. pectinatae	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1914	Local
C. piceae	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	1881	Widespread
C. pilicornis	.	.	.	+	+	.	.	.	.	.	.	.	.	.	+	1847	Widespread
C. pinea	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	1847	Common
C. pini	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1847	Local, S England
C. pinihabitans	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1847	Widespread uncommon
C. pruinosa	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	1847	Rare
C. schimitscheki	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1950	Rare, E & S Eng.
C. stroyani	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	1961	Rare
C. tujafilina	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1935	Rare, S Counties
APHIDIDAE																	
Aphis fabae	.	.	+	.	+	.	.	+	+	.	.	.	.	.	+	1962†	Widespread
Elatobium abietinum	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	1847	Common
Aulacorthum circumflexum	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	1968†	Widespread
THELAXIDAE																	
Mindarus abietinus	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1904	Local
M. obliquus	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	1967	Local
PEMPHIGIDAE																	
Asiphum tremulae	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	1915	Local
Prociphilus fraxini	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1970	Rare
Stagona pini	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	1915	Widespread
Species Total	9	9	6	7	10	4	1	4	3	0	3	2	2	3	2		

Footnote: † First recorded occurrence of these species making colonies on coniferous plants

Asiphum tremulae; ash leaves for *Prociphilus fraxini;* and hawthorn shoots for *Stagona pini.* Occurrences are, however, far fewer on the primary host than on the roots of their secondary hosts (see Table III), where they are sometimes very abundant. The Green Spruce Aphid *Elatobium abietinum* can be found on most spruce species. Although this aphid probably spread from the Norway Spruce forests of Europe, it has become extremely abundant in Britain as it thrives on Sitka Spruce growing in our more maritime climate. The European and Asian spruce species show more resistance to this aphid than the North American ones, the needles of which readily discolour and are prematurely shed after an attack.

Winged female aphids are often produced in many hundreds from a single tree in summer. They are well equipped to be transported in warm air currents over many miles. Probably less than 1% ever reach the correct host-plant, those that do (being parthenogenetic) can rapidly establish a new colony. Aphids are therefore one of the first groups of phytophagous insects likely to appear on the exotic tree species here. The records of new species and their distribution illustrates this point (see Table III).

FUTURE TRENDS

So far the insects new to Britain in these new habitats have been mainly the kinds that feed on young trees and young tissues. As the post-war plantations (the greater proportion) pass out of the closed canopy stage by subsequent thinnings and fellings the habitat will change for the better for other insects. More light falling on the forest floor and rides will enable further plant species and richer communities to become established. Fortunately the forests of Britain have not been planted with single varieties and clones of trees which are routinely sprayed to exclude the threat of every pest, disease and weed. Felling programmes, replanting with new species, adopting new management systems, and the inevitable disasters such as fires and gales will add variety to forest sites by providing opportunities for further foodplants to grow including the sun-loving and much needed, nectar-producing flowers that are visited by Diptera, Hymenoptera, Coleoptera and Lepidoptera.

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Further records of *Rhamphomyia marginata* (F.) (Dipt: Empididae)—During a visit to Thornden Wood, nr. Whitstable, Kent on 23.v.1982, we both were fooled into netting what we thought to be small moths disturbed from young pines, but which upon inspection were found to be empidid flies, later identified as *Rhamphomyia marginata* (F.) by reference to the paper by P.J. Chandler published in *Proc. Trans. Br. ent. nat. Hist. Soc.* **6**: 73–76.

P.J.J. recorded another specimen in Burnt Oak Wood, Orlestone, Kent at m.v. on 26.v.1982, which is close to the Longrope Wood locality where the insect was discovered as a British species by L.K. Evans and E.H. Wild, but the Blean record represents a substantial extension of its known distribution.—N.F. Heal and P.J. Jewess.

PSEUDOPOMYZA ATRIMANA (MEIGEN) (DIPTERA: PSEUDOPOMYZIDAE), A FLY OF AN ACALYPTERATE FAMILY NEW TO THE BRITISH LIST.

by PETER J. CHANDLER

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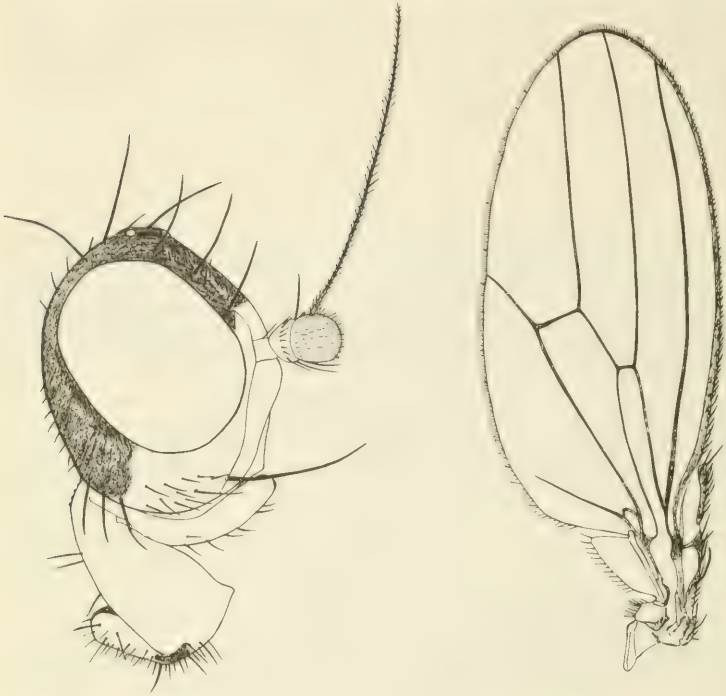
The identity of a small, shining black acalypterate fly with mainly yellow head and legs, which I collected some ten years ago, has till recently remained obscure. In the keys to British acalypterate families by Colyer & Hammond (1951, 1968), Oldroyd (1970) and Unwin (1981) it ran to the Drosophilidae, except that the fronto-orbitals are all reclinate, but it also differed in antennal structure, lack of dorsal preapical bristles on the tibiae and in the well developed ovipositor. Other than the lower fronto-orbitals not being incurved and the interfrontals not arranged serially, it conformed to the characters given in those keys for the Milichiidae. On reference to Hennig's (1937) work on the Palaearctic Milichiidae it was found to agree with the figures and description of one of the genera of uncertain position appended to that work, i.e. *Pseudopomyza* Strobl, which contains the single species *atrimana* (Meigen). Hennig's key characters in that work are not entirely correct as *Pseudopomyza* has the costa broken twice as in the Milichiidae and Drosophilidae, although the break near the humeral cross-vein is narrow.

The view of several recent authors that a family Pseudopomyzidae should be recognised to include *Pseudopomyza* and several more or less obviously related genera is provisionally accepted here.

McAlpine (1966) first recognised the relationship between *Pseudopomyza* and the Australian genus *Heloclusia* Malloch and also considered two New Zealand genera synonymous with *Pseudopomyza*. He correctly observed that these genera were allied to the Cypselosomatidae (including only the Oriental genera *Cypselosoma* Hendel and *Formicosepsis* de Meijere) and that both families belonged to the Micropezoidea (also including Micropezidae and Neriidae).



Head and wing of female *Pseudopomyza atrimana* (Mg.).

Hennig (1969) referred the Nearctic genus *Latheticomyia* Wheeler, previously considered of uncertain position (Wheeler, 1956; Stone et al., 1965) to the Pseudopomyzidae and described new Neotropical species of that genus and of two new genera, *Pseudopomyzella* and *Rhinopomyzella*. He gave a key to genera but did not define the family. Steyskal (1970) confirmed Hennig's suggestion that *Tenuia* Malloch from the Philippines also belonged here. The presently recognised composition of the family was completed by the description of *Polypathomyia* by Krivosheina (1979) from Siberia. Thus the existence of a worldwide group, but with relatively few genera and species has become apparent and may be recognised by the combination of characters cited below.

The only dispute has been about the position with respect to the Cypselosomatidae. Griffiths (1972), in his phylogenetic work based on male postabdominal structure in the Cyclorrhapha, accepted that the two families together represented a monophyletic group, considered to be the sister group of the Micropezidae and Neriidae together. He studied only *Heloclusia*, *Pseudopomyza* and *Formicosepsis* but found that the two latter shared apomorphies (derived characters) in their genital structure not found in *Heloclusia*. His conclusion that the group should be regarded as a single family, Cypselosomatidae, was followed by McAlpine et al. (1981) in their key to the families of Nearctic Diptera and *Pseudopomyza* runs to Cypselosomatidae in their key.

Andersson (1976), however, considered the characters on which Griffiths had based his conclusion could be due to convergence and restricted the Cypselosomatidae to the two originally included genera, on the basis of the many apomorphies shared by them. Krivosheina (1979) independently came to the same conclusion, based on a different set of characters in which the plesiomorphous (primitive) condition was again found in the Pseudopomyzidae; she also proposed to recognise two sub-families but without being sure of the position of some genera.

FAMILY CHARACTERS OF THE PSEUDOPOMYZIDAE

The following characters by which the Pseudopomyzidae may be recognised among the families of British acalypterates are shared with the two genera of the Cypselosomatidae except that the latter lack the costal break near:—

Stout flies with relatively short robust legs. Fronto-orbitals in a row, all reclinate (upswept), without lower ones incurved. Antennae porrect (standing out from head), with rounded third segment. Arista at most with short pubescence. Face without tubercle. Strong vibrissae present. Proboscis short and stout. Strong ocellar bristles. Interfrontals not serially arranged. Costa broken twice, near h and near R_1. Vein Sc weak, close to R_1 and fading apically. Vein CuA_2 present, forming closed but small anal cell. Vein A_1 extending distinctly beyond cell but not reaching margin. Tibiae without distinct dorsal preapical bristles. Hind metatarsus simple, elongate.

In the Cypselosomatidae, the third antennal segment is disc-shaped with a bare arista, the mid and hind tibiae are dilated, the sternopleuron bears only short hair-like bristles (at least one strong sternopleural in Pseudopomyzidae), two well developed interfrontals are present and the postverticals are diverging or nearly parallel (converging or crossed in the Pseudopomyzidae), the posterior cross-vein is absent and M_{3+4} does not reach the margin, but curves into M_{1+2}.

Of these characters only the condition of the postverticals is a possible synapomorphy of the Pseudopomyzidae with respect to the other Micropezoidea. The superfamily grouping is based principally on the genital structure. The Micropezidae and Neriidae, apart from their slender body and legs, differ from the Pseudopomyzidae in lacking vibrissae and ocellars (apomorphous), vein Sc not closely approximated to R_1 and vein A_1 reaching the margin (plesiomorphous) and in the unbroken costa (character state uncertain).

GENUS *PSEUDOPOMYZA* STROBL

Pseudopomyza is distinguished from other genera of Pseudopomyzidae by the following combination of characters: three pairs of fronto-orbitals; face bare between antennae; 4 pairs of dorsocentrals; 2 pairs of scutellars; mesopleuron bare; costa without spines.

Polypathomyia stackelbergi Krivosheina is the only other known Palaearctic species. It is a longer-bodied black fly with a similar extent of yellow on the head and legs as found in *P. atrimana*. It differs among other respects in the spinose costa and presence of 3 pairs of scutellars.

Pseudopomyza atrimana (Meigen, 1830)

Opomyza atrimana Meigen, 1830, *Syst. Beschr.* **6:** 106; Morge, 1975, Plate CLX, Fig. 10.

Pseudopomyza nitidissima Strobl, 1893, *Wien. ent. Zeit.* **12:** 284 (synonymy established by Hendel, 1902, *Wien ent. Zeit.* **21:** 261–264).

A small compact, mainly black fly but the head and legs strikingly parti-coloured black and yellow. The body is entirely more or less shining black with thin grey dusting evident from some angles; dusting is denser on the abdomen especially on the basal segments. The frons and occiput are black, slightly dulled by grey dusting, except for the narrow fore margin of the frons which is deep orange-yellow and concolorous with the face, cheeks and jowls, proboscis and palpi. The antennae are also yellow basally, including the narrow basal margin of the third segment, which is otherwise dull grey-brown.

Female. Head broad, a little broader than thorax. Frons about 2.5 eye widths, about as broad as distance from its fore margin to rear margin of head, rounded in profile.

Eyes large, oval. Face broad, shorter than frons, with rounded protuberance below antennae. Lower margin of head rounded with jowls nearly as broad as fore femora. Mouth large with large fleshy proboscis and palpi.

Antennae small, with short basal segments and rounded third segment a little longer than two basal together, flattened dorsally and bearing long dorsal arista, 4 times antennal length. Basal segments with marginal bristles, those on second including some longer than third segment above and below. Third segment with short hair. Arista densely clothed with short hairs.

Ocellar triangle small, not sharply separated from frons, bearing one strong pair of proclinate ocellars in middle and very short proclinate pair behind. Two pairs of convergent postocellars, inner pair long and crossed. Two strong pairs of (post) verticals, inner convergent, outer divergent. Three strong reclinate fronto-orbitals with short weak hairs between. Frons also bearing several very short scattered interfrontal hairs each side of mid line on dark area. One pair of long, strong convergent vibrissae; several short, scattered, proclinate jowlar hairs behind, some longer erect bristles behind near lower margin of occiput.

Thorax compact, rounded shallowly above. Scutellum short, angular between apical scutellars. Thorax with 1 + 3 strong dorsocentrals, prescutellar pair longer. Acrostichals short, biserial, pre- and postsutural. Scattered weak intra-alar hairs. 1 + 3 strong supra-alars, weak hairs between. One strong humeral with weak hairs in front. 2 strong notopleurals, 1 strong long postalar, a shorter bristle behind. 2 pairs of strong scutellars, apicals long and crossed. Pleura bare except one strong sternopleural with several short hairs in front of it.

Abdomen broader and longer than thorax. Basal six tergites subequal, much broader than long, bearing evenly scattered short black bristles, these a little longer on sides apically on tegites 5 and 6. Ovipositor including tergite 7, which is tapered and elongate, as long as 5 and 6 together, shining black with a brownish median depression and a rounded bare protuberance on each side basally, otherwise sides densely bristled. Cerci small, yellowish brown. Sternites longer than broad, grey dusted, bristly, separated by membranes from ventral tergal margins.

Legs short but slender, with only short bristling except several long, curved posteroventral bristles on apical three-fifths of fore femora, some exceeding femoral width. Fore tarsi with long bristling below, several longer bristles below base of metatarsus. Mid tibia with strong ventral apical spur. Hind femur with strong erect anterodorsal seta at apical third.

Wings relatively narrow, 2.5 times as long as broad, clear with yellowish veins, uniformly covered by microtrichia. Costa with 2 strong bristles midway between base and vein h and a shorter pair just before each costal break. Costa broken narrowly just beyond h and before tip of R_1. Vein Sc weak, running closely parallel with R_1, fading apically. Median and posterior cross-veins before and beyond middle of wing length, widely separated. Second basal cell not demarcated, although a faint fold is present in the membrane, level with the very small anal cell, which is convex apically. Anal vein not reaching margin. Anal lobe narrow, angular, alula broadened distally. Halteres lost in specimen, pale yellow according to Hennig.

Wing length 2.3 mm, body length with abdomen extended (but excluding antennae) 2.7 mm.

Male. Not seen. It was described by Frey (1952) as being a little smaller than the female, 1.8 mm long, with a large reflexed genital capsule which he figured.

Material examined

LONDON (S.E.): Downe, Cuckoo Wood, swept in beech woodland, 23.vii.72, one female.

The type locality of *atrimana* was the vicinity of Aachen, West Germany; that of *nitidissima* was Seitenstetten in Lower Austria. Hendel (1902) mentioned that Thalhammer had collected it in Transylvania (Rumania). Hennig (1937) added a record of one female from near Leningrad. Frey (1952) recorded it from two localities near Helsinki, where he netted the flies in numbers over fallen tree trunks;

he also noted an inland Finnish record from Ruovesi (Tb). Roháček (1981) swept one male over decayed vegetation on 31.8.80 near Plešivec, Slovakia, Czechoslovakia.

Polypathomyia was reared from larvae found beneath bark of various trees in the extreme east of Siberia and on Kunashir Island off northern Japan, so Frey's observation may indicate an association with dead wood in *Pseudopomyza* also.

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AN ENTOMOLOGICAL HISTORY OF THE 'CRUMBLES'

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THE HISTORICAL PERSPECTIVE

In response to a parliamentary question concerning the Crumbles, the Rt. Hon Ian Gow, Conservative Member of Parliament for Eastbourne described the area as " . . . a barren featureless land . . ." The stimulus for such a reply was the question of the local borough council's plans for redevelopment of the area into a Marina and Golf driving range. This paper examines the entomological facts about the site, its slow but deliberate destruction in the name of progress and its loss in the author's opinion as one of the premier sites in Sussex.

The 'Crumbles' is a local name for an area of stabilised shingle in many respects similar to Dungeness in Kent. It is smaller in size, about two square miles in area and is situated between the towns of Eastbourne and Pevensey on the Sussex coast.

As an example of habitat type the Crumbles is unique in Sussex. In a national context Dungeness is very similar but has also suffered from shingle removal and consequently falling water tables; in addition a significant portion of the shingle formation has been colonised by the Central Electricity Generating Board.

The first major changes to affect the Crumbles began in 1857 with extensive amounts of shingle removed for construction of the growing town. Ballast mining as it is called continued unabated until 1885 and periodically up to the present day. These activities had the effect of bringing the shingle surface nearer the water table and resulted in the establishment of ponds, reedbeds and carr communities. At some time during the 1930's the 'Crumbles Pond' was drained, re-lined and put to work as a paddling and pleasure boat lake. This pond must have been of great age for during the excavation two feet of Sedge peat were removed. Prior to this happening the pond was a noted locality amongst Eastbourne's fishermen as early as the beginning of the nineteenth century. Major urban encroachment on the Crumbles began in 1880, and again later in 1914 with residential building at the eastern end of the site. This culminated in 1963 with the construction of Langney Estate, hundreds of dwellings for the overspill from the growing population of Eastbourne. Modern building techniques had overcome the problems of construction on the unstable substrate.

Following the 1939–45 war, widespread dumping had disfigured the original reedbeds and thorn-scrub that flourished in the damper parts. Ballast mining licences terminated at the end of 1982 and the path is clear for major redevelopment as discussed earlier. So much shingle has been removed that most of the site has been lowered in excess of twelve feet. The open water bodies have lowered the water table through evaporation, resulting in the drying out of the Sallow Carr and reedbeds.

HABITAT

It is regretfully outside the scope of this article to enter into a lengthy discourse on the botanical merits of the site. The flora has been actively researched (Ash, unpublished) in conjunction with the Sussex Botanical Recording Society. Ash lists 288 species from the area under review.

The substrate comprises variously shaped and sized flint pebbles which are bound together by small amounts of humus and vegetative growth. The storm bank on the coastal edge of the site has plants such as Horned Poppy *Glaucium flavum*, Sticky Groundsel *Senecio viscosus* and plentiful Sea Kale *Crambe maritima*. Behind the storm bank on the artificially lowered shingle the habitat is dominated by Sea Campion *Silene maritima* and various salt tolerant grasses. Humus here is at a premium, most of the other plants are prostrate or encrusting, many are lichens and mosses. Further inland the humus thickens, and much of the shingle remains covered with a near continuous carpet of lichen over an inch in depth. Floral diversity is high, of importance for nectar feeding insects. The vegetation is structurally more complex with tall shrubs such as Sallow *Salix caprea*, Gorse *Ulex europeus* and Bramble *Rubus fruticosus agg.* in profusion.

Further inland along the edge of the B2191 is Hawthorn *Crataegus monogyna* scrub and an experimental conifer plantation.

LEPIDOPTERA

Recording of Lepidoptera has been spasmodic and concentrated on the more interesting species, resulting in a species total of one hundred and fifty-seven. This is quite reasonable considering the extreme environmental conditions, for example—lack of shelter, temperature extremes between day and evening and continual exposure to sea spray.

Perhaps the most interesting record for the site is that of the Sussex Emerald *Thalera fimbrialis*. The late Charles de Worms (pers. comm. 25th February 1977) notes its presence at the site and refers to the fact that Ellison had even taken specimens at his house in Eastbourne. This note from de Worms sheds new light on the status of the species in the Eastbourne area in the fifties. In his authoritative work on the Lepidoptera of Sussex, Pratt (1981) notes that both de Worms and Ellison (1955) recorded a breeding colony in the British Isles, but doubts the authenticity of a Sussex colony at that time. The present author feels that the details of the occurance of *fimbrialis* in the town and in 1956 on the Crumbles is sufficient proof of a resident population on the Crumbles rather than chance immigration.

Among other species indigenous to the area one can include the large populations of *Hadena perplexa*. The Crumbles in common with Dungeness exhibits a range of forms where the normal light brown coloration of the imago is replaced by various degrees of whiteness associated with the reduction or absence of markings. The open areas of bare shingle colonised by *S.maritima* are an ideal habitat for the species with the larvae feeding inside the developing seed capsules. The aberrant white coloration would be a distinct advantage to a species which has to conceal itself amongst the flints during the day as there is no vegetative cover for the adult moths in this part of the Crumbles. It is also worth noting that the species enjoys a protracted emergence period and the writer has noted adults from the beginning of May until late August.

Another rare insect of such habitats, the moth *Calophasia lunula* was reported breeding on Toadflax *Linaria vulgaris* during the 1960's and 1970's. The author even recorded adults to light in 1977 and 1978 in his own garden two miles distant.

The site was, and still is an important interception point for migrants. The small patches of *Senecio viscosus* have produced several generations of *Heliothis peltigera*. These have been variously recorded in the past: Adkin (1930), Banner (1951, 52 & 53 pers. comm), Parsons (1980 pers. comm.) and the author (1982). The stands of *Crambe maritima* have proved a useful pabulum for oviposition of *Pieris brassicae*, a regular migrant in early summer. A single specimen of *Rhodometra sacraria* was taken by A. L. Rayward in 1932 (Adkin: 1934). During the B.E.N.H.S. field meeting led by Dr. I.A. Watkinson (1976) several specimens of *Heterographis oblitella* seemed to indicate a strong migration to the south coast. This last species belonging to the Pyralinae brings us on to the second sub-division of the Lepidoptera.

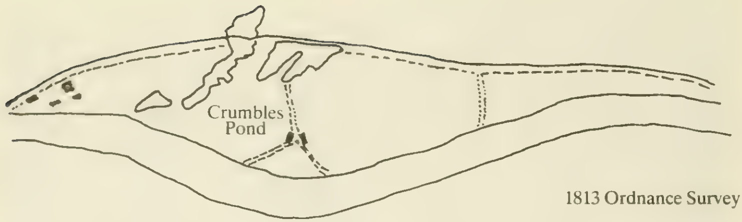
Sixty-five species of microlepidoptera have been recorded from the Crumbles. Twenty-five species representing 38 per cent of the total are noted as 'local' or 'rare' in Meyrick (1928). Both the life styles and foodplant preferences of these species are strongly influenced by the floral composition of the site. *Achillea millefolium* or Yarrow is one of the important foodplants for several species, including *Thalera fimbrialis* as discussed earlier. *Phycitodes carlinella, Thiodia citrana* and *Aethes smeathmanniana* all exhibit a strong preference for this plant. In addition these

Fig. 1. Ballast removal encouraged areas of standing water, in this case the area was dominated by thorn scrub.

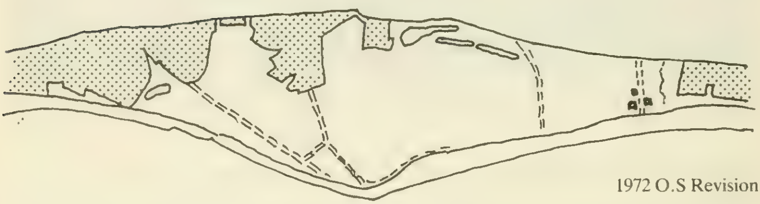
Fig. 2. Unstable shingle is loosely bonded by a rich layer of lichens, mosses, salt-tolerant grasses and the ubiquitous Sea Campion.

Fig. 3. The late 1950's saw widespread dumping of domestic refuse, particularly in the reedbeds.

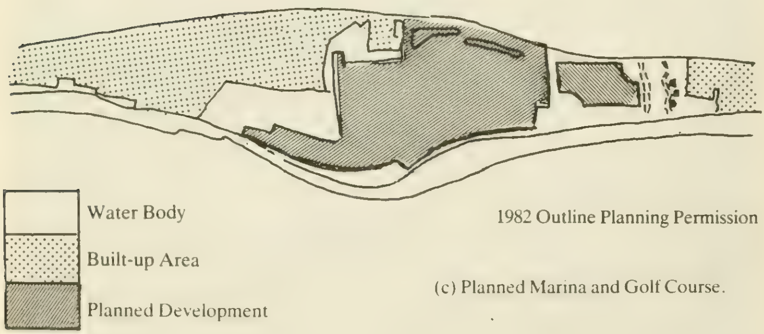
Fig. 4. A late stage in shingle succession, coarse grasses and brambles flourish on a thin layer of humus.



(a) Map of the shingle formation at the Crumbles, also showing 'Crumbles Pond'.



(b) Encroaching residential development at both ends of the site.



(c) Planned Marina and Golf Course.

Fig. 5. DEVELOPMENT OF THE CRUMBLES

species and many of the others listed in the appendices will feed avidly on *Senecio jacobaeae* which grows in profusion here.

Both grasses and mosses are widely employed by microlepidoptera in this sort of environment, including many of the rare species such as *Bryotropha basaltinella*. Very few species lack a suitable foodplant on the Crumbles terrain but three Oak-feeding species have been found here, *Zeiraphera isertana*, *Ypsolopha ustella*, and *Y.parenthesella*.

Butterflies are poorly represented in this type of area, nine species having been recorded.

ORTHOPTERA

Visits were made to the Crumbles in 1966 and 1973 during a survey carried out by E.C.M. Haes. (pers.comm.) Of the five species noted the most interesting is perhaps the record of *Chorthippus albomarginatus*, which has a preference for dry coastal areas such as estuaries, saltings, sandunes and shingle formations.

COLEOPTERA

The area has been briefly researched by three different coleopterists. The aquatic species were examined by Foster (1967 pers.comm.) whilst the terrestrial species have been studied by Hodge (1972–81 pers.comm.) and Jones (1982 pers.comm).

Fifty-two species were recorded of which twenty-three are either localised or rare. The aquatic fauna of the ballast pits is quite distinctive and includes species such as *Guignotus pusillus*, an attractive synanthropic species. The terrestrial fauna was on the whole more interesting as the habitat has remained in a similar condition for many years. The list submitted by P. Hodge includes *Licinus punctatulus*, *Gauropterus fulgidus*, *Trixagus elateroides*, and *Dacrila fallax*. A full list is appended.

DIPTERA

The Crumbles has been little worked by dipterists, and consequently there is only one record of note. During a meeting of the Entomological Club on the 28th May 1932 a series of the rare fly *Delia flavifrons* Zett., was taken by J.E. Collin, an eminent dipterist of the day.

From these notes and the appendices at the end of the paper the writer hopes to have established the view amongst readers that the site is in many respects unique and of merit. If the entomological community in the fifties and sixties had sought conservation status for this area as a Site of Special Scientific Interest in conjunction with the botanical and ornithological interests present, a strong case could have been made to halt the gradual destruction of the area. As it stands now, the Crumbles is destined for a Marina development which the majority of the populace neither need, nor will be able to afford to enjoy.

ACKNOWLEDGEMENTS

I should like to note the help and enthusiasm of several people without whose records this paper would have been much the poorer. Dr. & Mrs. B.M. Hobby, Miss M.A. Ash, Dr. I.A. Watkinson, Mr. C. Pratt, Mr. E.C.M. Haes, Mr. M.S. Parsons, Mr. S.N.A. Jacobs, Mr. J.M. Chalmers-Hunt, the late C. de Worms, Dr. G. Foster, Mr. P.T. Hodge, Mr. R.A. Jones and Dr. J. Banner. In addition I should like to thank D. Harvey and Dr. I.F.G. McLean of the Nature Conservancy for their help during preparation of this paper.

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INSECTS RECORDED FROM THE CRUMBLES

Lepidoptera (nomenclature Bradley and Fletcher 1979)

HEPIALIDAE: Hepialus humuli, H. lupulinus. TINEIDAE: Nemapogon cloacella, Tinea trinotella. GRACILLARIIDAE: Phyllonorycter emberizaepenella.

YPONOMEUTIDAE: Yponomeuta padella, Y.cagnagella, Scythropia crataegella, Ypsolopha scabrella, Y.parenthesella, Plutella xylostella.

COLEOPHORIDAE: Coleophora albitarsella, C. spissicornis, C. onosmella.

OECOPHORIDAE: Depressaria badiella, Agonopteryx alstroemeriana, A. nervosa. GELECHIIDAE: Monochroa palustrella, Teleiopsis diffinis, Bryotropha basaltinella, Scrobipalpa obsoletella. BLASTOBASIDAE: Blastobasis lignea, B. decolorella. MOMPHIDAE: Mompha epilobiella.

COCHYLIDAE: Agapeta hamana, Aethes smeathmanniana, A.francillana, Cochylis roseana, C. hybridella, C. atricapitana.

TORTRICIDAE: Cnephasia longana, C.stephensiana, Acleris comariana, Orthotaenia undulana, Endothenia gentianaeana, Epinotia fraternana, Zeiraphera insertana, Epiblema roborana, Eucosma campoliliana, E. hohenwartiana., E. cana, Thiodia citrana, Dichrorampha alpinana.

PYRALIDAE: Chrysoteuchia culmella, Crambus perlellus, Agriphila straminella, A.inquinatella, Catoptria falsella, Platytes cerusella, Scoparia subfusca, S. pyralella, Cynaeda dentalis, Eurrhypara hortulata, E.coronata, Dolicharthria puntalis, Pleuroptera ruralis, Endotricha flammealis, Eurhodope marmorea, Oncocera semirubella, Ancylosis oblitella, Homoeosoma sinuella, Phycitodes carlinella.

PTEROPHORIDAE: Capperia britanniodactyla, Platyptilia gonodactyla.

HESPERIIDAE: Thymelicus lineola. PIERIDAE: Pieris brassicae, P.rapae.

LYCAENIDAE: Lycaena phlaeas, Polyommatus icarus.

NYMPHALIDAE: Vanessa atalanta, Cynthia cardui, Polygonia c-album.

SATYRIDAE: Maniola tithonus.

LASIOCAMPIDAE: Malacosoma neustria, Lasiocampa trifolii, L.quercus, Philudoria potatoria. SATURNIIDAE: Saturnia pavonia.

DREPANIDAE: Cilix glaucata. GEOMETRIDAE: Thalera fimbrialis, Cyclophora punctaria, Rhodometra sacraria, Scotopteryx bipunctaria, Epirrhoe galiata, Eulithis prunata, E. pyraliata, Horisme tersata, Perizoma alchemillata, Eupithecia haworthiata, E.linariata, E.venosata, E.centaureata, E.absinthiata, Aplocera efformata, Opisthograptis luteolata, Selenia dentaria, Crocallis elinguaria, Peribatodes rhomboidaria, Aspitates ochrearia.

SPHINGIDAE: Mimas tiliae, Smerinthus ocellata, Laothoe populi, Deilephila elpenor.

NOTODONTIDAE: Cerura vinula, Furcula furcula, Notodonta dromedarius, Eligmodonta ziczac, Pterostoma palpina.

LYMANTRIIDAE: Euproctis chrysorrhoea. ARCTIIDAE: Eilema lurideola, Arctia caja, A.villica, Tyria jacobaeae.

NOCTUIDAE: Euxoa obelisca, E.nigricans, Agrotis exclamationis, A.puta, Ochropleura plecta, Noctua pronuba, N.comes, N.interjecta, Diarsia rubi, Xestia c-nigrum, X.xanthographa, Discestra trifolii, Hada nana, Lacanobia oleracea, Hecatera bicolorata, Hadena perplexa, H.bicruris, Orthosia incerta, Mythimna conigera, M.ferrago, M.impura, Calophasia lunula, Aporophyla lutulenta, Acronycta rumicis, Amphipyra tragopoginis, Phlogophora meticulosa, Cosmia trapezina, Apamea monoglypha, A.lithoxylaea, A.sordens, Mesoligia furuncula, M.literosa, Mesapamea secalis, Eremobia ochroleuca, Arenostola phragmitidis, Hoplodrina alsines, H.blanda, Caradrina morpheus, C.clavipalpis, Heliothis peltigera, Diachrysia chrysitis, Autographa gamma, A.jota, Abrostola triplasia, Hypena proboscidalis.

Coleoptera (Nomenclature Kloet and Hincks 1977).

CARABIDAE Nebria brevicollis, Trechus fulvus, Bembidion nigropiceum, B. femoratum, Agonum albipes, Harpalus rubripes, Licinus punctatulus, L. depressus, Cymindis axillaris.

HALIPLIDAE Haliplus immaculatus, H. lineatocollis, H. ruficollis. HYGROBIDAE Hygrobia herrmanni. NOTERIDAE Noterus clavicornis.

DYTISCIDAE Laccophilus minutus, Hyphydrus ovatus, Guignotus pusillus, Hygrotus inaequalis, Coelambus confluens, C. impressopunctatus, C. parallelogrammus, Hydroporus memnonius, H. palustris, H. planus, H. pubescens, Porhydrus lineatus, Agabus bipustulatus, A. conspersus, A. nebulosus, Ilybius fuliginosus, Rhantus suturalis, Colymbetes fuscus.

GYRINIDAE Gyrinus marinus, G. substriatus.

HYDROPHILIDAE Helophorus minutus, Hydrobius fuscipes, Anacaena globulus, A. limbata, Laccobius biguttatus, Helochares lividus, Cymbiodyta marginella, Berosus affinis.

HYDRAENIDAE Ochthebius marinus, O. minimus, Hydraena testacea.

STAPHYLINIDAE Gauropterus fulgidus, Staphylinus ater, Dacrila fallax.

THROSCIDAE Trixagus elateroides. APIONIDAE Apion schoenherri.

Orthoptera

Platycleis denticulata, Chorthippus albomarginatus, C.brunneus, C.parallelus, Pholidoptera griseoaptera.

Diptera

Delia flavifrons (flavidipennis).

1982 ANNUAL EXHIBITION

Chelsea Old Town Hall—23rd October 1982

89 exhibitors provided the usual total of over 100 exhibits. Whilst butterflies and macro moths still occupy the greatest space, the range of material is narrow and the reports pick out the most outstanding items. Migrants and newly established species share with aberrations the main attentions of most exhibitors. Few do experimental breeding, even to investigate aberrations. The lepidopterists do not evidence much constructive research into the ecology of their favourite insects in order to assist their conservation. Recording visitors to light traps in nature reserves is not enough.

In the microlepidoptera there is more scope for new observations by conventional methods. The bulk of the report reflects not just the growing number of exhibits, but the high proportion of new county records, new foodplants etc.

Diptera do not yet account for many exhibits, but they are a strong interest amongst the members, as evidenced by the papers submitted for the Transactions. Again the Coleoptera are in eclipse. Hymenoptera no better represented, despite the interest evoked by the mapping scheme.

The records have been compiled by: B. F. Skinner (British macros), R. F. Bretherton (foreign macros), A. W. Harman (British butterflies), J. M. Chalmers-Hunt (micros), P. J. Chandler (Diptera), I. McClenaghan (Coleoptera), and E. S. Bradford (illustrations). D. E. Wilson photographed selected specimens.

MICROLEPIDOPTERA

AGASSIZ, Rev. D.J.L.—*Microstega hyalinalis* Hübn, Grays; new to Essex. *Metzneria aestivella* Z., Purfleet; new to Essex. *Brachmia inornatella* Dougl., Mucking; second Essex record. *Eucosma pupillana* Clerck, West Thurrock; second Essex record. *Nothris congressariella* Bruand, Herm, Channel Is., bred. A series of each of the *Oegoconia* species: *O.caradjai* Popescu-Gorj & Căpuşe, *O. quadripuncta* Haw. and *O.deauratella* H.-S.

BEAUMONT, H.E.—*Caloptilia rufipennella* (Hübn.), Claythorpe, Lincs. 11.ix.82. Second Lincs. record. *Phyllonorycter dubitella* (H-S.), Denaby Ings, South Yorks., moths reared March/April 1982 from mines on *Salix caprea* collected

November 1981. First Yorks. and most northerly British record. *Goniodoma limoniella* (Stt.), Saltfleetby-Theddlethorpe Dunes NNR, 3.vii.82. Second Lincs. and most northerly British record. *Coleophora coracipennella* (Hübn.), Denaby Ings and Broomhill, South Yorks. Moths reared June 1982 from cases on *Crataegus* and *Prunus spinosa* collected May 1982. Most northerly British records. *Coleophora limosipennella* (Dup.), cases on *Ulmus* at Sprotbrough, South Yorks. in June 1981 and June 1982. Moth from same locality in July 1982. First Yorks. and most northerly British record. *Coleophora trigeminella* Fuchs, Denaby Ings, South Yorks., two cases on *Crataegus* 17.iv.81, moths reared June 1981. First Yorks. and most northerly British record. *Coleophora lineolea* (Haw.), Denaby Ings, South Yorks., moths reared July 1982 from cases on *Stachys sylvatica* collected May 1982. Third Yorks. record. *Exaeretia allisella* Stt., West Melton, South Yorks. Now recorded fairly commonly. Specimens exhibited taken in 1979 & 1980. *Metzneria aprilella* (H.-S.), Rotherham area, reared 1982 from seedheads of *Centaurea scabiosa*. Now recorded from four localities in South Yorks. Most northerly British records. *Syncopacma larseniella* (Gozm.), Woodthorpe, Lincs. 3.vii.82 among *Lotus uliginosus*. First confirmed Lincs. record. *Mompha nodicolella* Fuchs, Denaby Ings, South Yorks. Moths reared late September 1982 from larvae in seed pods of *Epilobium angustifolium* collected late August. First Yorks. and most northerly British record. *Ancylis geminana* (Don.), Claythorpe, Lincs. 20.vi.82. First Lincs. record. *Eucosma pupillana* (Clerk), West Melton, South Yorks. 1982. Recorded more frequently in recent years. *Cydia orobana* (Treits.), Saltfleetby-Theddlethorpe Dunes NNR, Lincs. 3.vii.82. First Lincs. record. *Euzophera cinerosella* (Zell.), West Melton & Denaby Ings, South Yorks. 1982. Recorded frequently in the past five years. *Leucinodes* sp. ? *orbonalis* (Guen.), moth reared from larva in aubergine of unknown origin purchased at Halifax, West Yorks. in March 1981. Moth emerged 26.iv.81.

BLAND, Dr. K.P.—(1) Map of British Isles showing the 10 km squares from which one or more species of Incurvariidae have been recorded (some 590 squares in all) for Incurvariid and Heliozelid Recording Scheme (2) *Glyphipterix equitella* Scop., Arthur's Seat, Edinburgh, Midlothian, 3.ix.1982; second Scottish record; previously only known from Moncrieffe Hill, Perthshire. *Dichrorampha alpinana* Tr., Blackford, Edinburgh, Midlothian, ex rootstocks of Ox-eye Daisy collected 31.v.1982 emerged 1–6.vi.1982; new to Scotland. *Bucculatrix cristatella* Z., Pettycur, Fife, ex *Achillea millefolium* collected 31.vii.1982, emerged 1–3.viii.1982; second Scottish record; rediscovered in its only Scottish locality after 88 years, but now also recorded from Midlothian and E. Lothian. *Cochylis dubitana* Hübn., Pettycur, Fife, 31.vii.1982; a rather *rare* species in Scotland. *Diplodoma herminata* Geoffroy, Balnaguard, Perthshire, ex oak trunk, collected 25.iv.1982, emerged 30.v.1982; Meggernie Pinewood, Perthshire, ex Scots pine trunk, collected 9.iv.1982, emerged 25.v.1982.

BROTHERIDGE, D.J.—Species taken in N. Wiltshire by the exhibitor in recent years. *Commophila aeneana* Hübn (taken on a site now sadly destroyed by 'progress'); *Ptycholomoides aeriferanus* H.-S. (two of five taken since the late 1960s) and *Phyllonorycter geniculella* Rag.

CHALMERS-HUNT, J.M.—*Bisigna procerella* D. & S., Orlestone Forest, 10.vii.1982, at light; the fourth British specimen. *Agonopterix astrantiae* Hein., Llandudno, bred 25.vi.1982, from larvae taken by H.N. Michaelis on *Sanicula europaea*. *Cochylis flaviciliana* Westwood, Selsdon, Surrey, bred 30.vii.1982, from a larva collected on seed head of *Knautia arvensis*.

CHIPPERFIELD, H.E.—*Pima boisduvaliella* Guen., *Adoxophyes orana* F. v. R., *Eucosma tripoliana* Barr. and *E.maritima* H. & W., all from Suffolk. *Eucosmorpha albersana* Hübn. and *Bohemannia quadrimaculella* Boh., from Norfolk. *Aphelia unitana*, from Yorks.

EMMET, Lt. Col. A.M.—*Lampronia fuscatella* (Tengst.) Romford, new to Essex. From a box of unset microlepidoptera taken by N. Nash. *Adela croesella* (Scop.) Icklingham, Suffolk: three reared 26–27.v.1982 from larvae taken in November, 1981. The larval cases were also shown. These are made of silk covered with earth fragments, not of leaf fragments as stated in MBGBI **1**: 298. A case of *A.reamurella* (L.) which is made from leaf fragments was shown for comparison. *Epichnopterix retiella* (Newman) and *Monopis crocicapitella* (Clemens) Foulness, Essex. The case of the psychid was found attached to the spinning in dead *Beta* of the tineid. The tineid ate the fragments of grass stem covering the psychid case, leaving only the silken core. Neither insect was the worse for this strange association. *Parectopa ononidis* (Zell.) Specimens from Grays and Foulness Island, Essex. The species is new to the county and a distribution map showed its preference for coastal localities in Essex. *Phyllonorycter saportella* (Dup.) Following a chance rearing of a single adult from South Lopham, Norfolk on 26.iii.1982, freshly emerged moths were found to be abundant on trunks of oak at this locality on 9 and 11.v.1982. Larvae were collected on 3.vii.1982 and further moths were reared. Both the reared and captured specimens were exhibited. The most recent prior record was made in 1949. *Phyllonorycter viminetorum* (Staint.) Specimens reared from Chigborough Lakes, Maldon, a nature reserve recently acquired by the Essex Naturalists' Trust. This local species is not uncommon in eastern Essex. *Yponomeuta malinellus* Zell. Specimens taken on 17.vii.1982 in an abandoned apple-orchard on Foulness Island, Essex. Larval webs were festooning the trees and the moths were abundant. *Coleophora frischella* (L.) Taken at Saffron Walden, Essex on 16.ix.1982. It is of interest because the locality is inland and the date shows it to belong to the second generation, this being the only British *Coleophora* to be bivoltine. *Ethmia funerella* (F.) New to Essex. A specimen captured by N. Nash at West Wood Nature Reserve, near Thaxted during a meeting of the Essex Field Club on 24.v.1982. It may have been a vagrant since the foodplants were not observed. *Endothenia ustulana* (Haw.) Taken on 7.viii.1982 during the Society's field meeting at Monks Wood, Cambridgeshire. *Eucosma pauperana* (Dup.) Six specimens captured on 27.iv.1982 at Fleam Dyke, Cambridgeshire, when the moth was flying freely between 1830 and 1930 hrs BST. *Cydia pallifrontana* (Lienig & Zell.) New to Essex. Four specimens captured on 29.vi.1982 on the nature reserve at Hadstock, near Saffron Walden, which has recently been acquired by the Essex Naturalists' Trust.*Crombrugghia distans* (Zell.) Three specimens reared from larvae on 2–4.vi.1982 and two from pupae on 13–15.vii.1982 taken at Barton Mills, Suffolk. This species has not previously been reared from the larval stage in Britain and the description of the larva given in the text-books was found to be incorrect.

FAIRCLOUGH, R.&A.J.—Species from Essex, Surrey, Hants., Kent. *Pammene agnotana* Rebel, taken 25.iv.1982, Fleam Dyke, Cambs. the second British specimen (the first, Surrey, 15.iv.1961).

GODFRAY, C.—Live *Epermenia chaerophyllella* Goeze, reared from *Heracleum*.

HALL, N.M.—A selection of microlepidoptera mostly taken at Portland Bill, Dorset. The purpose of the exhibit was in part to publicise a request for further records from the Portland Bill Observatory and Field Centre recording area (south of the 70 line on the OS map) for which N.M. Hall is an unofficial recorder, and whose address is 9 Edney Court, Gladridge Close, Earley, Reading, Berks.

HARMAN, T.W.—*Uresphita limbalis* D. & S. and *Eurrhypara perlucidalis* Hübn, both from Westbere, Kent in 1982.

HEAL, N.F.—*Coleophora ramosella* Zell., bred 26.vi. to 30.vii.82 ex cases collected 23/4.v.82 Thornden Wood, Whitstable, Kent; also young overwintering cases collected 11.ix.82. First record for Kent and otherwise known from the west coast of Ireland. *Coleophora* sp. indet. bred 7/24.vii.82 ex cases collected Harty, Kent on *Suaeda maritima* 3.x.81; also fresh cases collected 6.x.82. This species is figured erroneously by Benander in Die Coleophoridae Schwedens as *suaedivora* Meyrick. *C.orbitella* Zell., bred 6.vii.82 ex 2 cases collected 12.x.81, birch, W. Wickham, Kent. *C.saturatella* Staint., ex cases collected Dartford Heath, Kent, on *Sarothamnus* 1.vii.82. *C.adspersella* Benander bred 29.vi/1.viii.82 ex cases collected Funton, Kent on *Atriplex littoralis* 10.ix.81. *C.vibicella* Hübn., pale form bred 27.vii.82 ex cases collected Thorney Is., W.Sussex, 25.v.82, with typical specimens for comparison. *Caloptilia falconipennella* Hübn., bred 11/14.ix.82 ex pupae collected Thursley, Surrey, 22.viii.82. *Bedellia somnulentella* Zell., bred 19/23.ix.82 ex larvae collected Borden, near Sittingbourne, Kent, 9.ix.82. *Nemaxera betulinella* F., Leigh, Surrey, 18.vii/8.viii.82. *Argyresthia aurulentella* Staint., Hackhurst Down, Surrey, 6.vii.82. *Ypsolopha sylvella* L., Littlebourne, Kent, 27.viii.82. *Olindia schumacherana* F., Denton Bank, Kent, 20.vi.82. *Monopis crocicapitella* Clemens, Lower Rainham, Kent, 25.ix.82, with *M.ferruginella* Hübn. for comparison. *Bisigna procerella* D. and S., Orlestone, Kent, at light 14/18.vii.82. *Mirificarma lentiginosella* Zell., bred 6/15.viii.82 ex larvae collected Thorney Is., W.Sussex, 25.v.82. *Phyllonorycter roboris* Zell., Friday Street, Wooton, Surrey, 15.v.82, first record for Surrey. *Ancylosis oblitella* Zell., Murston, near Sittingbourne, Kent 14.v.82, 6/20.viii.82, 4.ix.82. *Cydia orobana* Treits., St. Margarets-at-Cliffe, Kent, 5.vii.82. *Zelleria hepariella*, Staint., Park Wood, Chilham, Kent, 25/26.vii.82. *Mompha propinquella* Staint., Park Wood, Chilham, Kent, 25/26.vii.82. *Apotomis sauciana* Frölich, bred 21.vi.82 ex larvae collected on bilberry from Oldbury Hill, Kent, 18.v.82. *Batrachedra pinicolella* Zell., Thornden Wood, Whitstable, Kent, 27.vi.82. *Phyllocnistis xenia* Hering, bred 16/20.viii.82 ex pupae collected Chislet, Kent, 13.viii.82 (second British locality). *Phyllocnistis saligna* Zell., bred 25.viii.82 ex pupae collected Winkworth, Surrey on *Salix purpurea* and *S. fragilis* 22.viii.82. *Cosmopteryx zieglerella* Hübn., Sittingbourne, Kent 8.vi.82. *Olethreutes lacunana* D. and S., melanic form, Fishpond Wood, Dunkirk, Kent, 29.v.82. *Cochylidia subroseana* Haw., Thornden Wood, Kent, 27.vi.82. *Syncopacma sangiella* Staint., bred 2.vi.82 ex larvae Trottiscliffe, Kent, on *Lotus corniculatus* 17.iv.82. *Lampronia morosa* Zell., Dungeness, Kent at light 2.vi.82. *Pammene aurantiana* Staud., Murston, Sittingbourne, Kent, 8.viii.82.

HECKFORD, R.J.—The following all taken or bred in 1982 unless otherwise stated. *Trifurcula griseella* Wolff, Beer, Devon, 13.vi. *Infurcitinea argentimaculella* Staint., Chyverton, Cornwall (VC1), bred 26–28.vi; Forder (VC2), Cornwall, bred 22–26.vi; St. Budeaux, Plymouth, (VC3), bred 29.vi–8.vii; Watermouth, Devon (VC4), bred 6–20.vii. *Caloptilia semifascia* Haw., Orley, Devon, bred from *Acer campestre*, 22–25.vii. *Cal. leucapennella* Stephens, Plympton, Plymouth, 10.vii. *Tebenna bjerkandrella* Thunb., Budleigh Salterton, Devon, two bred 11–14.ix; Heybrook Bay, Devon, three bred 15–16.ix; Axmouth, Devon, two bred 24–25.ix; all bred from cocoons collected on *Pulicaria dysenterica* between 5–16.ix.82. *Choreutis sehestediana* F., Plympton, Plymouth, bred 13–14.vii from *Scutellaria minor*. *Cosmiotes stabilella* Stt., Axmouth, Devon, bred 24.ix from larva collected 10.ix mining unidentified grass; Beer, Devon, bred 30.ix from larva collected 11.ix mining unidentified grass. *Parocystola acroxantha* Meyr., Shaldon, Devon, 19.ix. *Eniscostoma lobella* D.&S. Budleigh Salterton, Devon, 14–16.vi. *Depressaria ultimella* Staint., March Mills, Plymouth, bred 31.vii–5.viii; Saltash, Cornwall, bred 4–23.viii; Mothecombe, Devon, bred 7–16.viii; all bred from *Apium nodiflorum* a foodplant not previously recognised for this species and discovered by the exhibitor. *Agonopterix nanatella* Staint., Beer, Devon, bred 11–12. vii from *Carlina vulgaris*. *Oegoconia quadripuncta* Haw., Plympton, Plymouth, 9.viii.1979 and 17.viii.1979. *O.caradjai* P.-G. & C., Plympton, Plymouth, 5.ix.1980, 14.viii.1981, 22.viii.1981. All the specimens of *quadripuncta* and *caradjai* were taken in the exhibitor's garden.

JEWESS, P.J.—The following taken or bred in 1982. *Digitivalva perlepidella* Stt., Burnham, Kent. *Crocidosema plebejana* Z., Newington, Kent; first record outside Scillies and SW England. *Cydia pallifrontana* L. & Z., Cobham, Kent, bred.

Catoptria falsella D. & S., Bisley, Surrey. *Agriphila latristria* Haw. and *Platyes alpinella* Hübn., N. Kent. *Dioryctria schuetzeella* Fuchs, Burnt Oak Wood, Ham Street, Kent.

KNILL-JONES, Dr. R.P.—"New Scottish Species 1982": *Limnaecia phragmitella* Staint., Possil Marsh, Glasgow, 3.iv.82 (collected), 21.vi.82 (bred). *Metriostola betulae* Goeze, Parkgate, Dumfries, 10.vii.82.

LANGMAID, Dr. J. R.—*Leucoptera wailsella* Staint., Hayling Island, two of a series bred from *Genista tinctoria*, vii.82; new to Hants. *Parectopa ononidis* Z., Portsdown, Hants., four bred from *Trifolium pratense*, 1982. *Rhigognostis annulatella* Curt., Traeth-y-Munt, Cards., two bred from *Cochlearia*, 1982. *Acrolepiopsis assectella* Z., Southsea, two, 1980, the first Hants. specimens for over 30 years. *Coleophora niveicostella* Z., Leckford, 9.vii.81; new to Hants. *Schiffermuelleria grandis* Desv., Porlock, Somerset, two 2.vi.1982. *Depressaria daucella* D. & S., Magor Marsh, Mon., two very dark specimens bred from *Oenanthe fistulosa*, 1982. *D. ultimella* Stt., Southwick, Hants., four of a series bred from *Apium nodiflorum*, viii.1982; new to Hants. *Agonopterix astrantiae* Hein., East Meon, four of a series bred from *Sanicula europaeus*, vi.1982; new to Hants. *Chrysoesthia drurella* F., North Baddesley, four of a series bred from *Chenopodium;* new to Hants. *Glyphipteryx linneella* Cl., Southsea, 3.viii.1982; first Hants. record for 50 years. *Eucosma metzneriana* Tr., Southsea, 21.vi.1982; second British specimen, and new to Hants. *Margaritia sticticalis* L., Southsea, Hants., 7.iii.1982. *Palpita unionalis* Hübn, New Romney, Kent, two 10.xi.1982.

LANGMAID, Dr. J. R. and PELHAM-CLINTON, E. C.—A new *Agonopterix* from Cornwall: original specimen, a series bred from *Serratula* in 1982 and a leaf mine on *Serratula*. The earliest known specimen of this species, a female, was collected by E. P.-C. at Boscastle, Cornwall in 1949. In 1981, J. R. L. collected a male at light in the same locality. Neither specimen could be associated in appearance or genitalia with any known species. In 1982, a search was made for larvae. Small larvae were found commonly, mining leaves of *Serratula tinctoria* and later feeding in the tips of leaves folded upwards. The feeding habit and appearance of the larvae were distinct from *Agonopterix bipunctosa* Curtis which is widespread on this food-plant. The moths bred proved to be of the same species as the two originals. So far it seems that the species is undescribed.

MICHAELIS, H. N.—*Agonopterix astrantiae* Hein., Llandudno area (VC49), bred from larvae found in plenty on *Sanicula* 5–25.vi.1982. *Thiodia citrana* Hübn., Llandudno (VC49), 4.viii.1982; thought to be new to N. Wales.

PEET, Dr. T. N. D.—*Sitichroa palealis* D. & S., Sark; the first Channel Is. record. *Agrotera nemoralis* Scop., Guernsey. *Platytes alpinella* Hbn., series from Hickling, Norfolk.

PELHAM-CLINTON, E. C.—microlepidoptera taken in 1981/2, including: *Diplodoma herminata* Geoff., bred from larva under bark of dead pine, Perthshire. *Tebenna bjerkandrella* Thunb., bred from *Pulicaria dysenterica*, S.Devon. *Perittia obscurepunctella* Staint., Southwick, Hants. *Monochroa lutulentella* Zell., Axminster, S.Devon. *Monochroa* sp., a male taken in a light trap in 1981 and which has not yet been identified and appears to be unique, Devon. *Phthorimaea operculella* Zell., in light trap, New Romney, Kent. *Dichrorhampha consortana* Steph., bred from *Chrysanthemum leucanthemum*, Traeth-y-Mwnt, Cardigan. *Eucosma conterminana* H.-S., bred from *Lactuca virosa*, Bradwell-on-Sea, Essex. *Epiblema tetragonana* Steph., Hawkchurch, S. Devon. *Endothenia ustulana* Haw., Axminster, S. Devon. *Argyrotaenia pulchellana* Haw., bred from *Teucrium scorodonia*, Beer, S. Devon. *Palpita unionalis* Hübn., New Romney, Kent. *Leioptilus carphodactyla* Hübn., Walton-in-Gordano, Somerset.

PICKLES, A. J. and Mrs. C. T.—*Palpita unionalis*, Lymington, Hants., 17.ix.82.

SIMPSON, Dr. A. N. B.—From Worcester unless otherwise noted. *Orthotaelia sparganella* Thunb., 23.vii. *Donacaula mucronellus* D. & S., 23.vii. *Coleophora coracipennella* Hübn., bred sloe, 1982. *C. hemerobiella* Scop., bred apple, 1982.

Metzneria aprilella H.-S., Freckenham, Suffolk, bred *Centaurea scabiosa* ix.1981. *Cochylis flaviciliana* Westwood, Nr. Evesham, Worcs., vii.1982. *Mompha nodicolella* Fuchs, vi.1982. *Depressaria douglasella* Staint., Nr. Evesham, Worcs., v.82. *Batia lambdella* Don., Mwnt, Cardigan, viii. 82.

SKINNER, B.—*Palpita unionalis* Hufn., Peacehaven, Sussex, 17.ix.82. *Euchromius ocellea* Haw., Wye, Kent, 21.ix.81.

SOKOLOFF, P. A.—*Orthopygia glaucinalis* L., bred from larva found among detritus in the previous year's emerging cage; only the second specimen seen at Orpington, Kent in 10 years. *Ypsolopha nemorella* L., *Pyralis farinalis* L. and *Phylloporia bistrigella* Haw., all noted on Lullingstone golf-course, N. W. Kent, the latter at m.v. in the unlikely habitat of a mature hornbeam plantation. *Teleiodes vulgella* Hübn., bred from larvae beaten from Juniper, (a most unusual foodplant) N.E. Surrey.

STERLING, Col. D. H.—*Nemophora minimella* D. & S. Specimens and cases. Bred from *Succisa* heads gathered in September from Chilbolton Hants VC12. The heads were sleeved at the base of a growing plant in the open. In the early spring, the cases were readily visible and fed on fresh leaves rather than leaf litter. A new Vice-County record. *Antispila petryi* Mart. Specimens and cases. Bred from mines on roadside *Swida* from Winchester, Hants VC11. *Bacotia sepium* Spey. Specimen and case. Bred from cases found on lichens on dead *Larix* branches in Stockbridge, Hants VC 12, collected in the spring before they had fixed for pupation. A new Vice-County record. *Triaxomera fulvimitrella* Scop. Bred from larvae found in rotting *Quercus* from Harewood Forest, Hants VC 12 on 12.iv.82. A new Vice-County record. *Depressaria ultimella* Staint. Bred from pupae found in stems of *Apium nodiflorum* from Droxford, Hants VC 11, 21.viii.82. About 90% of the pupae were diseased or parasitised. No confirmed records from Hampshire (VC 11 or VC 12) before this year. *Agonopterix astrantiae* Hein. Bred from larva in spun leaf of *Sanicula* from Hen Wood, Hants VC 11 (Hants & IOW NT Reserve), 10.vi.82. Not known from Hampshire (VC 11 or VC 12) before this year. *Pediasia aridella* Thunb. Taken at MV on edge of saltern at Needs Ore, Hants VC 11 (NCC National Nature Reserve) 14.vii.82. Only 2 previous old records for Hampshire (VC 11 & VC 12).

STERLING, M. J.—*Exaeretia allisella* Staint. Bred from roots of *Artemisia vulgaris* dug from Long Eaton, Derbys., in Apl. 1982. *Agonopterix* species. Specimen of an unnamed *Agonopterix* taken from Lizard, Cornwall VC1. It appears to be the same species as that bred this year by Dr. Langmaid and Mr. Pelham-Clinton and not yet named or described. Taken at night flying over heather in the vicinity of *Serratula tinctoria* on 3.ix.82. *Ethmia funerella* F. Specimens from Clough Wood, Derbys., 1.vi.82. *Stenoptilia saxifragae* Fletch. Bred from larvae on garden saxifrage at Holloway, Derbys., 29.v.82. *Leioptilus lienigianus* Zell. Long Eaton, Derbys., 8.vii.82. A new record for VC 56. *Leioptilus osteodactylus* Zell. from Attenborough and Edwinstowe Notts. July 1981 and 1982.

UFFEN, R. W. J.—*Crambus uliginosellus* Zell. associated with *Carex* on the marshy shore of Loch Loy, Culbin Sands, Inverness-shire, 15.vi.1982.

WILD, E. H.—Species from Highcliffe, Dorset, and other named localities. *Incurvaria zinckenii* (Zell.), April 82. *Narycia monilifera* (Geoff.), New Forest. 19.vi.82. *Psychoides filicivora* Meyrick, 21.ix.82. *Heliozela hammoniella* Sorh., 26.iv.82. *Stigmella hemargyrella* (Kollar), 10.viii.82. *Bucculatrix thoracella* (Thunb.), 27.vii.82. *Caryocolum tricolorella* (Haw.), bred 1982. *Amphisbatis incongruella* (Staint.), 9.iv.82. *Caloptilia leucapennella* (Steph.), Brockenhurst, 12.v.82. *Pleurota bicostella* (Clerck), 31.v.82. *Mompha subbistrigella* (Haw.), 17.vi.82. *Elachista apicipunctella* Staint., New Forest, 30.v.82. *Limnaecia phragmitella* Staint., bred 1982. *Scrobipalpa salinella* (Zell.), Keyhaven, 10.vii.82. *Ancylis uncella* (D. & S.), 17.v.82. *Acleris hastiana* (L.), Lizard, bred 1982. *Galleria mellonella* (L.), 29.vii.82. *Cryptoblabes bistriga* (Haw.), June 82. *Palpita unionalis* (Hübn.), 13/16.ix.82.

BUTTERFLIES

Bred butterflies this year included several aberrations. A mixed gynandrous *Anthocharis cardamines* emerged on 26th April from second generation stock bred by D. L. FURNELL. He had seen the colouring in the pupa. B. FENSOME had bred two *Lycaena phlaeas* ab.*radiata* and another combining the *caeruleopunctata* character. He, amongst others, had tried his hand at exposing pupae to low temperature and was rewarded by an *Inachis io* ab. *belisaria* and four *Aglais urticae* ab. *semiichneusoides*. *Semiichnusoides* had also been caught wild, one by Mr. Fensome at Potton, Beds. and another at Woodstock, Sittingbourne, Kent by P.J. JEWESS. Many members were able to share Mr. Jewess's thrill at capturing this exotic-looking butterfly when he brought it alive to the indoor meeting on 9th September. R. REVELS included a black aberration of *A. urticae* from a cooled pupa.

A.S. HARMER showed F_1 generation crosses between a Kentish male and Cornish female *Melitaea athalia* with the original stocks for comparison.

R. S. TUBBS had continued his work on breeding from stock of *Hipparchia semele* L. containing the ab. *holanops* gene and showing the association of this gene with ab. *monocellata* Lempke and a striking rayed effect in the pale areas. F_1 and F_2 *Pararge megera* from an original female ab. *anticrassipuncta* Lempke had produced fine examples of this aberration in the second generation. Mr. Tubbs had also been busy breeding four generations of *Pieris napi* ab. *fasciata* Kautz.

Amongst the caught specimens, R.M. CRASKE showed a very local repetitive form (a candidate for breeding experiments?) of *Boloria selene*, a male with the upper forewings basally blotched and the underside of the hindwings rayed with silver centrally. A.J. and MRS. C.T. PICKLES showed *Plebejus argus* from a heather-topped cliff in Anglesey, closely resembling the extinct sub-species *masseyi* Tutt from the Westmorland mosses. This subspecies, with the dwarf form *caernensis* Thompson from the Great Orme and the southern heathland form were shown for comparison. The implicit question seemed to be: how many genes make a sub-species?

Messrs. A.D.A. RUSSWURM and H.G.M. MIDDLETON had found named aberrations of eight species, but a *Polygonia c-album* male with greatly enlarged black markings in the centre of the hindwings seemed to have no name. Combined forms included a *Pyronia tithonus* male from the New Forest, 26.vii.82 showing both ab. *excessa* Tutt and ab. *lugens* Oberthur.

I.G. FARWELL saw things in black and white this year, with a male *Vanessa cardui* having very dark hindwings, taken Lymington, Hants. 15.ix, another male showing several areas of white, Lydford, Devon 23.viii, and a *Pyronia tithonus* male with the whole of the lefthand background replaced by white, Okehampton, Devon 21.vii. O.A. HOLDER had a *Lycaena phlaeas* with pale forewings and normal hindwings, Dungeness, Kent 7.ix, and R.C. REVELS had an *Aglais urticae* ab. *lutea* from Biggleswade, Beds. vi.82. R.D.G. BARRINGTON had a *Thymelicus sylvestris* female with the forewings mainly white.

B. FENSOME also showed an aberrant *Melitaea cinxia* bred from the Isle of Wight and one of the few aberrations of European species, *Lycaeides idas* ab. *radiata* caught at Bergerac, France, in July.

See also under 'illustrations'.

MACROLEPIDOPTERA

BAKER, B.R.—A selection of moths taken during a five-year quantitative trapping programme from 1978–1982 at Caversham, Berks; of special interest were examples of *Rhyacia simulans*, *Lithophane leautieri hesperica* Boursin, *Elaphria venustula*, and a single specimen of *Cyclophora puppillaria* taken on 24.x.77.

BAKER, P.J.—A specimen of *Palpipher sexnotatus* Moore bred from a larva discovered within the tuber of the arum lily *Arisaema speciosa* which had been imported from India. A case of the more interesting species taken over the last twelve years at Thorpe, Surrey included *Dicycla oo, Cosmia diffinis*, and *Rhyacia simulans*.

BRETHERTON, R.F.—A short series of *Heliothis peltigera* bred from larvae collected in West Sussex during August 1982. Several charts comparing the counts of macrolepidoptera at Bramley, Surrey between March–October 1981 and 1982.

BROTHERIDGE, D.J.—A striking example of *Thalpophila matura* from Wroughton, North Wiltshire on 15.vii.82.

COLLINS, G. A.—A migrant specimen of *Enargia paleacea* from South Croydon, Surrey on 16.vii.82.

ELLIOTT, B. and SKINNER, B.—A bred series of *Herminia tarsicrinalis* from East Suffolk. This species has only been recorded twice before in the British Isles and these represented the first to be bred in this country.

CRASKE, R.M.—Two specimens of *Heliothis peltigera* from East Sussex:—from Lancing on 18.viii.82 and from Hove on 3.ix.82.

EMMET, A.M.—A selection of noteworthy moths taken at Saffron Walden, Essex during 1982: *Idaea vulpinaria atrosignaria* Lempke on 19th July, *Rheumaptera undulata* on 15th July, three specimens of *Rhyacia simulans* during July and August, and the fourth record for Essex of *Eilema deplana;* a second specimen was noted but not taken. A specimen of *Agrius convolvuli* taken at light at Elmdon, Essex on 19.ix.82.

FORSTER, A.P.—The tenth recorded specimen of *Tathorhynchus exsiccata* taken at Mawnan Smith, Cornwall on 22.xi.81.

HADLEY, M.—A short series of *Zygaena trifolii pallustrella* Verity from West Sussex showing much variation. Taken during 1982 at New Bradwell, Bucks were examples of *Hadena compta, Rhyacia simulans* and a 'dark' race of *Apamea sordens*.

HARMAN, T. W.—An aberrant series of *Ecliptopera silaceata* bred from a female taken in South East Kent during 1982.

HARMER, A.S.—A series of *Catocala fraxini* bred from a female taken at Lymington, Hants. on 1.x.81.

HECKFORD, R.J.—A specimen of *Eublemma parva* bred from a larva feeding in the flower head of fleabane, *Pulicaria dysenterica* in South Devon on 28.viii.82. Single examples of *Heliothis peltigera* from Plympton, Devon on 18.vii.82 and *Trichoplusia ni* from East Budleigh, Devon on 7.ix.82.

HOLDER, O.A.—A yellow variety of *Tyria jacobaeae* (L.) taken at Bury St. Edmunds, Suffolk on 15.v.82.

JEWESS, P.J.—Migrant Lepidoptera taken at Newington, Kent were single specimens of *Euxoa cursoria* on 3.viii.82, *Spodoptera exigua* on 9.ix.82 and *Helicoverpa armigera* on 24.ix.82.

KNILL-JONES, Dr. R.P.—A specimen of *Eublemma parva* from Parkgates, Dumfriesshire on 10.vii.82.

McCORMICK, R.F. and PENNEY, C.G.—A case of Lepidoptera collected at Conaglen, Inverness-shire from 21.vi.82–2.vii.82; of special interest were specimens of an unusual race of *Tetheella fluctuosa*.

MICHAELIS, H.N.—An albino form of *Orthosia gothica* from Glan Conwy, Denbighshire in April 1982.

PARSONS, M.—A male *Timandra griseata* ab. *nigra* Rebel from East Sussex on 2.ix.82, and an aberrant example of *Ecliptopera silaceata* from Ninfield, East Sussex on 27.v.82.

PEET, Dr. T.N.D.—An aberration of *Plusia festucae* having the gold spots of the forewing combined to form a single spangle, and the thirteenth recorded specimen from the British Isles of *Macdunnoughia confusa;* both specimens were taken in East Norfolk during August 1982.

PELHAM-CLINTON, E.C.—A specimen of *Odontosia carmelita* taken in Devon during 1968 constituted a new county record.

PICKLES, A.J. and Mrs. C.T.—A variable series of *Euxoa cursoria* from Findhorn, Morayshire during August 1982. A selection of migrant species included the second recorded specimen from the British Isles of *Earias biplaga* from Lymington, Hants. on 23.vii.82; two examples of *Trichoplusia ni* from Portland, Dorset, 1.ix.82. and Lymington, 11.vii.82; *Lithosia quadra* from Lymington, 11.vii.82; and *Helicoverpa armigera* from Lymington, 27.ix.82.

PLATTS, J.—The first migrant record from Kent of *Autographa bractea* from Dover on 14.vii.82.

REID, J.—A short series of *Rhodometra sacraria* bred from a female taken at Royston, Herts. on 10.ix.82. A male *Luperina dumerilii* from Hertford on 16.ix.74; a male *Trichoplusia ni* from Royston on 17.9.82 and a series of *Hyles euphorbiae* bred from a female netted at Valerian flowers in the Purbeck district of Dorset on 21.viii.68.

SKINNER, B.—The first British bred series of *Peribatodes secundaria* from females taken in South East Kent during 1981. A pair of dark *Hadena caesia mananii* bred from larvae collected from Talisker, Isle of Skye in July 1981 and a male *Nola aerugula* from Orlestone, Kent on 13.vii.82.

STERLING, M.J.—Local and aberrant moths mainly from Derbyshire and Nottinghamshire. Of particular interest was a bred series of very dark *Selenia lunularia* from Attenborough, Notts. and specimens of *Xanthorhoe munitata* from the Goyt Valley, Derbys.

STERLING, P.H.—Lepidoptera collected at Boat of Garten, Inverness-shire during March 1982 included a specimen of the now very local *Xylena exsoleta*.

WEST, B.K.—A short but variable series of *Mimas tiliae* bred from Orpington, Kent. A new aberration of *Chesias rufata* having the central fascia absent, bred from feral larva from Dartford, Kent in 1966. The first record for Kent of *Lobophora halterata* ab. *nigra* Warnecke taken at Dartford on 2.vi.82.

WILD, E.H.—Migrant species noted this year at Highcliffe, Dorset included one *Cyclophora puppillaria* on 31.viii.82 and two *Rhodometra sacraria* on the 12 and 21.ix.82.

WILSON, D.E.—A drawer of moth aberrations which included a male *Lasiocampa trifolii flava* Chalmers-Hunt having unusually pale forewings, taken at Dungeness, Kent in August 1982 and a female *Trichoplusia ni* from Peacehaven, Sussex on 18.ix.82.

WINTER, P.Q.—A male *Euproctis chrysorrhoea* from Flamborough Head, South East Yorkshire, a local species in this county, and on the same night a large specimen of *Eupithecia absinthiata* was taken having a wingspan of 25mm.

FOREIGN MACROLEPIDOPTERA

Exhibits were fewer and less spectacular than in recent years, and were mainly from the Palaearctic zone.

From Denmark E. P. WILTSHIRE showed both sexes of *Conisania leineri* Freyer, which has recently become established there after spreading from the south east. It somewhat resembles a small and brownish *Heliophobus reticulata* Goeze, and it should now perhaps be watched for as an immigrant to Britain. From Guernsey, D.J.L. AGASSIZ had *Agrotis crassa* Hübn., which is resident in the Channel Islands, but is also a possible immigrant to Britain; he also showed a dark example of *Ennomos quercinaria* Hufn, common in the local population.

From Switzerland R.F. BRETHERTON showed contrasting series of *Erebia mnestra* Hübn. from the Tesch Alp, 7,000 ft., on the north side of the Pennine Alps, and from Laquintal, c.4,500 ft, on the south side, the latter being constantly much larger than the former. This difference between the local races does not appear to have been previously remarked.

From south west France R.C. REVELS had *Maculinea arion* ab. *arthurus* Melvill and *Lycaena phlaeas radiata* Spuler, with British aberrations of these species.

C.J. LUCKENS exhibited butterflies collected in late May and early June 1982 in southern France and north central Spain. These included *Eurodryas desfontainii* Godart from three separate areas in Spain, including Burgete, Navarra, a new record; also two differing forms of *Plebejus pylaon hespericus* Rambur from Madrid and Albarracin, and the distinctive Spanish race of *Iolana iolas Ochs.*

N.M. HALL had Heterocera taken in various places in France, Spain and Andorra, August 4/28 1982, and A.H. DOBSON Heterocera caught at an actinic trap on the Costa Brava, Spain, including as known migrants to the U.K. *Helicoverpa armigera* Hübn., *Mythimna unipuncta* Haw., *M.vitellina* Hübn., *M. loreyi* Dup., *Spodoptera exigua* Hübn., *Eublemma ostrina* Hübn. ab. *carthami* H-S., *Chrysodeixis chalcites* Esp., *Rhodometra sacraria* L., *Cyclophora puppillaria* Hübn., *Palpita unionalis* Hübn.

P.W. CRIBB showed Continental Lepidoptera reared in England in 1982: *Euchloe tagis* Hübn., *Libythea celtis* Laich. and a homeotic form of *Nymphalis polychloros* L. from Var, France; *Daphnis nerii* L. from Yugoslavia, fed on periwinkle (*Vinca major*); *Zerynthia cerisyi cretica* Rebel from Cretan larvae; and *Archon apollinus* Herbst from larvae found near Troy, Turkey.

T.B. LARSEN showed two species, *Reissita simonyi* Rebel, from the Yemen Arab Republic (which is unusual in having a dimorphic male and monomorphic female) and *Praezygaena caschmiriensis* from Pakistan. Both are closely related to the European Burnets of the genus *Zygaena*. *P.caschmiriensis* is precisely and strictly allopatric with any species of *Zygaena*.

From the Far East T.W. HARMAN showed Lepidoptera from Brunei, and from Africa M.J.S. HUBBARD had nine striking species of butterflies caught in May 1971 in the Bugongo Forest, Uganda.

COLEOPTERA

Dr. I.Mc.CLENAGHAN. (1) Some Coleoptera taken in a mercury vapour light trap in his garden at Ingrave, Brentwood, Essex (TQ6292): *Trox scaber* (L.) 6.vi.82; *Malachius viridis* F. 7.viii.80; *Dryophilus pusillus* (Gyll.) 6.vi.82, new to this area of Essex, normally beaten from pines; *Bledius diota* Schiodte 2 and 5.viii.82 and *B. atricapillus* (Germar) 2.viii.82. *B.diota* is new to Essex, is usually found in saltmarshes, but is very rare. The nearest saltmarsh is about 13km from the trap.

(2) Other Essex material: *Symbiotes latus* Redtenbacher 25.iv.82, Brentwood area (TQ59), from under dead Dutch elm diseased elm bark; *Clytra quadripunctata* (L.), hatched from nest material of *Formica rufa* L. 26.v.82, Brentwood (TQ69); six *Mycetophagus quadrifasciatus* L. with apical spots much reduced and two typical specimens from Epping Forest and Thorndon Park, with two from Thorndon Park (TQ6292) with extended or extra spots.

(3). *Epitrix atropae* Foudras 5.viii.78, from Slindon, W.Sussex (SU90), a rare flea beetle found on *Atropa belladonna*.

Mr. A.P. FOSTER. (1) some aquatic Coleoptera collected from the River Teign, South Devon, on 13.ix.82: *Deronectes latus* (Steph.), *Gyrinus urinator* Ill., *Hydochus nitidicollis* Mulsant, *Helophorus arvernicus* Muls., *Oulimnius troglodytes* (Gyll.), *Helichus substriatus* (Müller).

(2) *Hydraena pygmaea* Waterhouse, from a small rocky stream at Trebudannon, Cornwall. This is the first Cornish specimen and appears to be the only modern record for southern Britain.

(3) *Nacerdes melanura* (L.), a singleton taken vi.82 in Knightsbridge, London. Two *Silis ruficollis* (F.), swept from *Phragmites* in Walland Marsh, Kent, 2.viii.82.

S.P. GARLAND and J. LEE. Coleoptera from Chatsworth Park, Derbyshire: *Scolytus intricatus* (Ratz.) 31.vii.82, first Derbyshire record; *Bitoma crenata* (F.) 31.vii.82, first Derbyshire record; *Triphyllus bicolor* (F.) 27.ix.82, only recent record from S.Yorks. and Derbys. areas. *Sinodendron cylindicum* (L.) 11.vi.82, *Glischirochilus quadriguttatus* (F.) 24.iv.82, *Dryocoetinus villosus* (F.) 27.ix.82, *Cerylon ferrugineum* Steph. 9.ix.82, *Rhizophagus ferrugineus* (Payk.) 9.ix.82, *Scaphisoma agaricinum* (L.) 21.viii.82 and *Dacne bipustulata* (Thunb.) 15.vi.82.

DIPTERA

ELSE, G. R.—A selection of uncommon species collected in 1982 in S. England (Hants, Dorset) and the Spey Valley, Scotland, including *Stratiomys potamida* (Meigen) (Stratiomyidae), Charmouth-Lyme Regis landslip, 10.vii.82; *Alophora hemiptera* (F.) and *Lophosia fasciata* Meigen (Tachinidae), both Crab Wood, near Winchester, 13.vii.82; *Bombylius canescens* Mik. (Bombyliidae), Stoborough Heath, 20.vii.82; *Laphria flava* (Linnaeus) and *Rhadiurgus variabilis* (Zetterstedt) (Asilidae), *Microdon eggeri* Mik. (Syrphidae) and *Hypoderma diana* Brauer (Oestridae), the deer warble fly, all from near Feshiebridge, 2/4.vi.82, the last taken at rest on sunlit rocks by the river; *Blera fallax* (L.) (Syrphidae), Abernethy Forest, 31.v.82, female flying around pines.

HUDSON, I.—Brachycera from South Hants, 1982, including: *Stratiomys potamida* (Meigen) (Stratiomyidae), male and female on *Heracleum* flowers, fenland, Gosport; *Atherix marginata* (Rhagionidae), Burley Street, New Forest, by Ober Water, 26.vi; *Atylotus fulvus* (Meigen) (Tabanidae), female, 10.vii, flying low over heather at Beaulieu Road Station; *Tabanus autumnalis* (Tabanidae), Gosport, female biting, male on tree trunk; *Machimus rusticus* (Meigen) (Asilidae), male 9.viii, female 2.ix, Portsdown Hill, a known locality for this rarity, sunning on bare ground; *Asilus crabroniformis* L. (Asilidae), Portsdown Hill, male and female 17.ix; *Bombylius discolor* Mik. (Bombyliidae), Gosport, male sunning on a grassy bank near woodland, 9.iv.82.

MERRIFIELD, K.—Two Diptera among other insects from Cornwall, near Falmouth, v–viii.1980: *Tabanus sudeticus* Zeller (Tabanidae), *Asilus crabroniformis* Linnaeus (Asilidae).

MILES, S. R.—Uncommon Syrphidae and Tipulidae taken 1980–1982: *Eriozona syrphoides* (Fallén), Broughton Plantation, Great Broughton, N. Yorks, 31.vii.80, on umbel at 245 m.; *Pelecocera tricincta* Meigen, Aldershot, Hants. 22.vi.81, swept from dry grass near bare sandy areas under Scots Pine, the first record outside the New Forest and Dorset heaths; *Xanthandrus comtus* (Harris), Isle of Wight, Downend, near Arreton, 6.vi.82, at *Heracleum* flowers at edge of scrubby woodland; *Didea intermedia* Loew, Woolmer Forest, Hants., 3.ix.82, exploring Scots Pine branches for aphid colonies—the common *Syrphus ribesii* was seen doing the same; *D. fasciata* Macquart, a male at Windsor, 3.vi.81 sunning on Rhododendron; a female at Ash Ranges, Surrey, 28.viii.82, first noticed as a loud hum 2m from ground near small oak. *Ctenophora flaveolata* (F.), Savernake Forest, Wilts, 14.v.80, pair *in copula* at 4m from the ground on the trunk of a large beech at 6.10 p.m. at the end of a warm sunny day—a new locality for this rare species known only from a few old woodland sites; the more frequent species *C. bimaculata* (L.) from both Savernake, 1.viii.82 and Park Wood, Ruislip, 30.v.81, flying round old hornbeam fence post in damp shady woodland.

STUBBS, A. E.—A range of species collected in 1982, most notably the following: *Xanthandrus comtus* (Harris) (Syrphidae), Sussex, Seaford Head, 12.ix.82, apparently a good year for this rarely reported species; *Hammerschmidtia ferruginea* (Fallén) (Syrphidae), Spey Valley, Kinrara, 18.vi.82, at *Conopodium* flowers; *Acanthiophilus helianthi* (Rossi) (Tephritidae), Sussex, Beachy Head, 11.ix.82; *Campiglossa argyrocephala* (Loew) (Tephritidae), Kinrara, 18.vi.82; *Pelidnoptera nigripennis* (Fabricius) (Sciomyzidae), Inshriach, 15.vi.82; *Prionocera pubescens*

Loew (Tipulidae). Radnor, Cors Llyn bog, 10.vii.82, the fourth British record, new to Wales; *Pachygaster orbitalis* Wahlberg (Stratiomyidae) and *Solva marginata* (Meigen) (Xylomyiidae), both from Ruislip, Middlesex, the former also Sudbury Hill, reared in 1982 from larvae found under bark of black poplar and baslam poplar.

TUCK, K.R.—In a box of insects from Malaysia, one dipteron, an unnamed species (Celyphidae), a remarkably beautiful "beetle fly", a group with the scutellum expanded over the abdomen and concealing the wings, with metallic green throax and metallic violet scutellum; from Genting Tea Estate.

UFFEN, R.W.J.—A live female reared in July and a multilocular gall of *Campiglossa argyrocephala* (Loew) (Tephritidae), Tayside, north of Pass of Drumochter, 20.vi.82. Infested shoots of foodplant *Achillea ptarmica* with young larvae were found at several places in Spey Valley in the preceding week but these galls ailed to develop. These findings implied that the species will prove univoltine, with probably both sexes overwintering to pair and oviposit in May as for *Paroxyna misella* (Loew) on *Artemisia*.

HYMENOPTERA (SYMPHYTA)

HALSTEAD, A.J.—Some uncommon and/or local sawflies and other Symphyta. *Xiphydria camelus* L. female, R.H.S. Garden, Wisley, Surrey. 9.vi.80; *Calameuta filiformis* Evers. female, on *Ranunculus* flower, Woking, Surrey. 19.vi.82; *Zaraea fasciata* L. female, on *Urtica* leaf, Sheerwater, Woking 4.vii.82; *Arge melanochroa* Gmelin male on *Heracleum* flower, Chilbolton, Hants, 5.vi.82; *Dolerus triplicatus* Klug male, *Juncus*, Horsell Common, Woking 16.v.82; *D. madidus* Klug, male swept Basingstoke Canal, Woking, 3.iv.82 and female on *Juncus*, Horsell Common, Woking 16.v.82; *Heterarthrus ochropoda* Klug female bred 23.iv.82 from leaf mine on *Populus tremula* collected 9.viii.81, Sheerwater, Woking; *Athalia bicolor* Lep. male 25.v.82, female 27.v.81, both on *Ranunculus* flowers, Therfield Heath, Royston, Herts; *Pachyprotasis variegata* Fall. female bred 29.iv.82 from larvae feeding on flowers and foliage of *Hieracium* sp. collected 4.vii.81 from Sheepleas, Surrey; *Tenthredo amoena* Gray. female on *Heracleum* flower, 10.vii.82, Whitedown, Surrey; *T. omissa* Foerst., male 4.viii.82, female 19.viii.81, both on *Heracleum* flowers, R.H.S. Garden, Wisley; *Macrophya blanda* F. male 12.vi.80, female 17.vi.82, swept from grass, R.H.S. Garden, Wisley; *M. montana* Scop. female on *Anthriscus sylvestris* flower, 22.v.82, Pewley Down, Guildford, Surrey.

MERRYFIELD, K.—Two female wood wasps, *Uroceras gigas* L. and *Sirex noctilio* Fab. from southwest Devon.

ILLUSTRATIONS

There were a number of exhibits containing illustrations this year, the majority being colour prints or transparencies. The quality of the illustrations is very good and seems to improve each year.

Two very interesting books containing over 500 colour photographs of the larvae of British butterflies and moths were shown by S.H. CHURCH and J. PORTER. The two gentlemen have worked out a good format for the book and size for the larvae illustrated.

Some spectacular photographs showing the diversity of colour and form of British and exotic jumping spiders (Salticidae) were presented by Mrs. F.M. MURPHY. They had been assembled by Mr. F.R. WANLESS of the British Museum for the centenary open days in 1981. Many of the photographs had been taken by Mrs. Murphy.

Mr. M.W.F. TWEEDIE showed beautiful photographs of butterflies taken in Greece in 1981. These were to his usual high standard.

An unusual exhibit by Mr. J. HEATH was a colour photograph of the entry in the minute book of the Spalding Gentlemen's Society dated 28th September 1794, which included a watercolour drawing of *Lycaena dispar*, taken at Dozens Bank. The exhibitor asked whether this was the earliest record of the species, predating its description.

Another fascinating show of pictures came from R. REVELS. Two in particular showed cryptic spiders with their prey, one a damsel fly and the other a blue butterfly.

The theme of the NATURE CONSERVANCY COUNCIL'S stand this year was the invertebrate site register. It was illustrated with photographs of species, sites of national importance and a number of histograms indicating the decrease of many species during this century, especially since 1945.

A.S. HARMER presented a series of photographs depicting stages in the life history of *Catocala fraxini* (L.)

Charts of weekly averages of nightly catches of macro moths and pyrales for 1981 and 1982 were presented by R.F. BRETHERTON. He explained differences between the two years in terms of climate.

HOMOPTERA

SOKOLOFF, P. A.—*Ledra aurita* (L.) taken at mercury vapour light, Orpington, Kent, 17.ix.82.

GENERAL

ZOOLOGICAL SOCIETY OF LONDON.—A selection of living exotic arachnids, chilopods, diplopods and insects.

INDOOR MEETINGS

BENHS Meeting 15.i.1983.—*Exhibits.* Rev. D.J.L. AGASSIZ: a 25cm × 20cm colour transparency of *Argyresthia* moths magnified. Mr. A.J. Halstead: a particularly small specimen of *Erannis defoliaria*, Surrey, 1982.

Lecture: Rev. D.J.L. AGASSIZ spoke about *the British species of Yponomeutinae.* The speaker outlined the present status of our understanding of the *Yponomeuta padella* group, on which controlled breeding from clearly typed stock is still a desideratum. His illustrations of the early stages included *Y.stannella* (known in G.B. only from Dovedale) and *S.passerella*, on *Betula nana*, whilst his clear photographs of set specimens enabled members to appreciate some of the earlier entomologists' confusions over identity from verbal descriptions.

BENHS Meeting 27.i.1983.—*Exhibits.* Mr. R.A. SOFTLY: *Eupsilia transversa.* (3), *Agriopis leucophaearia* (1), *Orthosia incerta* (1); all produced by his actinic light trap at Hampstead over the past three nights. He observed that *O.incerta* had shown remarkable constancy in numbers over the past four years as follows: 1979,6.v–4.vi(27); 1980,14.iv–3.vi(26); 1981,25.iii–29.v, one week unrecorded (20);1982, 23.ii–5.vi(30). Thus, it will be seen that there has been a wide divergence of first appearance, but a consistent finish at the beginning of June.

New Members: Andrew Godfrey, David Peter Rees, Miss Clair E. Appleby, Colin Wilfred Plant.

Announcement: Mrs. Mandy Watson, widow of the late Bob Watson, will be carrying on at her new address ('Jacobaeae', 23 Watton Rd., Holbury, Southampton, Hants., phone Fawley 893704) the customary annual invitation, with the week-end of Saturday and Sunday, 26th & 27th March being chosen for the 1983 occasion.

Communications. Mr. BRETHERTON stated that at Bramley, Surrey he had noted on the 26th January, *Apocheima pilosaria* (6 including one black one), *A.leucophaearia, Conistra vaccinii, Eupsilia transversa, Orthosia cruda, O.stabilis, Tortricodes alternella* and *Acleris cristana* f.*vittana* Stephens. Mr. M.R. BROWN recorded *Alsophila aescularia* at Dartford, Kent on 25th January.

Abstract of lecture by Dr. R.C. Welch: *The fauna of the Southern Beech (Nothofagus)* in Britain.

Before describing his recent work Dr. Welch showed members how the 41 species of *Nothofagus* (southern beech) are distributed in the Southern Hemisphere. Although most species are evergreen and occur in New Guinea and Australasia, foresters in Britain are only really interested in two deciduous species from Chile, *N. obliqua* and *N. procera.* Planted in Britain from 1902 and 1913 respectively, extensive Forestry Commission trials started in 1954 and 1976.

During 1979 and 1980 a surprisingly large insect fauna was sampled from both species at 14 sites mainly in the Cotswolds and the Forest of Dean. 81 spp. of larval Lepidoptera were present on the two species of which 76 were foliage feeders. Approximately 80% of these are known to feed on oak compared with 20% in a year's light trap catch from Monks Wood NNR., Hunts. *Operophtera brumata* (L.), *Agriopis aurantiaria* (Hübn.) and *Erannis defoliaria* (Clerck) accounted for over 50% of all larvae collected. Other insects recorded include 70 spp. of Coleoptera (10 wood-borers, 33 under bark and 17 on foliage), 22 Homoptera and smaller numbers of other orders making a total of around 180 species.

Dr. Welch finished by stressing the limitations of published data on the fauna of British trees and the need for more work on that of introduced species.

BENHS Meeting 10.ii.1983.—The President announced that the SSSI Code of Guidance was now available from the Society's Library.

The main event of the evening was the showing of (with running commentary) a selection by Mr. Chalmers-Hunt and the Lanternist of 3¼ in. × 3¼ in. glass lantern slides from the Society's historical collection by Hugh Main, A. Tonge, etc.

BENHS Meeting 10.iii.1983.—*Exhibits.* Mr. S. PAINTER, oak galls on leaves ex Rogate, September 1981, mounted between adhesive plastic. Gall wasps subsequently emerged and were trapped.

Lt.Col. A.M. EMMET, on behalf of Mr. A. J. DEWICK, a specimen of *Platyptilia calodactyla* D. & S. taken on 14.vii.82 in his light-trap at Bradwell-on-Sea, Essex. An earlier specimen taken in 1976, likewise at light, on the Colne Point Nature Reserve by Mr. M. Heath was also shown. These are the only specimens known to have been recorded in Essex. Both were taken close to salt-marshes and far from any goldenrod (*Solidago virgaurea*) which is the only recorded foodplant. An alternative such as sea-aster (*Aster tripolium*) seems likely.

Mr. J. ROCHE, two species of microlepidoptera taken at light in his garden in Chestfield, Kent: (a) *Zophodia convolutella* Hübn., a phycitid not previously recorded from Britain. It is found in Central Europe, France and N. America. The moth flies in March and April. Foodplant is gooseberry, feeding in a web on the leaves, flowers and unripe fruit. (b) The uncommon pyrale *Eurrhypara perlucidalis.*

Mr. G. BENINGFIELD (a visitor) gave a most interesting and entertaining talk entitled "Illustrating Butterflies" accompanied by colour slides. This was of much wider appeal than the title implied, and dealt also with conservation of the English countryside. A large and appreciative audience attended.

BENHS Meeting 24.iii.1983.—In the absence of the President, Mr. P.A. Sokoloff took the Chair.

Exhibits. Col. A.M. EMMET: living adults and leaf mines of *Phyllonorycter saportella* from South Lopham, Norfolk.

Mr. C. HART: a larva of *Sphecia bembiciformis* in its mine in a sallow stem. The larva was fully grown and preparing a cocoon. He also pointed out a very thin exit cap, which was not easy to see. Found on Ditchling Common, Sussex on 5.iii.83.

Membership. Mr. P.A. Cross was elected.

Communications. Mr. R.F. BRETHERTON reported on the spring moths at his Bramley, Surrey, trap. In four days of the previous week there had appeared 126, 250, 320 and 420 moths, representing 18 macros and 2 micros.

Mr. R. FAIRCLOUGH reported three Red Admirals (*V. atalanta*) in Surrey and Sussex which did not seem to coincide with any reported migration. Mr. B.K. WEST had seen Red Admirals on 20th March and posed the question of probable hibernation.

Col. EMMET had seen six Peacocks and a Small Tortoiseshell.

Transparencies were shown by Mrs. F.M. MURPHY and Mr. E. BRADFORD. Mr. C.B. ASHBY showed slides of butterflies and moths of Syon Park.

BENHS Meeting 14.iv.1983.—The President announced the death on the 22nd January 1983, of Mr. T.D. Fearnehough, of Lymington, Hampshire.

Exhibits. Col. EMMET: Galls in twigs of birch believed to be the feeding places of *Lampronia fuscatella* (Tengström) (Lep.: Incurvariidae). They were collected at Bedfords Park, Romford and Hainhault Forest, south Essex (VC 18) on 9.iv.83. The life history of *L. fuscatella* is described in MBGBI 1:286, where it is stated that two larvae may occupy the same gall and that parasitised larvae fail to make the characteristic silk-sealed exit-hole. An opened gall was shown containing lepidopterous frass, the head-capsules of two larvae and two cocoons, presumably of parasites, since no exit-holes had been made. The species was added to the Essex list in 1982 by Mr. N. Nash, who took two adults near Bedfords Park at light. One of these specimens was shown.

Mr. P.A. SOKOLOFF: Freshly emerged specimens of *Alispa angustella* bred from spindle berries, Dartford Heath, Kent.

Mr. COLIN HART: Larvae of *Euschesis orbona* from near Barton Mills, Suffolk. The larvae are nearly full grown and were found at night in early March when they were half grown or less. About 40%–60% have produced parasites of several sorts.

Communications. Mr. J. BADMIN drew attention to the fact that the Society and the Kent Field Club operated reciprocal arrangements regarding field meetings in Kent, and he presented the Society with the KFC programme card for 1983.

Col. EMMET strongly urged that the age-old practice of reading the minutes be continued, and that the newly adopted system of leaving on the table a copy of the minutes of the previous meeting should cease, since he noticed very few people troubled to read them, and this motion was supported by Mr. S.N.A. Jacobs.

Col. EMMET asked why the current issue of the Proceedings and Transactions was devoid of the customary illustration on its front cover.

The Editor informed him that individual issues were now distinguished by cover illustration relevant to the text. None had been available. Independent drawings of insects or topics of current interest would be welcomed for such eventualities.

Mr. JOHN MUGGLETON gave a most interesting talk with the aid of slides, entitled "Industrial Melanism after Kettlewell".

BENHS Meeting 28.iv.1983.—The President, Mr. B.R. Baker introduced Prof. N.W. Moore to give the first Hammond Memorial Lecture, on *Conservation of dragonflies.*

Exhibits. Mr. A. HALSTEAD. Two beetles from an imported bamboo cane. Both specimens were from the same cane, which presumably originated from somewhere in the Far East. A gardener in the Glasshouse Department at the Royal Horticultural Society's Garden, Wisley, Surrey, noticed the larger beetle emerging on 22.ii.83 as he was using the cane to stake a plant. It was subsequently identified at the British Museum by M.L. Cox as *Diboma posticata* Gahan (Cerambycidae), which has been recorded from India, Burma, Ceylon, Laos and S.E. Asia. E.A.J. Duffy in his 1968 "Monograph of the Immature Stages of Oriental Timber Beetles" states that the host plant is *Dendrocalamus strictus.*

When part of the cane was split open it was found to have been extensively tunnelled by *Dinoderus minutus* F. (Bostrychidae). Several adults were found inside but all were dead and there was no sign of the immature stages.

Mr. I.R. HUDSON. Early Spring Tachinidae. *Gonia picea* (R–D) Titchfield, Hants, 25.iii.1982, abundant amongst the long grass and herbage on this site. Supposedly local. Recorded as having been bred from the larvae of Agrotid moths.

Servillia ursina (Meigen) Botley Wood, Hants 15.iv.1983. A few specimens were seen along the rides of this deciduous wood. Supposedly not common. Probably parasitic on lepidopterous larvae. The other British species of the genus has been recorded from Sphingid and Agrotid moths.

Membership. Keith N.A. Alexander, Martin F.V. Corley, Dr. Terence R. Mitchell, Michael J. Pearce and John A. Pearson were elected members.

Communications. Col. Emmet said that he hoped Volume 2 of *Moths and Butterflies of Gt. Britain and Ireland* would be ready for the printer later this year, and he urged people to send in their records either to him or to Mr. John Heath as soon as possible so that they may be incorporated.

Mr. R. F. Bretherton said that he had had a *Plutella xylostella* (L.) at his light trap at Bramley, Surrey recently.

BENHS Meeting 12.v.1983.—The President announced the death of Mr. F.C. Stanley of Rowlands Castle, Hampshire. Although his death had taken place as long ago as 22nd June 1980, the Society had only lately been made aware of this.

Exhibits. Mr. J. MUGGLETON. A male and female of the rarely recorded ladybird *Coccinella distincta* collected from Chobham Common, Surrey on 7.v.83. The last published record seems to be for Wyre Forest in 1957. It was discovered in the Forest of Dean by N.J. Armes in 1975 (first Glos. record) and at Esher by Prof. J. Owen c.1980. The British distribution is Surrey, Sussex, Kent, Worcs. and Glos. The species is found in association with Wood Ant nests (*Formica rufa*), usually on the surrounding vegetation. It is a large species but is very difficult to distinguish from *Coccinella 7-punctata,* and is probably under-recorded because of this similarity.

Col. EMMET. A vacated cocoon of *Etainia sphendamni* (Hering) (Lep.:Nepticulidae). This had been spun in a dry, otherwise empty glass tube and was at first pure white. So it remained for a week. Then a fresh young hawthorn leaf was placed in the tube and within two hours the cocoon had turned dark brown. Silk used for making larval habitations by spinning leaves together remains white; cocoons likewise stay white in the majority of species. In certain species of *Coleophora* the silk used in the construction of their cases changes from white to brown or even black. The exhibitor asked if there was an explanation why silk spun by different species reacted differently to moisture.

Mr. A.H. DOBSON. Two living noctuid larvae for identification taken at Ober Water Valley, New Forest on the B.E.N.H.S. Field Meeting of 7–8.v.83. They were determined as *Noctua comes* Hübn. and *N.interjecta* Hübn.

Lecture. Some aspects of advisory agricultural entomology by Dr. D.V. Alford. Dr. Alford concentrated on pests acquired by the recently introduced forms of *Brassica napus L.* grown for rape-seed oil. The introduction of winter-grown, early-flowering strains had greatly reduced the attack on the seeds by one beetle. It was difficult to persuade farmers not to spray when they saw the beetle. Sprays were harmful to bees attracted to the crop. The plant is automatically self-pollinated and does not need bee pollination.

BENHS Meeting 26.v.1983.—The President announced the death of Prof. G.C. Varley, formerly of the Hope Department of Entomology, Oxford.

Exhibits. Mr. C.W. PLANT: (a) A number of living larvae, including *Xylocampa areola* Esper on honeysuckle from his garden at East Ham, Essex; and *Amphipyra pyramidea* L. on silver birch, from Wanstead Park, Essex. (b) A number of unidentified preserved blown larvae from the Passmore Edwards Museum, collected between 1860 and 1890.

Mr. R.F. McCORMICK. Living larvae of *Diachrysia chryson* Esper, collected near Andover, Hampshire on the 21st May.

Col. EMMET. A copy of the recently published *Moths of South East Asia,* which had been presented to the Society by the author H.S. Barlow.

Communications. Mr. CHALMERS-HUNT stated that yesterday he had gone out to look for the dayflying micro *Lampronia flavimitrella* Hübner near Ashford Kent, and believing it to be resident in this country had succeeded in taking the 4th and 5th British specimens. However, he observed that further investigation is needed to discover the species' pabulum and life history, both of which appeared to be unknown.

Mr. BRETHERTON said that in his experience it was the latest spring for some years for moths at light at Bramley, Surrey.

New Members elected this evening: Roger K.A. Morris; David Furmage; William J. Tennent; Nicholas A. Holford; Guy J.O. Farage.

Mrs. F.M. Murphy, Mr. B.R. Baker, Mr. A. Callow, Mr. K. Merrifield and Dr. I. McClenaghan showed transparencies and commented upon them.

BENHS Meeting 9.vi. 1983.—*Exhibits.* Mr. S.N.A. JACOBS: six specimens of the Lily Beetle *Lilioceris lilii* (Scop.) from East Horsley, which had been brought to him for identification.

Mr. J.M. CHALMERS-HUNT: a living trichopteron *Phryganea grandis* (L.), notable for its large size, taken at light 7th June in Epping Forest.

Communications. Mr. K. EVANS stated that he had had a *Calophasia lunula* (Hufn.) at light at his home at East Grinstead, Sussex on 7th June.

Lecture. Dr. J. CHATFIELD spoke on *Gilbert White and the natural history of Selborne*. The speaker covered the life and letters of Gilbert White and appraised his approach to entomology.

BENHS Meeting 23.vi.1983.—*Exhibits*. Mr. R.W.J. UFFEN: a female *Metzneria aprilella* (Gelechiidae) taken at an actinic fluorescent lamp the previous night at Welwyn, Herts.

Mr. A.J. HALSTEAD: a female froghopper, *Cercopis vulnerata* Illiger (Hemiptera: Cercopidae) with dirty white coloration replacing the red of the wings and abdomen. This specimen was taken at Whitedown, Surrey on 11.vi.1983. There is an entirely albino population in Yorkshire.

New members. Messrs. J.A. Fradgley, M.M. Parsons, M. Hughes, J.B. Rapkins, Dr. N.M. Bailey, Misses H. Davis and C.J. Crockett.

Communications. Mr. R.F. BRETHERTON reported about 20 Brimstones (*G.rhamni*), including a courting pair, at Durfold Woods, Surrey, on 18th June. Other indications of a late season included Mr. S.L. MEREDITH's record of Marsh Fritillaries (*E.aurinia*) still flying in Hampshire.

The President, Mr. B.R. BAKER, had seen Holly Blues (*C.argiolus*) laying eggs on cultivated *Cornus* flowers.

Mr. R.S. TUBBS had seen two male Clouded Yellows (*C.croceus*) on the downs near Dorking on 12th June. Two sources of records for W.Oxfordshire were reported.

Lecture. Dr. J.E. RIGBY conveyed her enthusiasm for Mollusca in *Diversity of form and habitat among the molluscs*. The 80,000 species described may be only a fraction of the species of insects, but they vary from primitive animals showing signs of segmentation, dredged in recent years from the deep oceans, through reduced, insensitive, burrowing animals to such highly mobile and sensorily developed animals as the squid.

The asymmetrical contortions of the body plan to fit various modes of life were outlined. The study of larval forms had become more practical and enlightening with the development of phase contrast and interference microscopy.

The dependence of molluscs on cilia for breathing and feeding currents and their influence on body shape were emphasised.

Dr. Rigby concluded with a rapid survey by transparencies of some of the more bizarre and visually attractive molluscs. Such riddles as how a mollusc can consume the protective poisoned spines of its prey and re-use them in its own defence must surely promote the curiosity of more students in this diverse group of animals.

BENHS Ordinary and Annual General Meetings 24.ii.1983.—The President, Mr. J. Heath, in the Chair.

Membership. Messrs. B. Brigden, B.C. Eversham, K.F. Webb, D. Reavey, C. Charalambas were elected.

Communications. Mr. Bretherton observed that at Bramley, Surrey, he had in his m.v.trap a specimen of the geometrid *Coenotephria salicata*, the second record only for Surrey of this moth, the first having been of one taken by the late Mr. Messenger at Witley on May 25 1962. Mr. Bretherton's specimen occurred on May 31 1982.

The following Reports were read: Secretary's Report by Mrs. Murphy; Curator's Report by Mr. Bradford; Librarian's Report by Mr. Miles; Treasurer's Report by Col. Sterling; Hering Memorial Fund Report by Col. Emmet.

The Council's nominees for Officers and Council for 1983 were elected unopposed and are listed on the cover of parts 1/2.

The retiring President then gave his address entitled "The insects of the Yellow Balsam, *Impatiens noli-tangere*". He then inducted the new President, Mr. B.R. Baker, into the chair.

British Entomological and Natural History Society

PUBLICATIONS ACCOUNT FOR 1982
(Publications free to members)

1981	Expenditure	1982	*1981*	Income	1982
£		£	*£*		£
2930	Production of Proceedings	2307	*812*	Sales proceeds and plate contributions	397
220	Production of Membership List			Hammond Bequest grant for plates	244
470	Distribution Costs	384	*2808*	Net cost to Income & Expenditure a/c	2050
3620		2691	*3620*		2691

SPECIAL PUBLICATIONS ACCOUNT FOR 1982
(Publications for sale)

1065	Opening stock saleable publications	3028	*3763*	Sales of publications	2476
633	Pug plates		*3028*	Closing stock saleable publications	2390
2658	Production of new publications				
182	Distribution costs	124			
2253	Surplus to Special Publications Fund	1714			
6791		4866	*6791*		4866

OFFICERS' REPORTS

HONORARY TREASURER'S REPORT FOR 1982

The main thanks for a very satisfactory financial year must go to our Honorary Editor, who has reversed the seemingly inevitable trend of annual cost increases by a reduction of over £750 compared with 1981 on the net cost in the Publications Account. Surplus from the sales of Christmas Cards and surplus equipment disposed of at the Annual Exhibition has also increased. On the other side, stationery and general expenses were higher for a number of reasons, the largest single item being a bank charge of nearly £100 for carrying out administrative work necessary on the death of Mr. J.L. Messenger whilst holding the office of Trustee. The cost of the Annual Exhibition was also up because we are no longer able to make our own catering arrangements at the Chelsea Town Hall, the profit from which, in the past, has made a considerable contribution towards the cost of hiring the hall. The new subscription rate has increased subscription income to approximately £3,900, but members will see that the cost of running the Society in 1982 was in fact about £1,000 more than this, this balance being met from investment income. The surplus from Special Publications sales will be used towards financing new publications.

BALANCE SHEET AS AT 31st DECEMBER 1982

FUNDS

1981			1982	
	£		£	
	12775	*General Fund* — Opening balance	10228	
	3028	To Special Publications Fund		
9747				
		Gain on investment redemption	150	
10228	*481*	Excess of Income over Expenditure	1492	11870
	115	*Library Fund* — Opening balance	450	
	451	Income	626	
	566		1076	
450	*116*	Expenditure	497	579
2308		*Housing Fund*		2308
		Special Publications Fund — Stock transferred/		
	3028	Opening balance	5281	
5281	*2253*	Surplus from sales	1714	6995
	10000	*Hammond Bequest* — Opening balance	10678	
10678	*678*	Interest and second payment	13448	
			24126	
		Expenditure	244	23882
	2580	*Hering Memorial Fund* — Opening balance	2690	
		Gain on investment redemption	8	
	287	Income	294	
	2867		2992	
2690	*177*	Expenditure	328	2664
31635		TOTAL FUNDS		48298

We received a further payment from the estate of our late member, Mr. C.O. Hammond, bringing the balance of the bequest account including accrued income to nearly £24,000. Your Council have decided that this and any other surplus uncommitted funds shall be held in temporary investments such as National Savings Investment and Deposit accounts until the position on the expiry of our lease at the Alpine Club at the end of this year is known. Meanwhile, some of the interest will be used for special projects such as the provision of coloured plates in the Proceedings and a Memorial Lecture.

This year, may I couple our thanks to Mrs. S.B. Walker, wife of our Assistant Treasurer for subscriptions, who is continuing to look after this work whilst he is abroad, with an appeal to members to make her work a little easier by making sure that, if they do not pay by Banker's Order, their subscription reaches her by Jan. 1st each year without any reminder, and, if they do pay by Banker's Order, that it is amended to the correct current rate. Our thanks are also again due to our Honorary Auditors for completing the audit in time for the Annual General Meeting.

—BALANCE SHEET AS AT 31st DECEMBER 1982 contd.—

THESE FUNDS ARE REPRESENTED BY

	1981		1982	
	£			
£		*Investments at Cost* (details appended)		
	7913	General Investments	8062	
10083	*2170*	Hering Memorial Fund Investments	2178	10240
		Stock		
	3028	Special Publications at cost	2390	
3130	*102*	Coloured Christmas Cards	246	2636
		(The value of the library, collections, ties and other publications is not included in the accounts)		
		Liquid Assets		
	10799	P.O. Savings Investment Account	24260	
	1074	Debtors and Advance Payments	742	
	7824	Cash on Deposit	10000	
	110	Cash on Current Account	514	
	19807		35516	
	336	Subscriptions in advance	73	
18422	*1049*	Amounts owed and provisions	21	35422
31635				48298

There is a contingent liability for £80 bookbinding which it is anticipated will be met by a British Library grant.

AUDITORS' REPORT

In our opinion the annexed Balance Sheet gives a true and fair view of the Society's affairs as at 31st December 1982 and the Income and Expenditure Accounts give a true and fair view of the Society's results for the year.

A.J. Pickles F.C.A.
R.A. Bell

INCOME AND EXPENDITURE ACCOUNT FOR 1982

2808	From Publications Account	2050	*2849*	Subscriptions	3934
1154	Rent and Insurance	1575	*1940*	Interest and Dividends	1921
354	Stationery and General Expenses	756	*32*	Donations and Bequests	201
294	Indoor Meetings and Exhibition	253	*291*	Surplus on sales (Ties, surplus Equipment and Christmas Cards)	336
57	Subs/Donations to other societies	107			
	Display Board (Sarnis Trust donation)	175	*36*	Surplus on Annual Dinner	16
481	Excess of Income over Expenditure	1492			
5148		6408	*5148*		6408

SCHEDULE OF INVESTMENTS AT COST AS AT 31st DECEMBER 1982

		General £	*Hering Memorial Fund* £
£1600	Agricultural Mortgage Corp. $9\frac{3}{4}\%$ Stock 1985–8	646.49	646.48
1010	Drayton Premier Investment Trust 25p Ordinary Shares	1398.21	
410	Shell Transport & Trading 25p Ordinary Shares	477.79	771.83
189	Midland Bank £1 Ordinary Shares		459.66
150	Unilever 25p Ordinary Shares	248.45	
£4098.06	Treasury $13\frac{3}{4}$ Loan 1993	4041.44	
£1644.20	Treasury $8\frac{1}{4}\%$ Loan 1990	1250.00	300.00
		8062.38	2177.97

COUNCIL'S REPORT FOR 1982

Whatever the entomologists may think about 1982, 1932 was certainly a Special Year and in December 1982 the Society was able to elect three Special Life Members, Mr. Peter Crow, the Rev. J.N. Marcon and Mr. W.L. Rudland. What is more, in a very charming letter of thanks to the Society, Mr. Crow mentioned that he and the Rev. Marcon were elected on the same day!

To come back to 1982 the Society elected 35 new members, lost 13 by death, 13 by resignation and had to strike 22 members off for non-payment. This brings the membership total to 735.

The new Membership Secretary, Mr. Marc Hadley, relieved the Secretary of a good deal of work for which she is duly grateful and the new Distribution Secretary has (or so he says) mastered the society's Addressograph machine. The society now has rather a lot of officers but it was thought that the work load carried by any individual officer should be kept to a reasonably low level.

The Indoor Meetings Program was again very successful and the attendance at Indoor Meetings has risen this year.

The Field Meetings were also appreciated and were mostly well attended. The week-long meeting in the Forest of Dean was much enjoyed by the eight members who went to it.

The Society sustained a sad loss when Mr. Messenger, who was one of our Trustees died. Mr. Derek Stimpson was elected in his place.

Although there was no new publication this year, the previous years' publications sold well. The guide to British hoverflies will—it is hoped—be published in 1983.

Our Editor, Mr. Raymond Uffen, has been considering the form and content of the Proceedings and would be interested to hear the members' views on the part it should play in the life of the Society.

Mr. Dyke designed and helped to produce for us a handsome new Christmas Card which sold very well.

The Annual Dinner (arranged by Dr. McNulty) was, as usual, a very cheerful occasion.

The Council is grateful to Mr. Ken Evans who, in spite of other problems, found time to manage the Exhibition so competently.

As an experiment the Society's rooms were opened on four afternoons this last winter and a number of members availed themselves of this opportunity. The Council intend to continue this arrangement and the dates in question will be circulated in the autumn distribution.

CURATOR'S REPORT FOR 1982

The most important thing I have to report this year is the Society's acquisition of twelve cabinets of various sizes and their contents.

J.L. Messenger's bequest, the first to be received, consisted of his collections of Lepidoptera plus the seven cabinets holding them; also a number of store boxes and sundry entomological equipment. Much of this equipment was sold at the annual exhibition, along with other surplus items. The sale was very successful and realised a useful profit. Mr. Messenger's collections are to be kept as a whole, not separated or divided in any way, it being a condition of his will on the Society accepting them. The butterflies especially, are a welcome addition to the Society's own collections, the majority being of British and European origin.

One gift to the Society featured a large gilt frame of about five feet square which contained hundreds of butterflies and moths, arranged in an elaborate pattern; a not uncommon object in many households a generation ago. It was eventually sold to a member of the Society.

During the year a purchase was made of the late Mr. Stoughton-Harris's cabinets and collections. They are contained in four Hill units and one twelve-drawer cabinet.

The collection is composed wholly of British and continental butterflies. Unfortunately, a large number of pins holding the specimens have suffered corrosion where the pin is in contact with the base of the drawer. As the cabinets were only recently installed no decision has been taken for the time being regarding this problem. Included in the purchase were a number of store boxes, some pill boxes and a satchel.

As a result of bequests, gifts and purchases, the Society's space is now bulging at the seams. The more valuable cabinets and Hill units will be retained as far as possible. Various other cabinets can be offered for sale to members when they become available. They will need to be emptied of their contents, a time consuming occupation, as there are some thousands of specimens to be transferred to other cabinets or store boxes.

There are two requests I make concerning the collections, work on which progresses slowly but satisfactorily. The first is for members to be more careful when removing or replacing drawers into cabinets, particularly those containing the microlepidoptera. Several appear to have been jolted or banged in some way, as there are a number of loose bodies and wings about the drawers. My second request concerns that menace to collections, *Anthrenus museorum L.* Within the last few weeks several dead specimens and a number of larval skins have been discovered in the Joy collection of Coleoptera. The beetles were probably introduced via bequests. Odd specimens were found last year in the duplicates and a Diptera cabinet. This is the first serious threat to the collections, as far as I am aware, for at least twenty five years, possibly much longer. A systematic search and treatment of all drawers is now under way to eliminate the beetle. I appeal to members, should they find any evidence of infestation, to inform the curator or assistants so that action can be taken.

The Society's display unit, bought in 1982 was used at the Amateur Entomologists' Society exhibition that year, although only partially complete. It is hoped to finish work on it and make full use of the display as soon as possible.

In conclusion, I would like to thank Mr. P. J. Chandler, Mr. W. Parker and Mr. R. Weal for their help and advice during the past year.

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

Report for 1982

Grants were made to three out of a short list of four applicants as follows:—

(1) M. Michel Martinez. £150 for field study of the Agromyzidae in France. M. Martinez works at the National Institute of Agricultural Research at Versailles.

(2) Senhor Angelo Pires do Prado and Senhor Yara Valença da Rocha. £100 for field study of the Tephritidae and Agromyzidae in Brazil. Senhor do Prado is an associate professor and Senhor da Rocha a research student at the University of Campinas in southern Brazil.

(3) Professor C. Wilkinson, F.R.E.S. £75 for the study of the Nepticulidae in the field and in collections in New Zealand. Professor Wilkinson is the Head of the Department of Animal Systematics and Zoogeography at the Free University, Amsterdam. His department is undertaking intensive study of the Nepticulidae which will lead in due course to a world revision of the family. Knowledge of species occurring in the southern hemisphere is essential for formulating ideas on phylogeny and evolutionary development. In a preliminary report Professor Wilkinson states that he discovered ten species new to science, lectured at six universities and brought back to Europe a large quantity of living material for further study.

Reports have not yet been received from the other beneficiaries.

LIBRARIAN'S REPORT FOR 1982

The Society's library is a recognised back-up to the British Library. This enabled my predecessor, Mr. G. Prior, to obtain a grant towards the cost of binding a considerable part of the backlog of foreign journals. This has now been accomplished and completed runs of further journals are being assembled with a view to making a further application for a grant to complete this work.

Further effort has been expended in listing and then contacting those members who have had books out on loan overdue for two years or more, to minimise potential losses. Notices dealing with the proper procedure both for borrowing books and for returning them have recently been placed in the library. It would greatly assist the smooth running of the library if members who wish to borrow books would read one of these notices, follow its instructions and finally return the books within the stipulated period.

Two journal exchanges were arranged during 1982: one with the Derbyshire Entomological Society and the other, at their request, with Entomologischer Verein Apollo of Frankfurt.

Two bequests of books, journals and slides were received during the year from our late members M.B.S. Goodban and Mr. J.L. Messenger.

In September 1982 Mr. W. Parker very kindly offered to look after the Society's slide collection, to which arrangement Council agreed, although overall responsibility is still under the function of the Librarian.

I would like to thank the following for their donations of books and journals: Mrs. F.M. Murphy, Col. A.M. Emmet, Mr. G. Prior, Mr. S.N.A. Jacobs and finally Mr. A. Callow for the gift of a large number of photographic slides illustrating orders other than Lepidoptera. Thanks are also due to Gaston Prior for his help during the year with my initiation into this Office and to Mrs. F. Murphy and Messrs. D. Wilson, W. Parker, P. Sokoloff, R. Bretherton and E. Bradford for general library help.

PRESIDENTIAL ADDRESS

by J. HEATH

I. REPORT

You have heard from our Secretary, Treasurer, Curator and Librarian of the affairs of the Society during the past year. To them and to all the other officers and council members I owe an especial debt of thanks for having made my year as President so pleasant and enjoyable. In particular I would like to thank Mr. Eric Bradford for all his hard work in re-arranging our collections, Mr. R. Tubbs and the Rev. D. Agassiz for the production of the Society's special publications which have been so successful and Mr. Steven Miles for re-organising our library procedures. I must re-emphasize the importance of everyone conforming to the regulations concerning the loan of books. There are prominent notices detailing the procedures in each room in the basement at the Society's rooms.

In addition to the monies received from the Hammond bequest detailed by our treasurer, a donation of £200 was received from the Sarnia Trust, in Guernsey, through our member Dr. T.N.D. Peet. This money has been used to provide new panels for the exhibits we display at our Annual Exhibition and at the exhibitions of other societies. In our turn we made a small donation to the Hants and Isle of Wight Naturalist's Trust towards the legal costs of presenting the evidence for wildlife interests at the public enquiry held to consider the effect of oil exploitation within the New Forest.

The Society would like to congratulate Lt. Col. A.M. Emmet on the presentation to him of the Stamford Raffles Award by the Zoological Society of London. This award was made in recognition of the most outstanding contribution made to zoology by an amateur naturalist in the previous year.

During the year no fewer than three members have become Special Life Members—a most exceptional number unlikely to be equalled or surpassed again this century. They are Mr. P.N. Crow, the Rev. J.N. Marcon and Mr. W.L. Rudland.

Inevitably there have been deaths among our membership during the past twelve months.

Mr. B.A. Cooper, a professional entomologist who joined our Society in 1936, had wide-ranging natural history interests. He was best known as the person who took over the organisation and running of the Amateur Entomologists' Society from 1937 until 1945.

Mr. T.H. Court had been a member since 1918 and a Special Life member since 1971. He was interested in the Lepidoptera and lived at Market Rasen, Lincs.

Mr. J.E. Delhauty, an odonatist, had been a member since 1964.

Mr. C.H. Dixon, who was 91, was elected in 1945. He was a life-long entomologist who specialized in the Macrolepidoptera. His fine collection is now housed in the Hampshire County Museum.

Mr. R. Largen, a young man of 36, died in August 1982. He joined the Society in 1980. Specimens from his collection of British Lepidoptera were exhibited at our Exhibition in October last.

Dr. D. Leston, a life-member of our Society since 1948 died in Florida in October, 1982. A notable heteropterist, he was joint author, with Professor T.R.E. Southwood, of Warne's *Land and Water Bugs of the British Isles* published in 1959.

Mr. J.L. Messenger joined in 1951, had been President in 1963 and a Trustee since 1968. His fine collection of Lepidoptera was bequeathed to the Society.

Mr. G.A. Mitchell, a lepidopterist, joined in 1960.

Mr. F. Stanley-Smith, an honorary member since 1967, who joined in 1927, had been Hon. Secretary 1940–51 and President in 1938 and 1953. His special interests were the Lepidoptera and Coleoptera.

Mr. G.R. Sutton, elected in 1934, was especially interested in recording migrant Lepidoptera, as well as in the Coleoptera.

Mr. R.W. Watson joined in 1945. He was a well known lepidopterist who had one of the largest and finest private collections in Britain, which he donated to the BMNH some years before his death. The meeting held each year at his home was a regular fixture on our programme.

PRESIDENTIAL ADDRESS PART II

THE INSECTS OF THE YELLOW BALSAM, *IMPATIENS NOLI-TANGERE*

by J. HEATH

Four insects are specifically associated with *Impatiens noli-tangere* L. in Great Britain, viz.,

an aphid, *Impatientinum balsamines* (Kaltenbach)
a leaf-mining dipteron, *Phytoliriomyza melampyga* (Loew)
a tortricid moth, *Pristerognatha penthinana* (Guenée) and
a geometrid moth, *Eustroma reticulatum* (Denis & Schiffermüller), the Netted Carpet.

Between them they utilize most parts of the plant, as will be seen later.

My main interest has been in a study of the population dynamics of the Netted Carpet. This species had been listed by the Protection Committee of the Royal Entomological Society as being endangered as far back as the late 1940s. The other lepidopteron, *Pristerognatha penthinana* had by then been lost sight of; the last record being in 1914 (Bradley *et al*, 1979). Were the factors which had caused the decline to apparent extinction of this species likely to result in a similar fate for *Eustroma reticulatum?* This was the question which was posed in 1954. We can now assess how the Netted Carpet has fared after 25 years or so.

THE PLANT—*IMPATIENS NOLI-TANGERE*

There are four species of Balsaminaceae in Britain, *Impatiens noli-tangere* native in the Lake District and possibly North Wales, and three introduced species—*Impatiens capensis*, the Orange Balsam, in southern England; *Impatiens parviflora*, the Small Balsam, fairly widespread and occurring with the Yellow Balsam in the Lake District; and *Impatiens glandulifera*, the Himalayan Balsam which has spread greatly along river banks and canals. All these species are characterized by their unique flowers and explosive seed pods. The native *Impatiens noli-tangere* is also unusual in that it has cleistogamous racemes, in other words, it has self pollinating flowers which need not open before producing seeds—an important fact for the larvae of *Eustroma reticulatum*. The Yellow Balsam occurs in the central Lake District where it grows along streams and, especially on the wet flushes of the wooded fell-sides, just above the lake shores. Elsewhere in Britain it occurs very

Fig. 1. *Eustroma reticulatum* male (top) and female × 1.5.

locally in Wales and, as an introduction, in a number of other scattered localities, *e.g.* Fountains Abbey in Yorkshire where it was grown by the monks for medicinal purposes.

EUSTROMA RETICULATUM, THE NETTED CARPET MOTH

This species was first recorded from Britain in 1856 when adults were found in the Lake District by T.H. Allis (Doubleday, 1861) and although searched for annually it was not found again until 1869. In 1876 Hodgkinson found the ova and from then on it was successfully reared and the larvae regularly found (Buckler, 1899). However, during the period 1892 to 1898 it seems to have declined dramatically and was not seen again until 1904 when it was found in a new locality. It was noted regularly from then on until about 1914 after which date it declined to apparent absence by 1923. In fact Lowther (1923) suggested that it was extinct. Nothing more was heard of the Netted Carpet until it was found plentifully in 1945; a careful search made in 1940 failed to locate it (Birkett, 1951). Since 1945 it has maintained its populations and is now known to be flourishing.

The existing records show that periods of population decline were observed from 1892–8 and from 1914–23 and a period of population increase from 1940–5.

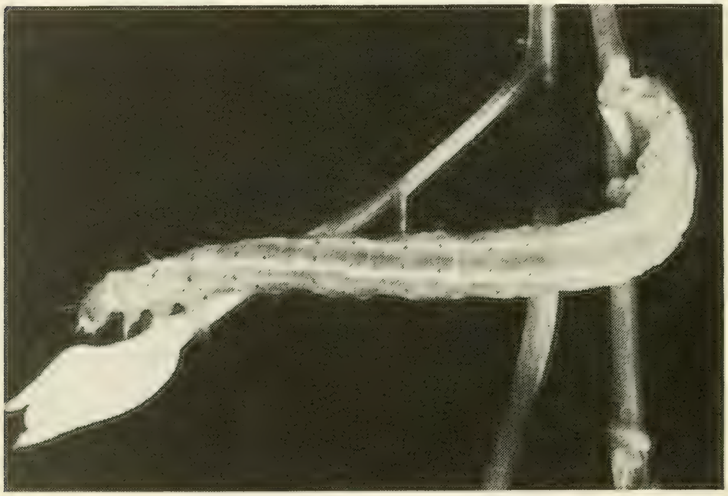
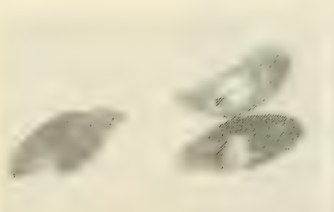


Fig. 2. Final instar larva of *E. reticulatum* eating a balsam flower.



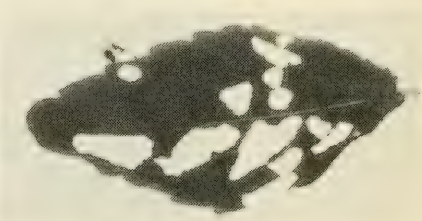


Fig. 3. Seeds of *I. noli-tangere* eaten out by *E. reticulatum*.

Fig. 4. Leaf of *I. noli-tangere* perforated by *E. reticulatum*.

DESCRIPTION

The adult moth has a wingspan of about 25mm. It is rather like a small *Ecliptopera silaceata* (Denis & Schiffermüller), Small Phoenix, in coloration and wing pattern (fig. 1). The hindwing of the male has an orange-yellow discal spot; this is reduced to a dark grey dot in the female. Prout (1911, 1912) described 14 varieties.

BIOLOGY

The ova are bluntly oval, pearl-white, opalescent and smooth without punctation or pattern and are laid singly on the underside of a leaf, there being rarely more than one per leaf. The egg stage lasts about one week (Littlewood, 1912b).

The first instar larva, 4–8 mm long, is almost transparent, being pale glossy white including the appendages. Gut colour is derived from the part of the plant being eaten—green from leaves, yellow from flowers and opaque white from seeds. The second instar larva, *c.* 13 mm long, has the head and legs pale brown, the body pale green and the subdorsal line developing. The last instar larva (fig. 2) is *c.* 25 mm long when full-fed and has broad whitish subdorsal lines and a broken reddish brown dorsal line. Littlewood (1912a) gives a very full description. Except in the first instar when the leaves are preferred, the larva feeds almost exclusively on the ovaries of the flowers or the germ cells of the seeds (fig. 3). How is this achieved when access to the seed is through an explosive seed-pod? The answer must be that the explosive factor does not develop until after the stage when the seed is attractive to the larva. When neither flowers nor seeds are available the leaves are eaten; the larva perforating the leaf, (fig 4), not feeding in the normal manner of a geometrid at the edge of the leaf. It feeds at night, resting by day along the midrib on the underside of a leaf where it resembles a seed-pod.

The larval stage is of about 30 days duration.

Pupation takes place in a tough cocoon amongst leaf litter beneath the foodplant. This is normally very wet and regularly flushed with water. Pupation occurs almost immediately after completion of the cocoon. The pupa is about 9 mm long. The head and thorax are bright translucent green and the abdomen golden brown. The pupal stage lasts 9 months. The main mortality of the species occurs in this stage. The extent of this mortality depends upon the extent to which the pupation site dries out.

The moth is on the wing from early July to mid-August depending a little on season. Newly emerged specimens may be found throughout this time indicating a long emergence period. As a result only a few individuals are seen on any one date. It flies at dusk with an erratic, rapid flight. It has been taken at actinic light.

DISTRIBUTION AND ABUNDANCE

Eustroma reticulatum occurs locally throughout the Palaearctic region from Britain to Japan. The European distribution is alpine and northern (fix. 5) and in Britain it is confined to six 10 km squares in the Lake District (fig. 6). There is an old record from North Wales (Barrett, 1907) and one was recorded from near Bala, 1930, by R.E. Vaughan Roberts (Smith, 1950). This specimen has not been traced but Vaughan Roberts' identifications were considered to be reliable by his contemporaries (H.N. Michaelis pers.comm.). However Bala is some 15 miles distant from the nearest then known locality for the foodplant which now only occurs very locally in Merionethshire (VC 48) and Montgomeryshire (VC 47) although it also occurred in Denbighshire (VC 50) in Barrett's day. No specimens or other records of *Eustroma reticulatum* from Wales have been traced. All the specimens in the National Museum of Wales are from the Lake District (A.F. Amsden, pers.comm.).

In the Lake District it occurs in about 20 localities most of which are along the shores of Windermere, Lake Coniston and Derwent Water. The most usual habitat is on wet flushes and alongside small streams under a closed or almost closed canopy. Plants in more open situations flower profusely but usually have a low population of

TABLE I

Mean population indices for three years

Site	*Eustroma reticulatum*			*Phytoliriomyza melampyga*
	1955	1980	1981	1955
Windermere east (7 sites)	40	64	69	1917
Windermere west (6 sites)	46	55	—	2329
Stockghyll Park Ambleside	30	141	—	281
Rusland Valley (2 sites)	Present	114	—	Present
Coniston east (7 sites)	60	68	93	2011
Derwent east (3 sites)	Absent	19	—	Present
Derwent west (2 sites)	Present	22	—	—

Eustroma reticulatum; as the canopy closes the plants flower less profusely but then produce cleistogamous racemes. When the canopy closes completely the plants become very tall and eventually die back. In the 1955 survey larval counts were made at 16 localities. The method used was to count as many larvae as possible over a period of time which varied from 5 to 15 minutes from which the number which would have been counted in one hour was calculated. This count was carried out by at least two different observers, the mean calculated and termed the population index. The indices so calculated enabled the populations at the various localities to be statistically compared. The localities were classified into four habitat categories: (a) hedgerow, (b) coppice, (c) high forest without shrub layer and, (d) high forest with shrub layer. The larval population indices ranged from 9 in the hedgerow sites to 67 in the high forest with shrub layer sites, the differences being highly significant. It was noted that the localities with high larval populations were much wetter than those with lower populations, had a denser cover and would therefore be less susceptible to drying out.

An experiment was carried out to test the effect of drying out on pupae by keeping two batches under dry conditions in a Littlewood pupa cage and in damp sealed tins. The pupae kept under damp conditions showed a 51% emergence whilst those kept under dry conditions gave only 8.5% emergence. These differences were statistically significant. Mortality was observed by noting the change in colour of the pupae which had all been removed from their cocoons at the beginning of the experiment. On death the pupa changed from bright green to brown. All the mortality occurred towards the end of the pupal stage (Heath, 1959).

SEASONAL INCIDENCE

Study of the published records of *Eustroma reticulatum* shows that declines occurred between 1894 and 1896 and 1913 to 1917 and the species could not be found in 1940 but was rediscovered in 1945 and increased in abundance during the next decade. These declines all followed periods of drought in May and June as was shown by study of the relevant Meteorological Office records (Heath, *loc.cit.*). This is the period in which pupal mortality was shown to occur through drying out. The decline

Fig. 5. European distribution of *Eustroma reticulatum*.

of 1940 coincided with a particularly severe drought which was followed from 1942 by several years of exceptionally high spring rainfall. Therefore it can be seen that the long term seasonal fluctuations correlate well with spring rainfall amounts. Local variations in population are linked to changes in cover brought about principally by woodland management or lack of it. In 1980/81 the general population level as shown from counts made at 20 localities showed an increase over that in 1955 but this increase was not significant except at one locality. This is the colony in Stock Ghyll Park, Ambleside where active management for the maintenance of *Impatiens noli-tangere* has been in force since 1955. Here the population has shown an enormous increase from an index of 30 to 141.

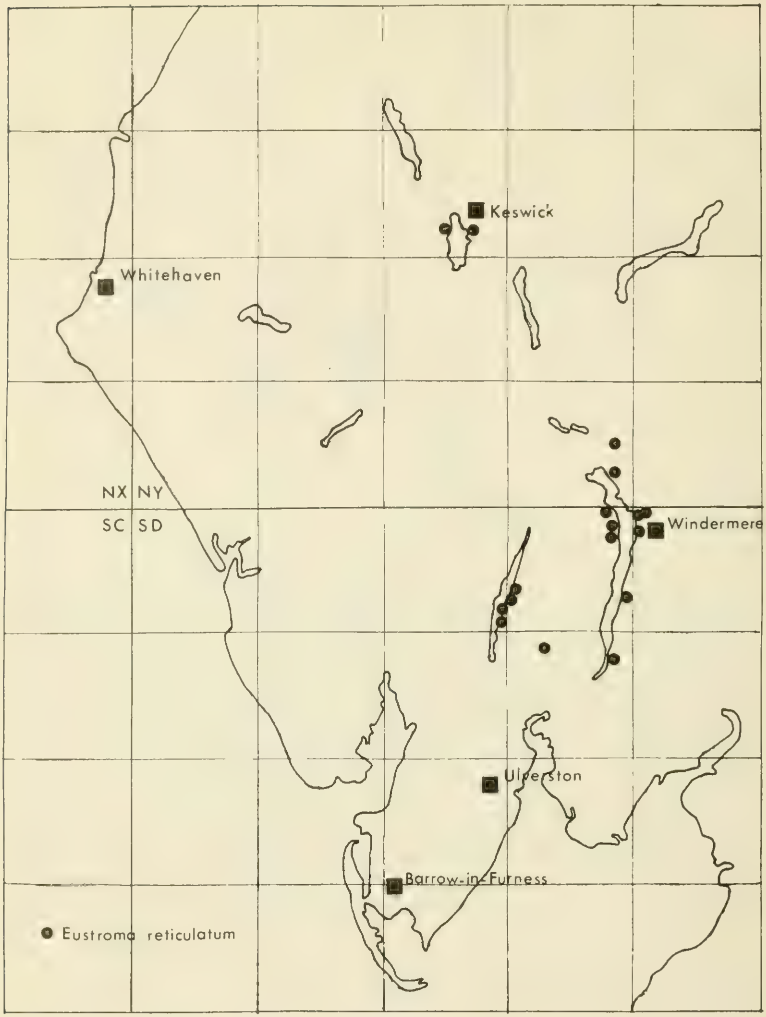


Fig. 6. Distribution of *Eustroma reticulatum* in the English Lake District.

CONSERVATION

In 1959 I wrote "If *Eustroma reticulatum* is to survive it is essential that its habitats should be left undisturbed. Its major enemy is not the collector but the forester, builder, or landscape developer". Well, it has survived in almost all its sites as the changes that were feared have not, in fact, taken place except in a few localities. However, what I said in 1959 still applies.

OTHER SPECIES ASSOCIATED WITH *IMPATIENS NOLI-TANGERE*

The other lepidopteron exclusive to yellow balsam is the tortricid *Pristerognatha penthinana* which is reputed to feed from August to October in the lower portion of the stem and roots of the plants. It used to fly in mid-May (Gregson, 1881) but has not been recorded since 1914 (Bradley *et al.* [*loc.cit.*]). It used to occur on the west shore of Windermere and we are told could be reared by collecting old stems of the foodplant in October (Hodgkinson, 1878). In my experience there is nothing left of the plant by then.

The leaf-mining dipteron, *Phytoliriomyza melampyga* is widespread and abundant wherever the plant occurs in the Lake District and counts of infected leaves show that it has similar habitat preferences to those of *Eustroma reticulatum*.

The aphid *Impatientinum balsamines* is similarly distributed.

Finally, mention must be made of *Xanthorhoe biriviata* (Borkhausen) which was discovered in 1955 in the Home Counties where it is now known to be well established feeding on *Impatiens capensis*. It is bivoltine flying in May/June and July/August (Minnion & Goodban, 1956). The larva of this species feeds on the leaves in normal fashion in June/July and August/September (Haggett, 1957). In Scandinavia it feeds on *Impatiens noli-tangere* together with *Eustroma reticulatum* with which it does not appear to compete. The circumstances of the arrival of *Xanthorhoe biriviata* in England are obscure and it is interesting to speculate as to whether or not it will reach the Lake District. Certainly it should be looked for there in those localities where *Impatiens noli-tangere* occurs.

ACKNOWLEDGEMENTS

My thanks are due to: K. Alexander of the National Trust for granting permission to work on Trust properties and for assisting with the survey; Paul Waring for assisting with the survey; Mrs. B.G.P. Dobson and Dr. R.E.C. Ferreira for permission to work on their estates, A.F. Amsden of the National Museum of Wales, D.J. Carter of the British Museum (Natural History) and H.N. Michaelis for information concerning the distribution of *Eustroma reticulatum* and *Impatiens noli-tangere* in Wales.

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BOOK REVIEWS

Danske natsommerfugle, by Michael Fibiger & Poul Svendsen. Scandinavian Science Press Ltd., Klampenborg, Denmark, 1981. 272 pp. £16.90.

This book entitled 'Dansk Faunistisk Bibliotek. Bind 1' is the first of a set of books on macrolepidoptera which are designed to update and replace the well known trilogy by the late Bishop Skat Hoffmeyer.

It comprises chiefly descriptions of 50 species added to the Danish list from 1966–1980 with a careful analysis of the regions of the world from which they originated and into what categories they fall: e.g. migrants, or species extending their range, species newly recognised as distinct from similar ones and so on. About half of the 50 species described are also on the British list, but only a few like *E. imbecilla* and *A. berbera* have been added to our list in the same period. In addition to treatment of species new to Denmark there are brief notes on many species the status of which has significantly changed since Hoffmeyer's books were published. The Psychidae are included along with the macrolepidoptera.

Each species is described, with illustration of genitalia or other critical characters where appropriate. 84 descriptions or notes are supported by distribution maps. Some of these are of Denmark only, whilst others show northern Europe including the British Isles.

The page size is about 10″ × 6½″. The work is pleasantly case bound. Apart from the systematic section there are some 24 pages of introduction, including a brief summary in English (and German). The set adults on the three fine photographic colour plates are natural size except Psychidae which are ×2. These illustrations are of the highest quality on a blue background — which seems to be becoming popular. These are followed by three plates of drawings of larvae, 40 species being figured at about twice natural size. There follows a full bibliography and index, the whole book amounting to 272 pages.

Since the text is in Danish this is bound to be a disincentive to British entomologists, for few have the devotion and application of Michael Tweedie, who learnt the language so as to be able to use Hoffmeyer's books. However the Danish fauna has some similarities to our own, and their entomologists are among the most helpful and cooperative of our European counterparts. This book will alert macrolepidopterists to some species the range of which is spreading and the excellent illustrations can make us watch out for subtle differences to prevent allied species from being overlooked.

The volume is well produced and we can look forward with encouragement to the remainder of the series. The only puzzle to me is why this book should be felt necessary if all the species included are to be fully described in the remaining volumes.

D.J.L.A.

A complete Guide to British Butterflies, by Margaret Brooks and Charles Knight. pp. viii, 159. Numerous colour illustrations, text diagrams. Cloth 4to.dw. Jonathan Cape Ltd. 1982. £10.95.

The greatest interest in natural history photography as an offshoot of two very popular interests, photography and entomology, has been aided over the past two decades by the advent of small sophisticated cameras. The recording of life history details in photographs is now an important addition to the traditional collection of set insects. A landmark in butterfly books appeared in 1947 with the publication of 'Butterfly Lives' by S. Beaufoy, a superb collection of black and white photographs of live insects and their stages. One still marvels at the quality obtained by equipment of that era.

This present work, 'A Complete Guide' takes the coverage of butterflies into the world of colour photography. The result is an attractive volume with popular appeal which contains some very helpful and informative studies of life cycles of our native butterflies. Some aspects of the illustrations fall short of the quality needed to identify specimens, particularly those of some ova and smaller larvae. The photographer has apparently frequently limited herself to pictures taken under natural conditions and light which has resulted in some indistinct illustrations. The colour balance of some plates has gone awry. The pictures of the Brimstone butterfly have suffered from a very unfortunate colour cast as have several other insects, such as the Scotch Argus and the underside of the Small Pearl-bordered Fritillary. Perhaps the most unsatisfactory aspect of the illustrations is the use of photographs of set insects on natural backgrounds. Where ever did these tatty, ancient specimens come from?

In other instances the illustrations are informative and pleasing. The coverage of the larva of the Chequered Skipper is very good.

The text is divided into a brief guide covering distribution, habitiat, life cycle, larval foodplants and a coloured wheel calendar. The rest of the text describes the insects' four stages, together with notes on occurance and habitats. These are generally quite helpful detailed sections which show a good degree of personal experience with the butterflies. In several instances the distribution of an insect seems misleading. The Dark Green Fritillary in Ireland is indicated as being of coastal distribution only; there is no mention of Irish localities for the Purple Hairstreak. The use of the term 'rare' has been applied to the Purple Emperor and the Black Hairstreak. They are not rare, though the occurance of the latter might be described as local. The nomenclature used for both the High Brown and the Marsh Fritillaries is now obsolete. The American Painted Lady has been omitted, which in view of its irregular but repeated sightings, seems unfortunate. It is also unfortunate that space was not found to include habitat photographs.

Despite these criticisms, this is an attractive volume, which offers a good collection of studies of our native butterflies, at a time when the other titles of complete guides are out of print. It is a well bound and presented book and by today's standards, good value.

D.E.W.

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The correct abbreviation of THIS Volume is:
'*Proc. Trans. Br. ent. nat. Hist. Soc.*, **17**'

Vol. 17
1984

Published at the Society's Rooms: The Alpine Club, 74 South Audley Street, London, W.1., and printed by Bocardo Press, Cowley, Oxford.

EDITORIAL

New look.—For parts 3/4 of volume 16, our printer changed from IBM to phototypesetting. This removed some constraints that have been with us since vol14. We shall now use a point larger type size to improve legibility and offset the loss of words per page by changing to a wider A5 page size. This also eases the problem of setting tabular data which has been prepared for a grander page. I trust that the improvements will be seen to compensate for the irritating step in your row of bound volumes.

Illustrations.—Since vol. 14 we have been using photo-lithographic reproduction. Camera-ready line or continuous tone illustrations cost less per page than setting text. There is no justification for surcharging authors for illustration. Letterpress printers used to charge little for the process engraving but so much for the nailing it onto a bit of wood and aligning it with the text that typesetting the same space was cheaper. Hand work tidying up a figure and adding lettering is of course still expensive, unless we exploit the skills of our editorial panel.

We chose a matt paper to eliminate the glare from the glossy paper that used to be essential to good litho reproduction. The loss of quality in reproducing photographs is now more likely to be a result of poor platemaking than of incorrect choice of paper (vol. 14, pls. 1–2).

Congratulations to Prof. Sir Richard Southwood on his knighthood and vice-presidency of the Royal Society. Prof. Southwood's perception of the quality of a paper and its aptness for our publication restores editorial confidence in our objectives when they seem unattainable.

Why proceed with the Transactions?—The Society's meeting on 12th April is scheduled as a discussion meeting on the function of the Proceedings and Transactions. How very dull, you may say—what will be on 'telly' that night? Your Editor's introduction promises to be anything but dull, encompassing a salutary review of the rise and collapse of similar journals, an analysis of our compulsion to record and a reminder that he spends more of your subscription than any other Officer of the Society. Come and state your views— a typescript for publication in the Transactions guarantees admission.

R.W.J.U.

Correction—In the paper by S.R. Bowden (**16**:76–80), the locality of the unique wild specimen of f. *funebris* of *Artogeia* on p. 77, 79, and 80 should read Alai Mts.

A pierid butterfly alighting on water—The episode took place in the Olokemeji Forest Reserve, West Nigeria on the 2nd of January 1972, one of the last remaining areas of virgin forest in the western part of the country. The species in question was a medium-sized member of the Dismorphiinae, *Leptosia marginea* (Mabille). Several specimens were drinking along the edges of a small pool on the banks of the Ogun River, accompanied by various *Appias* and *Belenois* spp.

A specimen flying out from the forest floor suddenly alighted very gently on the surface of the pool, near the far bank.The surface tension was more than enough to ensure it did not sink. The next few minutes it spent on the surface of the water, probing with its proboscis, incongruously surrounded by a multitude of swirling *Gerris* spp. Its wings acted as a sail, and gradually it drifted towards the near end of the pool, a distance of more than half a metre. It flew away without incident before reaching the bank and disappeared.—Torben B. Larsen, Danida, 7 Golf Links, New Delhi, 110 003, India.

1983 ANNUAL EXHIBITION

Chelsea Old Town Hall—29th October 1983

113 exhibits were recorded. These completely filled the hall. The hot summer was most obviously reflected in numerous caught and bred Clouded Yellow butterflies and Vestal moths. More members than ever showed microlepidoptera. There was a welcome increase in the number of Coleoptera shown. The accompanying notes show how students of some of the less popular orders make much more effort to record the macro- and micro-habitat in which their specimens have been captured than do lepidopterists. This awareness is invaluable when recording for the purpose of conservation of a habitat.

Recorders were: R.S. Tubbs (British butterflies), B.F. Skinner (macromoths), J.M. Chalmers-Hunt (micromoths), R.F. Bretherton (foreign Lepidoptera), P.J. Chandler (Diptera and Odonata), Dr. I. McClenaghan (Coleoptera), A.J. Halstead (other orders), E.S. Bradford (illustrations).

D.E. Wilson photographed selected specimens.

The Editor will welcome new offers to record groups or to give second opinions on the selection of specimens for photography at the 1984 exhibition. The day is hectic for those of our recorders who perform other duties too.

BRITISH BUTTERFLIES

Once again many of the exhibitors tried to cast some light on the biology or genetics of the butterflies concerned rather than just showing rows of unrelated aberrations. Many exhibits also reflected the large immigration of *Colias croceus* which began early in June along the whole of the south coast with further generations breeding here.

British Museum National Collection—Six drawers of *C. croceus* Geoff. including one drawer of fm. *helice*. It was good to see again the splendid row of eleven male and female albino specimens bred by R.E. Warrier and originally exhibited by him both at an ordinary meeting and then at the Annual Exhibition of our Society in 1949. They were bred from a very worn female taken at West Wickham, Kent, on June 12th 1949. (The brood consisted of 16 albinistic and 41 normal specimens.) (*Proc. S. Lond. ent. nat. Hist. Soc.* 1949–50: 46). The present B.M. exhibit also included one row of specimens of colour intermediate between type and fm. *helice*. I have bred two of this form but do not know its genetic basis.

Barrington, R.D.G.—A fine exhibit of which the outstanding section was a series of eleven aberrant forms of *Maniola jurtina* L. all taken in one North Dorset field in July 1983. This included two female ab. *postmultifidus* and a pair of ab. *fracta* (probably the variable effect of the same gene), an almost unique female ab. *postatrescens-antinigromargoglabrata*, in which the underside was suffused with charcoal black and a female upperside *antiaurolancia* with the orange band broken with cross-bars. Also shown from a Hants locality: *Plebejus argus* L. including a mixed gynandromorph, affecting three wings. Minor forms of bred *C. croceus* were exhibited.

Dyson, R.C.—*Lysandra coridon* Poda. Five male and two female obsolete forms taken at Portland, Dorset 1983. This form is relatively common there but the gene frequently causes some wing deformity.

Elston, Captain H.J.—Series of *Vanessa cardui* L. and *C. croceus* both of which Captain Elston found plentiful along the south coast in 1983.

HARMER, A.S.—Among a range of minor aberrations of various species, two were particularly noteworthy—a fine ab. *anticrassipuncta* of *M. jurtina* with greatly enlarged "eye" spots and an impressive male ab. *suffusa* of *L. bellargus* Rott. This specimen had a black suffusion from the margins crossing over half the fore-wings. Other *bellargus* aberrations had spots joined together on the underside.

HARMAN, T.W.—Nine *C. croceus* taken in Kent and Sussex 1983 including three fm. *helice*.

JENKINS, A.—*C. croceus* taken South Devon and Dorset in August 1983 and also eight fm. *helice* bred from two females. 75% of the females that emerged from the brood were the *helice* form. This form is controlled by a single gene which is dominant in the female but can also be carried by the male in which it produces no visible effect. Thus from a female *helice* which has paired with a typical male 50% of the offspring should statistically be *helice*, whereas if the *helice* paired with a male carrying the gene, the percentage would be 75%. In the present case the numbers bred were not sufficient to be significant.

KNILL-JONES, S.A.—Twenty-one different species taken near Freshwater, Isle of Wight, including *C. croceus*—an original June migrant (10.vi.83), some first brood specimens taken in August and some second brood found on the wing in September/October. It was particularly interesting to note a *Nymphalis polychloros* L. which flew into his sitting room window 29.vii.83. Although this may have been a locally bred specimen, it might also have been an immigrant as the species seems to need constant reinforcement from the Continent to maintain a population in England.

MELLING, T.M.—*Coenonympha tullia* Müller, a selection of males showing the range of variation between samples taken from various localities throughout England and Scotland during 1983.

MCCORMICK, R.F. and PENNEY, C.—specimens bred from ova. *Colias croceus* Geoff., *Thecla betulae* L., *Hamearis lucina* L., *Polygonia c-album* L., and *Euphydryas aurinia* Rott.

PAYNE, J.H.—Specimens of a pathological form of *Vanessa cardui* bred in the F2 generation from a May 1982 female. This form occurred in approximately forty specimens amongst one thousand bred. *Pieris brassicae* L. bred 1980–82. Aberrations shown were from bred stock of ab. *coerulea* Gardiner from selected matings. Specimens included ab. *maria* Mellaerts (the two dots in the female joined by a sprinkling of black scales) ab. *striata* Rocci (apical blotch joined to upper discal spot by black scales) ab. *fasciata* Kiefer (discal spots joined to each other and to the apical blotch by fine black scales) and two ab. *nigroviridescens* Rocci. *Pieris rapae* L. F1 generation from wild-caught female ab. *fasciata* which included three ab. *fasciata*. The exhibit also included one P. *rapae* ab. *immaculata*, bred 1983, with totally white uppersides to wings. This prompted a discussion on what is an albino. The specimen was, of course, not an albino which is when there is a total absence of melanin in those scales which should normally be black, a good example being the albinistic *C. croceus* in the B.M. exhibit already described.

PICKLES, A.J. and C.T.—A series of *Leptidea sinapis* L. ssp. *juvernica* from the Burren Co. Clare, showing the darker, creamy tones of this sub-species together with three typical English specimens for comparison, looking very white! Also *Gonepteryx rhamni* L. ssp. *gravesi* Huggins from the Burren with typical English ones for comparison. The Irish specimens have a slightly greenish tint.

PITTIS, Rev. S.C.—A drawer of C. *croceus* including some fm. *helice* caught or bred June–September 1983. A range of minor varieties of different butterflies including an attractive *Celastrina argiolus* L. ab. *obsoleta* with no spots on the underside. Also a bred series of *Apatura iris* L. from wild female taken in Hampshire. This female had been put in a net cage 3 feet high by 2 feet wide over a growing plant of *Salix caprea*, had laid 101 eggs and had then been taken back to the original wood and released.

PRATT, C. on behalf of ASBELL, D.—*Pyronia tithonus* ab. *pallidus* with the orange colour replaced by a paler tone similar to ab. *mincki*, taken at Swanage, Dorset.

REVELS, R.—A drawer of bred aberrations of *Pyronia tithonus* (a) from female ab. *excessa* 1974–76. There were 31 specimens in the F1 generation (16 typical and 15 extra-spotted to some degree) and the F2 generation consisted of 6 normal males, 7 male aberrations and 21 females with some additional spots. The results suggest a multifactorial basis. (b) from pale straw coloured female, ab. *mincki*, taken in Wiltshire wood in August 1981. The F1 generation had all proved normal but some good pale forms occurred in the F2 generation.

RUSSWURM, A.D.A. and MIDDLETON, H.G.M.—amongst various aberrations there was a good example of M. *jurtina* ab. *postmultifidus* taken in the same field near Shaftsbury in which R. Barrington took his *jurtina* aberrations previously mentioned; a female *Hipparchia semele* L. underside ab. *monocellata* captured Portland 5.viii.83—this aberration is genetically associated with ab. *holanops*; a good series of C. *croceus* including an impressive melanic female ab. *striata* with black suffusion extending along forewings in rays and other aberrations.

SCANES, J.T.—C. *croceus* with ground colour reduced to light chrome, captured Boldre, Hants 3.8.83.

TREBILCOCK, G.D.—specimens taken 1976–83 including a male *Anthocharis cardamines* L. ab. *auroflavescens* with pale lemon yellow tips—a form which it would be most interesting to breed (the difficulty, of course, is having a virgin female available); homeotic *M. jurtina* with part of male upperside on the underside and a number of minor *L. coridon* and other aberrations.

TREMEWAN, W.G.—a specimen of *Vanessa atlanta* L. ab. *klemensiewiczi* taken wild at Gwithian, Cornwall, 16.8.83. This aberration has the white spots, blue markings and the red band blurred and suffused both on the upper and the underside. Although this aberration has occasionally been taken wild for a very long time (it was figured by Esper in 1777), it has also recently resulted from low temperature experiments on the pupa. Indeed some specimens so produced were shown at the 1981 Anuual Exhibition. *Pieris rapae* ab. *fasciata* from Portcadjack near Portreath, Cornwall, 17.8.83.

TUBBS, R.S.—(1) 27 bred *Aphantopus hyperantus* L. ab. *arete* Müller, being an F2 generation from an ab. *arete* taken near Winchester in 1981. The brood comprised three categories—29% ab. *arete*, 21% specimens with much reduced spots and 50% typical specimens. Ab. *arete* is caused by a simple recessive gene. The genetic basis of the specimens with reduced spots is at present unknown.

(2) F2 generation *Pyronia tithonus* L. from pale straw coloured female ab. *mincki* taken August 1981 by R. Revels in a Wiltshire wood. (See note on R. Revels's exhibit). Eggs kindly given to R. Tubbs. There were 19 pale specimens out of 54 which emerged = 35%. This aberration is, therefore, almost certainly a recessive.

(3) *Maniola jurtina* L. F2 generation from female ab. *postmultifidus* taken in 1981 in Dorset by R. Barrington. Eggs kindly given to R. Tubbs. This gene seems to have a serious weakening effect on the strain. Only ten reached imaginal state out of 130 eggs, and only one of these was ab. *postmultifidus* and this was slightly deformed.

(4) *Lysandra coridon* Poda. Five specimens of ab. *syngrapha* bred in 1983 being the sixteenth generation from ab. *syngrapha* female taken wild in 1967.

TURNER, P.—A fine exhibit of aberrations beautifully set, including *Argynnis paphia* L. with sandy cream ground colour, similar to but not quite so pale as ab. *cifkai*. As specimens of both these very rare forms have been taken from situations close to each other, they are probably associated with the same gene. *Lycaena phlaeas* L: a male ab. *alba*, ab. *subradiata*, and ab. *antipallidula*. *Anthocharis cardamines*: ab. *reducta*, ab. *crassipuncta*, ab. *striata* and ab. *costaenigrata* and *Coenonympha pamphilus ab. pallida*.

WINTER, P.Q.—a male *Colias croceus* taken Scarborough 20.vi.83.

YOUNG, L.D.—An aberration of *Papilio machaon* L. with rounded wings and shortened tails bred August 1983 (S. Morel collection). *Aricia agestis* D. & S. Several underside aberrations, *Polyommatus icarus* Rott: four undersides including two near ab. *obsoleta*. *Lysandra bellargus*: a male and female ab. *discoelongata* and a male and female ab. *caeca*, all from the North Downs.

BRITISH MACROLEPIDOPTERA

AGASSIZ, Rev. D.J.L.—A specimen of *Arctia caja* L. with yellow hindwings, and a dark banded form of *Nola cuculatella* L., both taken at Grays, Essex during 1983.

ALBERTINI, M.—Some of the less common species found in Buckinghamshire over the last four years including four new to the county; these were *Mythimna pudorina* D. & S., *Archanara dissoluta* Treits., *A. geminipuncta* Haw., and *Autographa bractea* D. & S. Other interesting records were *Mythimna straminea* Treits. and *Herminia strigilata* L.

BAKER, B.R.—Seven drawers of clearwing moths (Sesiidae) displaying life-histories; and an unusual variety of *Epirrhoe alternata* Müll.

BARR, B.—Lepidoptera from the Inner Hebrides, including a short series of *Polia hepatica* Cl. from Mull.

BRETHERTON, R.F.—Abberations of Lepidoptera noted at m.v. light at Bramley, Surrey included an unusually dark *Agrius convolvuli* L. on 7.ix.83, and an extreme melanic *Dryobotodes eremita* F. Scarce species included *Rhyacia simulans* Hufn. on 16.vii.83, *Euphyia biangulata* Haw. 26.viii.83, *Trichiura crataegi* L. on 10.ix.83, *Euphyia biangulata* Haw. on 24 & 27.vii.83, and *Dicycla oo* L. on 24.vii.83. Unusual second broods were four *Scopula aversata* L. between 24.ix and 8.x.83, and three *Laspeyria flexula* D. & S. between 26.ix. and 3.x.83. Finally a series of twenty *Rhodometra sacraria* L. showing variation in size and colour, taken between 21.viii. and 8.x.83.

BRITISH MUSEUM (NATURAL HISTORY)—Two drawers of *Dasypolia templi* Thunb. showing variation, taken on Mainland, Orkney by R.I. Lorimer. The historic specimen of *Paranthrene tabaniformis* Rott. taken at Tubney, Berkshire in June 1924 by R. Swift.

CHIPPERFIELD, H.E.—Suffolk Lepidoptera included single examples of *Lithophane leautieri hesperica* Bours. and *Idaea vulpinaria atrosignaria* Lempke, both from Walberswick.

CHURCH, S.H. and PORTER, J.—Coloured photographs illustrating 650 species of larvae and 420 species of live adults. Also living larvae of *Spodoptera littoralis* Boisd., *Heliothis armigera* Hübn. and *Lithosia quadra* L.

CORLEY, M.F.V.—Noteworthy Lepidoptera from southwest Oxfordshire were two *Enargia paleacea* Esp. from Faringdon on 18.vii. and 7.viii.82, two *Photedes fluxa* Hübn. from Abingdon on 27.vii.82, and two *Cryphia muralis* Forst. from Faringdon on 6.viii.81 and 7.viii.82.

CRASKE, R.M.—A dark suffused specimen of *Phlogophora meticulosa* L. taken at Hove, Sussex on 13.v.83.

CULPIN, J.—*Eurois occulta*, female, Clapwell, Derbyshire, 10.ix. 1983.

DAVEY, P.—An example of *Dysgonia algira* L. taken at m.v. light near Swanage, Dorset on 23.ix.83. This suspected immigrant has been recorded on three previous occasions; twice in England and once in the Channel Islands.

ELLIOTT, B.—Lepidoptera taken or bred during 1982 and 83 included a series of *Xylena exsoleta* L. from Rannoch, Perthshire; two *Mythimna loreyi* Dup. from the Lizard, Cornwall in August 1982; and a variable series of *Dryobotodes eremita* Fabr. from Nottinghamshire, including a number of melanic forms.

EMMET, LT. COL. A.M.—A pale aberration of *Apamea anceps* D. & S. from Great Bendysh Wood, North Essex on 8.vii.83; and a selection of uncommon Essex species from Saffron Waldron including *Catarhoe rubidata* D. & S., *C. cuculata* Hufn., *Thera juniperata* L., *Eupithecia pusillata* (Common where there is no native juniper.) Distribution maps for other species in Essex.

EVANS, K.G.W.—Eight generations of *Rhodometra sacraria* bred from Addiscombe, Surrey, and showing a wide range of variation, including many extreme forms.

FOSTER, A.P.—A male *Thaumetopoea processionea* L., probably the first authentic British record, and a male *Lymantria dispar* L. Both specimens were taken at m.v. light Mawnan Smith, Cornwall on 19.viii.83

HALL, N.M.—A male *Aspitates ochrearia* Rossi taken near Greenham Common, Berkshire, and apparently new to the county.

HARMAN, T.W.—Single specimens of *Agrius convolvuli* L. and *Acherontia atropos* L. taken at m.v. light at Westbere, Kent during 1983.

HART, C.—Larvae, adults, and photographs of *Pelosia obtusa* H.-S. originating from the Norfolk Broads. This is the first time this species has been reared in this country. A male *Eurois occulta* L. taken near Reigate, Surrey in 1983.

HEAL, N.F.—Notable records from Kent were *Nola strigula* D. & S. and *Euphyia biangulata* Haw. from Whitstable on 13.vii.83, and *Heliothis armigera* Hübn. from Detling Hill, near Maidstone on 27.ix.83.

JACKSON, B.C.—Lepidoptera from Yorkshire.

KNILL-JONES, DR R.P.—A selection of Scottish Lepidoptera included *Amphipyra berbera svennsoni* Fletch. and *Lacanobia suasa* D. & S. from Glasgow; *L. suasa* D. & S. and *Eilema complana* L. from Galloway; and a series of *Diaphora mendica* Cl. from Kintyre in which the males were intermediate between the dark brown English form and the cream-coloured Irish form (f. *rustica* Hübn.).

KNILL-JONES, S.A.—The more notable of resident and immigrant species taken near Freshwater, Isle of Wight during 1983 were *Heliothis armigera* Hübn. on 25.ix, *Spodoptera exigua* Hübn. on 23.ix, and *Standfussiana lucernea* L. on 28.ix.

MCMORMICK, R.F. and PENNEY, C.—Species bred from ova included *Orgyia recens* Hübn., *Hypena rostralis* L., *Lithophane leautieri hesperica* Bours., and *Clostera anachoreta* D. & S.

MACNULTY, DR B.J.—Lepidoptera from the Gower Peninusula, Glamorgan; of special interest were specimens of *Standfussiana lucernea* L., *Ochropleura praecox* L., *Alcis jubata* Thunb., and *Rhodometra sacraria* L.

MIDDLETON, H.G.M. and RUSSWORM, A.D.A.—Immigrants to Hampshire: *Diachrysia orichalcea* at Boldre on 27.ix.83; *Eurois occulta* L. at Brockenhurst on 9.viii.83; and a short series of *Rhodometra sacraria* L. from Boldre during August and September.

PARSONS, M.—A male *Scopula nigropunctata* Hufn. from Ninfield, East Sussex on 17.vii.83.

PEET, DR T.N.D.—A selection of immigrant and vagrant Lepidoptera taken on Guernsey during 1983. New to the Channel Islands was *Mythimna loreyi* Dup., and to

Guernsey were *Agrotis ripae* Hübn. and *Hypena crassalis* F.

PELHAM-CLINTON, E.C.—A male *Mythimna loreyi* Dup. taken at Axminster, Devon on 17.viii.83.

PICKLES, A.J. and C.T.—A female *Eublemma ostrina* from Portland, Dorset on 17.vi.83, and a display of Irish specialities taken in the Burren, Co. Clare during 1983.

PITTIS, Rev S.C.—Two specimens of *Tyta luctuosa* D. & S. taken at Portland, Dorset in July 1983, and a male *Alcis jubata* Thunb. taken at Poole, Dorset. Immigrants were represented by *Trichoplusia ni* Hübn. from Poole on 15.ix.82; *Heliothis armigera* Hübn. from Poole on 22.ix.83; bred and caught series of *Rhodometra sacraria* L.; and a pair of *Agrius convolvuli* L. taken in August and September 1983.

PORTER, Dr B.I.—A male *Ochropleura fennica* from Rugby, 14.viii.1983.

PRATT, C.—Uncommon and immigrant Lepidoptera from Sussex were *Moma alpium* Osbeck, *Mythimna loreyi* Dup., *Diachrysia chryson* Esp. and *Atolmis rubricollist* L.

RADFORD, J.T.—The first recorded specimen from Britain of *Ochropleura leucogaster* Frey. taken at Walberton, West Sussex on 17/18.x.83.

REVELL, R.J.—Interesting records from the Cambridge area during 1983 were *Rhodometra sacraria* L., *Xanthia ocellaris* Borkh., and *Cryphia muralis impar* Warren.

SIMSON, Brig. E.C.L.—A display of the fourteen species of macrolepidoptera, all of which have apterous females.

SKINNER, B.—A mixed gynandromorph *Angerona prunaria* L. from Ham Street, Kent on 3.vii.83; a halved gynandromorph *Agrotis puta puta* Hübn. from Addington, Surrey on 21.vii.83; an extreme aberration of *Arctia caja* L. from Addington on 17.vii.83. L. having the forewings with reduced brown markings hindwings without the blue-black spots and the abdomen without the black bars; a dark suffused example of *Phlogophora meticulosa* L. from Addington on 16.v.83 and almost identical to the specimen exhibited by R.M. Craske; a male *Nola aerugula* Hübn from Aldeburgh, Suffolk on 18.viii.83 and a female *Acherontia atropos* L. from Swanage, Dorset on 30.ix.83.

SOFTLY, R.—A comparison of actinic light trap catches of selected species apparently showing different flight level habits.

SOKOLOFF, P.A.—A small series of aberrant *Caradrina clavipalpis* Scop. from Orpington, Kent, and specimens of *Perizoma taeniata* Steph. taken in Merionethshire in August 1982.

STERLING, M.J.—Examples of *Eupithecia distinctaria constrictata* Guen. and *Agrotis cinerea* D. & S. from Dovedale, Staffordshire; and bred melanic and typical examples of *Apatele menyanthidis* Esp. from Beeley Moor, Derbyshire.

STERLING, P.H.—The fifth recorded specimen of *Cryphia raptricula* Hübn. taken at Dungeness, Kent on 19/20.vi.83; one *Rhodometra sacraria* L. ab. *sanguinaria* Esp. from Winchester, Hampshire on 12/13.ix.83; and two *Parascotia fuliginaria* L. from Ham Street, Kent on 15/16.vii.82.

TREMBATH, D.A.—Moths taken at Dorking, Surrey included a short series of *Rhodometra sacraria* L. taken between the 25—30.ix.83.

TREMEWAN, W.G.—An *Agrius convolvuli* L. taken at Blackwater, Cornwall on 22.viii.83.

TWEEDIE, M.W.F.—Suspected immigrant species taken at Playden, Sussex during 1983 were single examples of *Eurois occulta* L. and *Pelosia muscerda* Hufn.; and a male *Hypena obsitalis* Hübn. captured in a garage on 6th March. Colour photographs of seven British moths.

WILD, E.H.—Species of interest taken at m.v. light at Highcliffe, Dorset were *Diachrysia orichalcea* F. on 27.viii.83; *Agrotis trux lunigera* Steph. in 1983; and *Euphyia biangulata* Haw. in 1983.

WINTER, P.Q.—Macrolepidoptera taken in the Scarborough District during 1983 included *Eupithecia dodoneata* Guen. taken as pupae in birds' nests from a large hawthorn hedge on 9th January; *Panemeria tenebrata* Scop. in late May; *Rhyacia simulans* Hufn. on 3rd August; *Eupithecia linariata* D. & S. on 7th August; and two *Rhodometra sacraria* L. flushed from stubble on 28th September. On behalf of A.S. Ezard a specimen of *Abraxas grossulariata* L. ab. *varleyata* Porritt taken at m.v. light at Rudston, Yorkshire on 12.viii.83.

MICROLEPIDOPTERA

AGASSIZ, Rev. D.J.L.—*Leioptilus carphodactyla* Hbn., *Caryocolum proximum* Haw., *Crambus pascuella* L. (tending to melanism), *Epiphyas postvittana* Walk.; all from Grays, Essex. *Coleophora linosyridella*, Mucking, Essex. *Scythris grandipennis* Haw., bred from *Ulex gallii, Cosmopterix orichalcea* Stt.; both from Pembrokeshire. *Agriphila tristella* D. & S., Orkney. *Synclita obliteralis* Walk., Enfield, Middx., in nurseries. *Aethes rutilana* Hübn., *Swammerdamia compunctella* H.-S.; both bred, Beinn Eighe, W. Ross.

BEAUMONT, H.E.—New records for S. Yorkshire, Lincolnshire and Herefordshire. *Eriocrania sparrmannella* (Bosc.) near Alford, Lincs. (VC 54) First Lincs. record. *Niditinea piercella* (Bent.) West Melton, S. Yorks., 3.vi.82. First Yorks (VC 63) record. Previously unrecorded north of Warwicks. *Phyllonorycter tenerella* (Joann.) near West Melton, S. Yorks. (VC 63) 15.vi.83. First Yorks. record. *Parornix finitimella* (Zell.) Woodthorpe, Lincs. (VC 54). First Lincs. record. *Ocnerostoma friesei* Svens. near Alford, Lincs. (VC 54). First Lincs. record. Beaten from pine, 8.v.83. *Zelleria hepariella* Stt. near Alford, Lincs. (VC 54), 9.vi.83. First Lincs. record. *Monochroa lucidella* (Steph.) West Melton, S. Yorks. (VC 63), 13.vii.83. First VC 63 record. *Rhynchopacha mouffetella* (L.) West Melton, S. Yorks. (VC 63), there are few county records and only one other in the past seventy years. *Teleiodes alburnella* (Zell.) Queenswood, Hereford (VC 36), 3.viii.83. Second Herefordshire record. *Synocpacma sangiella* (Stt.) reared from spinning on *Lotus corniculatus* at Sprotbrough, S. Yorks. (VC 63). *Stathmopoda pedella* (L.) Denaby Ings, S. Yorks. (VC 63), 17.vii.83. First Yorkshire record. Possibly the first record north of Norfolk. *Lozotaeniodes formosanus* (Geyer) Wormelow, Hereford (VC 36), 6.viii.83. Three previous county records. *Clavigesta purdeyi* (Durr.) West Melton, S. Yorks. (VC 63), 14/15.viii.83. First recorded in Yorkshire in 1979, there have now been several records from the south of VC 63. *Epinotia pygmaeana* (Hübn.) near Alford, Lincs. (VC 54). Several disturbed from spruce, 8.v.83. First Lincs. record. *Agriphila latistria* (Haw.) West Melton, S. Yorks. (VC 63), recorded commonly at m.v. light in August '83. First recorded in the county in 1976 and only occasional records thereafter. *Leioptilus lienigianus* (Zell.) Denaby Ings, S. Yorks. (VC 63), 17.ix.83, a late date (text books give July/early Aug.). First VC 63 and second county record.

BLAND, Dr K.P.—(1) Second records for Scotland. *Phyllonorycter trifasciella* Haw., previously only from VC 92, now reared from *Lonicera* from: Boltonmuir Wood (NT5168), E. Lothian, VC 82; Arniston (NT3360), Midlothian, VC 83. *P. quinqueguttella* Stt., previously only from VC 96, now reared from *Salix repens* from: Toraston, Isle of Coll, Mid Ebudes (VC 103), collected 2.viii.83, emerged 15.viii.83.

Coleophora lixella Zeller, previously only from VC 91, now found at Pettycur (NT2686), Fife, VC 85 on thyme (1.iv.83) and then on grass (1.v.83). (2) Scarce Scottish species. *Strophedra nitidana* F., previously recorded from VC 77, 81 and 86; first record for 50 years: Inchcailloch, Loch Lomond (VC 86), 26.vi.83. *Diplodoma herminata* Geoff., previously recorded from Perthshire and Sutherland, now found in S. Scotland at Aiky Wood, Berwicks. (NT7961), VC 81 on 12.iv.83. *Caryocolum vicinella* Douglas, previously recorded from VC 91 & 106, now reared from *Silene maritima* from St. Abbs, Berwickshire (VC 81); collected 12.iv.83, emerged 2.vii.83. *Lobesia reliquana* Hübn., a scarce species in the north of Britian; this specimen from Ross Point, Loch Lomond, 28/29.vi.1983 (at light). (3) New larval substrates. *Monopis weaverella* Scott, reared from fox faeces collected on Flanders Moss, Perthshire, May, 1981. *M. rusticella* Hübn., reared frcm eagle pellets collected in Dubh Loch area, Wester Ross, February 1983. (4) Five species of *Nematopogon* (Incurvariidae) including: *N. variella* F., Rannoch, 19.vi.1977, recently recognised as British. *N. pilella* D. & S., Burnley, Lancs., only confirmed in Britain in from Lancs. & Mid-Ebudes. *N. panzerella* F., not yet discovered in Britain but probably here.

Bland, Dr K.P. on behalf of I.C. Christie, Garlocharn, Dumbartonshire—(1) First Confirmed Scottish Record. *Nematopogon pilella* D. & S., Toraston, Isle of Coll, Mid-Ebudes (VC 103), 27.vi.1983, taken by I.C. Christie. (2) Second Scottish Record. *Trifurcula griseella* Wolff, previously known from Fife, now taken near Ben Hogt, Isle of Coll, Mid-Ebudes (VC 103), 2.vii.1983 by I.C. Christie.

Chalmers-Hunt, J.M. A remarkable melanic specimen of the local sand dune pyrale, *Melissoblaptes zelleri* Joannis, taken by the exhibitor, Sandwich Bay, Kent, 30.vii.1983.

Chipperfield, H.E.—*Schoenobius gigantella* D. & S., 10.vii.83, *Eurrhypara perlucidalis* Hübn., 9.vii.83, *Evergestis extimalis* Scop., 16.viii.69, *Gymnancyla canella* D. & S., 28.vii.83, *Catoptria falsella* D. & S., 4.vii.83, *Batia lambdella* Don., 18.vii.83, *B. lunaris* Haw., 31.vii.83, *Scrobipalpa instabilella* Douglas, bred 18.vii.83; all from Walberswick, Suffolk. *Platytes alpinella* Hübn., Dunwich Forest, Suffolk, about a mile from the beach, 29.vii.83. *Ancylis siculana* Hübn., Wicken Fen, 5.vii.83.

Christie, I.C.—see under Dr K.P. Bland.

Corley, M.F.V.—*Metzneria aprilella* H.-S., Dry Sandford, Abingdon, Oxon., 25.vi.83. *Pammene trauniana* D. & S., 19.v.80, *Yponomeuta rorrella* Hbn., 25.vii.82, *Pyralis lienigialis* Zell., 9.vii.82; these last three species from Faringdon, Oxon.

Emmet, Lt. Col. A.M.—(1) Distribution maps of 13 species of microlepidoptera added to the county list since the publication of *The smaller moths of Essex* in 1981. The maps were supported whenever possible by specimens from the county; where specimens from elsewhere were used, the name of the species is preceded by an asterisk and the county is give after the name.

Lampronia fuscatella Tengst., **Nemapogon personella* P. & M. (Middlesex) **Tinea columbariella* Wocke (Herts.), *Parectopa ononidis* Zell. *Coleophora frischella* L., **Metneria aestivella* Zell. (Wilts.), *Monochroa elongella* (Hein.) (no specimen), *Oegoconia caradjai* Pop.-G. & Cap., *Syncopacma larseniella* Gozm., *Cydia pallifrontana* (Lien. & Zell.) **Microstega hyalinalis* Hübn. (Kent), **Leioptilus carphodactyla* Hübn. (Kent).

(2) Species new to VC 19 (North Essex). *Opostega crepusculella* (Zell.) Great Bendysh Wood, 8.vii.1983. *Eurrhypara perlucidalis* (Hübn.) Bocking, 14.vii.1983.

(3) Species seldom recorded in VC 19. *Coleophora clypeiferella* Hofm. Saffron Walden, one 28.vii.1983. *Ptycholomoides aeriferanus* (H.-S.) Saffron Walden, one 12.vii.1983. *Apotomis lineana* (D. & S.) Saffron Walden, one 28.vii.1983. *Pammene aurantiana* Stdgr. Saffron Walden, several 14–26.vii.1983.

(4) Species seldom recorded in VC 18. *Glyphipteryx linneella* Cl. Wanstead, two 6.vii.1983. *Eucosma pupillana* Cl. Mucking, two 17.vii.1983.

(5) Life histories. *Etainia sphendamni* Hering Chigborough Lakes Nature Reserve, Maldon, one reared from the overwintering generation of larvae. These feed in the developing buds, moving externally from bud to bud. Tenanted buds show little sign of occupation and those that have been vacated soon drop off. This explains why the life history of this generation was hitherto unknown. *Argyresthia dilectella* Zell. Reared from *Chamaecyparis*, a hitherto unrecorded foodplant.

(6) Species from Devon. *Epinotia demarniana* F. v. R. Woodbury, one 17.vi.1983; new to Devon. *Cydia cosmophorana* Treits. Woodbury, one 17.vi.1983; new to Devon. *Parocystola acroxantha* Meyr. Shaldon, two 26.ix.1983.

(7) Species from Pembrokeshire. *Cochylis pallidana* (Zell.) Newport, two 24.vi.1983. *Anania funebris* Ström Maiden Castle, one 22.vi.1983. *Eurrhypara terrealis* Treits. Newport, one 24.vi.1983.

FAIRCLOUGH, R. & A.J. The following all bred or caught in 1983. *Lampronia flavimitrella* Hbn., Kent, 29.v; *Infurcitinea argentimaculella* Stt., Tunbridge Wells, bred; *Phyllonorycter roboris* Z., Surrey bred (? new county record); *P. saportella* Dup., Norfolk, bred; *Coleophora vitisella* Gregs., Aviemore, bred, *C. orbitella* Z., Ashdown Forest, Sussex, bred *Betula; C. ochrea* Haw., Kent, bred; *C. currucipennella* Zell., Kent, vii; *C. machinella* Brad., Surrey, bred; *C. ramosella* Zell., Kent, bred; *C. suaedivora* Meyr., Essex, bred; *Coleophora* sp. (awaiting identification), Kent (see N.F. Heal's exhibit); *Bisigna procerella* D. & S., Kent, vii; *Phalonidia luridana* Gregs., at m.v., Winchester. Also, two new forms of *Acleris cristana* D. & S. (1) a number of examples of a melanic variety of f. *subpurdeyana* Manley, bred from a Sussex/Essex cross; (2) a single specimen of f. *cristalana* Donovan, but with the red streak and buttons of f. *desfontainana* F., taken Huntingdon (VC 31), 13.viii.

FOSTER, A.P. *Maruca testulalis* Gey., a single specimen taken at light, Mawnan Smith, Cornwall, 16.viii.1983, possibly the third British example. *Scythris sinensis* Feld. a Rogen., det. Dr K. Sattler, one of two examples taken in a shopping store in Margate, Kent, v.1980.

HALL, N.M. (1) From Portland, Dorset: *Uresiphita limbalis* D. & S., *Sitochroa palealis* D. & S., *Ephiphyas postvittana* Walk. (2) The total yield of *Acleris hastiana* L. bred from *Salix repens* spinnings collected in Castle Gregory, Co. Kerry.

HEAL, N.F. *Coleophora ochrea* Haw., a rediscovered species from two new Kentish localities, Gillingham, bred 22.vii/11.viii.83 ex larvae 10/11.vi.83, Stockbury, bred 28.vii.83 ex larvae 13.vi.83. *Coleophora* sp., previously throught to be *C. suaedivora* Meyr. but now appears possibly to be a new species, Harty, Kent, bred 24.vii/20.viii.83, ex larvae 6.x.82, on *Suaeda maritima;* Peldon, Essex, bred 25.vii/31.vii.83, ex larvae 14.x.82, on *S. maritima. C. suaedivora* Meyr., Peldon, Essex, larval cases 14.x.82 not bred (Note: Identification of this species has lately been confirmed by breeding, see R. Fairclough's exhibit). *C. palliatella* Zinck., Dorking, Surrey, bred 1.vii/6.vii.83 ex fixed cases 13.vi.83; Orlestone, Kent, 5.vii.83. *Anania funebris* Ström, Whitstable, Kent, bred 26.vi/4.vii.83 ex larvae 11.ix.82 on *Solidago*. *Eucosma pupillana* Clerck, Dartford, Kent, 3.viii.83. *Bisigna procerella* D. & S., Orlestone, Kent, 12/18.vii.83; Bethersden, Kent, 11.vii.83. *Coleophora conspicuella* Zell., Whitstable, Kent, 13.vii.83, at m.v. *C. serpylletorum* M. Hering, Sandwich, Kent, 3.viii.82 (Note: first Kent record; only known elsewhere from Wales and SW England). *C. niveicostella* Zell., Folkestone Warren, Kent, 17.vi.83. *Esperia oliviella* F., Whitstable, Kent, 19.vi.83. *Phalonidia luridana* Gregs., Winchester, Hants, m.v., 23.vii.83. *Digitivalva perlepidella* Stt., Sittingbourne, Kent, bred 31.v/

6.vi.83 ex larvae 1.v.83. *Ethmia dodecea* Haw., Mickleham, Surrey, bred 10/19.vi.83 ex larvae 28.viii.82. *Apotomis sauciana* Fröl., Friday Street, Surrey, at m.v. 15.vii.83; Oldbury Hill, Kent, bred 10/18.vii.83 ex larvae 3.vi.83. *Coleophora currucipennella* Zell., Orlestone, Kent, m.v. 12/18.vii.83; Bethersden, Kent, m.v. 11.vii.83. *Eurrhypara perlucidalis* Hübn., Sittingbourne, Kent, m.v. 4.vii.83. *Paramesia gnomana* Clerck, East Sussex, m.v. 26.vii.83. *Lampronia flavimitrella* Hbn., Bethersden, Kent, 25.v/2.vi.83. *Cydia pallifrontana* Lienig & Zell., Kent, bred 23.vi.83 ex larvae 16.viii.82 from a new Kent locality which has since disappeared beneath the bulldozers. *Eriopsela quadrana* Hübn., Whitstable, Kent, 6.v.83 *Caryocolum blandulella* Tutt, Sandwich, Kent, bred 6.vii.83 ex larvae on *Cerastium semidecandrum* 31.v.83. *Parectopa ononidis* Zell., Sittingbourne, Kent, 27.vi.83; Stockbury, Kent, 4/14.vi.83 ex larvae 29.viii/5.ix.82 on *Trifolium pratense*; Folkestone Warren, Kent, 17.vi.83. *Commophila aeneana* Hübn., 4/14.vi.83.

HEATH, J. *Coleophora ochrea* Haw. From four larval cases taken on *Helianthemum* on the limestone hillock at La Place, Valais, Switzerland, in the Rhone Valley, 11.vi.83. One female emerged 19.ix.83, surely an exceptionally late date!

HECKFORD, R.J. *Lampronia morosa* Zell., Thorne Moor near Stibb Cross, 16.vi.83 (new to VC4). *Oinophila v-flava* Haw., Painton Zoo, 19.vii.83, new to Devon. *Phyllonorycter staintoniella* Stt., Near St. Agnes, Cornwall, 2–8.viii.83 ex larvae on *Genista pilosa*; discovered as new to Britain by the exhibitor. *Glyphipterix minorella* Snellen, (*equitella* auct.) Torquay, Devon, 3.vii.83. *Coleophora tamesis* Waters, Plymouth, Devon, cases and moths ex larvae *Juncus articulatus*, 26/27.vi.83; new to Devon. *C. taeniipennella* H.-S., together with cases, Seaton, Devon, ex larvae *J. articulatus* 22.vi.83; for comparison with *C. tamesis*. *Elachista gangabella* Zell., Elberry Cove near Brixham, Devon, ex l. *Brachypodium sylvaticum* 1–4.vi.83; new to Devon. *Schiffermuelleria subaquilea* Stt., Heddon's Mouth, Devon, 13.vi.83; not previously found south of Hereford. *Agonopterix scopariella* Hein., Haldon Hill, Devon ex larva. *Sarothamnus* 1.viii.83; new to Devon. *Monochroa lucidella* Steph., Penhape, Perranporth, Cornwall, 23.vii.83; new to Cornwall. *Sorhagenia janiszewskae* Riedl, Woodbury Common, Devon, ex larva *Frangula alnus* 12/13.vii.83. *Epiblema cnicicolana* Zell., Seaton, Devon, 20.vi.83. *Cydia gemmiferana* Treits. Branscombe, Devon, 26.vi.83.

KNILL-JONES, Dr R.P. *Monopis rusticella* Hübn., *Kessleria saxifragae* Stt., *Evergestis pallidata* Hufn.; all from Kintyre. *Eurhodope advenella* Zincken, *Phycita roborella* D. & S.; both from Galloway. *Monopis imella* Hbn., Glasgow. *Catoptria pinella* L. ab., Argyll. *Argyresthia curvella* L., white form, Nottingham.

KNILL-JONES, S.A. The following all taken at Freshwater, Isle of Wight. *Agriphila selasella* Hübn., 20.viii.83, *A. tristella* D. & S., *Catoptria falsella* D. & S., 14.viii.83, *Platytes alpinella* Hübn., 16.viii.83, *Catoptria pinella* L., *Ebulea crocealis* Hübn., *Pyrausta cespitalis* D. & S., *Sitochroa palealis* D. & S., 31.i.83, *Eurrhypara coronata* Hufn., *Nomophila noctuella* D. & S. (plentiful in 1983), *Palpita unionalis* Hbn., 22.ix (1), 30.ix.83 (1), *Hypsopygia costalis* F., *Pyla fusca* Haw., *Euzophera pinguis* Haw., 20.viii.83, *Udea elutalis* D. & S., *U. ferrugalis* Hübn., *Emmelina monodactyla* L., *Cydia aurana* F., *Dichrorampha alpinana* Treits., *Rhyacionia pinicolana* Dbldy., *Agapeta hamana* L., *Phalonidia alismana* Rag., *Cacoecimorpha pronubana* Hübn., *Epinotia solandriana* L., *Crocidosema plebejana* Zell.

LANGMAID, Dr J.R. *Lampronia morosa* Zell., Leigh-on-Sea, Essex, two bred from *Rosa*. *Monopis crocicapitella* Clemens, Southsea, Hants, extra-large specimen, wing span 18mm. *Bucculatrix thoracella* Thunb., Ampfield, Hants, three bred from *Tilia cordata*. *Caloptilia falconipennella* Hübn., Matley Bog, Hants, two bred from *Alnus glutinosa*. *Yponomeuta rorrella* Hübn., Peasmarsh, Sussex, one, Emer Bog, Hants, one; new to South Hampshire. *Coleophora hydrolapathella* M. Hering, Catfield, Norfolk, two. *C. tricolor* Wals., Barton Mills, Suffolk, 10.vii.83 at lights. *C. currucipennella* Zell., Ham Street, Kent, 17.vii.83. *Cosmiotes consortella* Stt., Southsea, 13.viii.83; new to Hampshire. *Batia lambdella* Don., Southsea, two bred from dead *Ulex* twigs. *Esperia oliviella* F., Harewood Forest, Hants, one bred from rotten oak. *Oecophora bractella* L., Harewood Forest, Hants, four bred from under dead oak bark and new to Hampshire; Monmouthshire, four bred from under dead conifer bark. *Depressaria* sp. (?*badiella* Hübn.), a large, dark, well-marked specimen with striking orange palpi, Dungeness, 19.vii.83.

PEET, Dr T.N.D. Species taken in Guernsey in 1983. *Uresiphita limbalis* D. & S., new island record; *Palpita unionalis* Hübn. *Agdistis bennetii* Curtis (possible resident or vagrant); *Nothris congressariella* Bruand, bred from *Scrophularia scorodonia, Crocidosema plebejana* Zell., bred from Tree Mallow; the latter two being new breeding records for Guernsey.

PELHAM-CLINTON, E.C. The following collected in 1983. *Coleophora hydrolapathella* M. Hering, Catfield, Norfolk, in light trap; *C. tricolor* Wals., Barton Mills, Suffolk, light trap; *C. saturatella* Stt., Barton Mills, Suffolk, light trap; *C. niveicostella* Zell., Barton Mills, light trap; *C. lassella* Stgr., Axminster, Devon, light trap; *C. therinella* Tengström, Williton, Somerset, light trap; *C. salicorniae* Wocke, Porlock, Somerset, three showing variation from pale ochreous to dark brown; *Amphisbatis incongruella* Stt., Freathy, Cornwall, one bred and the only moth resulting from several larvae collected ix.1982; *Monochroa divisella* Douglas, Catfield, Norfolk, light trap; *Chrysoesthia drurella* F., Lydd, Kent and Leckford, Hants, bred from larvae mining *Chenopodium*, ix.1982; *Psamathocrita argentella* Pierce & Metcalfe, Portsmouth, Hants, active at sunrise amongst *Agropyron* spp.; *Gelechia muscosella* Zell., Dungeness, Kent, at m.v. light; *Scrobipalpa* or *Scrobipalpula* sp., Axmouth, Devon, at m.v. light, a female specimen of distinct appearance which is so far unidentified and which appears by the genitalia to be distinct from other known British species; *Sitochroa palealis* D. & S., Dungeness, Kent, at m.v. light; *Diasemia litterata* Scop., Porlock, Somerset, light trap.

PICKLES, A.J. & C.T. *Stenoptilia saxifragae* Fletcher, Burren, Co. Clare, series bred from larvae collected 1983.

REVELL, R.J. *Eurrhypara perlucidalis* Hübn., Wicken Fen.

ROCHE, J. (1) An exhibit of the less common British Scythrids. (2) A specimen of *Zophodia convolutella* Hübn., from Chestfield, Kent; new to Britain.

SIMPSON, Dr A.N.B. *Griselda myrtillana* Humph. & Wesw., Tregroes, Cardigan, viii.1982; *Trifurcula cryptella* Stt., Windmill Hill, Worcs., vi.1982, ex *Lotus corniculatus*; *Parectopa ononidis* Zell., Worcester City, v.1983, ex *Trifolium pratense*; *Phyllonorycter ulicicolella* Stt., Hartlebury Common, Worcs., vi.1983; *Elachista regificella* Sirc., Eyemore Wood, Worcs., vi.1983, ex larva; *Mompha terminella* H. & W., Trench Wood, Worcs., ix.1982, ex larva; *Metzneria aestivella* Zell., Oxwich Burrows, S. Wales, v.1983; *Monochroa suffusella* Douglas, Grimley, Worcs., vii.1982; *Gelechia rhombella* D. & S., Leicester City, vii.1983; *Recurvaria nanella* D. & S., Crowle, Worcs., v.1983, ex l. on *Pyrus; Parachronistis albiceps* Zell., Wyre Forest, Worcs. vi.1983; *Caryocolum alsinella semidecandrella* Threlfall, Oxwich, S. Wales, v.1983, ex l. *Cerastium semidecandrum*; *Coleophora fuscocuprella* H.-S., Monk Wood, Worcs., x.1982; *C. saturatella* Stt., Hartlebury Common, Worcs., vi.1983; *Epischnia bankesiella* Rich., Horton, Gower, S. Wales, v.1983, reared from *Inula crithmoides*; *Platyptilia ochrodactyla* D. & S., Worcester, vi.1983, reared from *Tanacetum*; *Leioptilus tephradactyla* Hübn., Mwnt, Cardigan, viii.1982, reared from *Solidago; Agdistis staticis* Mill., Pembroke, viii.1983, ex larva.

SMITH, Dr F.H.N. (1) *Phyllonorycter staintoniella* Stt. New to Britain, discovered by R.J. Heckford in Cornwall in 1983, the larvae found mining a leaf of Hairy Greenweed, *Genista pilosa*. Four photographs: two of adult moth alive; one of earliest stage of mine, found by P.N. Siddons, on tip of leaf of *G. pilosa*; one of a leaf containing a pupa, showing effect on the leaf, also found by P.N. Siddons. (2) *Luffia lapidella* Goeze. Larval cases first discovered in 1981 by Mrs. W.G. Bennett at Marazion, Cornwall, subsequently brought to the exhibitor's attention, and in due course producing the first male moths of the species to be positively identified on the British mainland (cf. *Ent. Rec.*, **95**: 53). Case showing *L. lapidella*; four adult males, one female; larval cases and emerged pupal cases of each sex. Also, four photographs: one of adult male moth alive, one of adult female moth alive, one of larva and case, one of set male specimen.

SOKOLOFF, P.A. *Calamotropha paludella* Hübn., Mucking, Essex, 12.viii.83, a form with pure white ground; *Ancylosis oblitella* Zell., Mucking, dark and typical forms; *Dioryctria schuetzeella* Fuchs and *Bisigna procerella* D. & S., Orlestone, Kent, captured specimens; *Micropterix mansuetella* Zell., near Andover, Hants, swept from flowers of *Caltha palustris; Coleophora orbitella* Zell., West Wickham, Kent, bred; *Calybites auroguttella* Steph., Addington, Surrey, bred from *Hypericum*; *Bedelia somnulentella* Zell., Addington, bred from *Calystega*.

STERLING, Col. D.H. (1) Species bred from larvae collected from dead wood in Hampshire in 1983. *Nemapogon cloacella* Haw., *Triaxomera parasitella* Hbn., *Batia lambdella* Don., *Esperia sulphurella* F., *Oecophora bractella* L. and *Blastobasis lignea* Wals. (2) Selection of other species from Hampshire and Isle of Wight bred in 1983.

STERLING, M.J. *Opostega auritella* Hbn., Barton Broad; *Phyllonorycter roboris* Zell., Dovedale, Staffs.; *Phyllocnistis saligna* Zell., Leckford, Hants VC 12, bred from mines on *Salix purpurea*; *Coleophora hydrolapathella* Her., Norfolk; *Schiffermuelleria similella* Hübn, Straun, Perthshire, bred from fungus; *Monochroa conspersella* H.-S., Norfolk; *M.divisella* Douglas, Norfolk; *Phalonidia minimana* Carad., Barton Broad; *Eurrhypara perlucidalis* Hübn, Catfield, Norfolk.

STERLING, P.H.—*Monopis weaverella* Scott, a solution to the 'continuing mystery' of the larval pabulum (c.f. Pelham-Clinton, *Ent. Rec.*, **95**:212)—a dead rabbit picked up in early April 1983 at Dungeness, Kent contained large larvae feeding on the fur and skin and produced several adults by the end of the month. *Platytes cerussella* D. & S., a most unusual bilateral form of this species, taken Dungeness, Kine, 3.vii.1983. *Melissoblaptes zelleri* Joann., specimen taken at the Society's Field Meeting at Orlestone Forest, Kent on the night of 15/16.vii.1983.

UFFEN, R.W.J.—A stem of Great Water Dock bearing three old cases of *Colephora hydrolapathella* Her., from The Mere, Thorpeness, Suffolk. New county record. The previous year's stems were still standing in mid-July after the emergence of moths from the attached cases. Parasites emerged in August from several cases.

WHITEBREAD, S.E.—A selection of Swiss microlepidoptera, mainly Gelechiidae, including three species new to Switzerland. *Caryocolum vicinella* Douglas, Martigny, VS, bred ex *Silene otites*, 1983. *C. leucomelanella* Zell., Martigny, VS, bred from larva *Dianthus carthusianorum*, 1983; possibly the first confirmed Swiss record. *C. rougemonti* Rbl., Zermatt, VS, bred from *Gypsophila repens*, 1980. *Tila capsophila* Chrét., Zermatt, VS, bred from larva *Gypsophila repens*, 1980; identified when preparing for this exhibit; new to Switzerland, previously known only from one locality each in France and Germany. *Klimeschiopsis discontinuella* Rebel, Soglio, GR, 1981; freshly emerged female on lichen covered rock; a pupal case found amongst silken galleries in a grey fleshy lichen in rock crevices indicates this as being the larval substrate. *Syncopacma coronillella* Treits., Leuk, VS, bred from larva 1983 from? *Medicago;* a local central European species. *Xystophora pulveratella* H.-S., La Place, VS 1983. In Switzerland only known from the Valais. *Scrobipalpa artemisiella* Tr., Martigny, VS, reared from larva on *Thymus*, 1983. *S. proclivella* Fuchs, Salquenen, VS reared from *Artemisia absinthium*, 1983. *Lixodessa albifrontella* , Hein., Zermatt, VS, *Astragalus australis*, 1981 & 1982; a very local central European species. *Nothris lemniscella* Zell., Varen, VS, bred ex l *Globularia*, 1983; in Switzerland known from only two localities. *Cosmardia moritzella* Treits. *Versoix,* GE, 1982; few records for Switzerland. *Teleiopsis rosalbella* Fol., Martigny, VS, reared from *Rumex scutatus*, 1983; one of a number of Gelechiidae feeding on this plant. *Sattleria dzieduszyckii* Nov., Zermatt, VS, 1982, male; Moiry, VS, 1983, female. *Eulamprotes libertinella* Zell., Zermatt, VS, male, female, 1980 (Note: the females of these last two alpine galechiids have greatly reduced wings). *Phyllonorycter pastorella* Zell., Sicssach, BL, bred ex mine *Salix babylonica* (Weeping Willow), 1983; new for Switzerland. *Ectoedemia atrifrontella* Stt. (or possibly *longicaudella* Klim.), Erschmatt, VS, female bred ex mine in bark of *Quercus pubescens*, 1983; new for Switzerland; the species has only ever been bred twice.

WILD, E.H. (1) Taken in m.v. trap, 1983, Christchurch, VC 11. *Ethmia bipunctella* F., second VC record; *Oncocera genistella* Dup.; *Apomyelois bistratella neophanes* Durrant, new to VC. (2) *Elachista littoricola* Le Marchand, Keyhaven, Hants, two taken; new to Britain (cf. *Ent. Rec.*, **95**: 65)

WINTER, P.Q. The following from Yorkshire Wolds (VC 61). *Euzophera pinguis* Haw., m.v. light, 28.vii.83; new VC record. *Hypochalcia ahenella* D. & S., m.v. light, 4.vii.83; last Yorkshire records were mid-19th century from Huddersfield (VC 63). *Pterophorus tridactyla* L., flushed from downland, 16.vii.83. *Marasmarcha lunaedactyla* Haw., flushed from downland, 16.vii.83.

FOREIGN MACROLEPIDOPTERA

The 17 exhibits of which notes were provided, rather more than last year, were mainly from the Palaearctic zone, but they included some tropical species.

BRETHERTON, R.F.—North Greece, 1–13.vii.1983. (1). 26 species of Lycaenidae, the more notable being *Tarucus balkanicus* Frr., *Everes decoloratus* Stgr, *Polyommatus eroides* Frv., and a large 'blue', so far unidentified.

(2). 26 other species, including *Kirinia climene* Esp., from a colony found in the north Pindos mountains; *Zerynthia cericyi ferdinandi* Stichel, *Coenonympha leander orientalis* Esp., *Erebia medusa* D & S., *Erebia ligea* L. and *Melanargia russiae* Esp.

BROOME G.,—Some butterflies taken in the Spanish Pyrenees, July 1983.

CHIPPERFIELD, H. E.—Two specimens of *Lythria purpuria* L. from Yugoslavia, donated by Mr. Peter Collins. Only two specimens have been reliably reported in the British Isles, near Perth in 1965, although its western range includes much of France.

CRIBB, P.W.—(1). Two cases showing butterflies taken in North Greece, near the borders of Bulgaria, Yugoslavia and Albania 1st–14th July 1983. Over 100 species were recorded, including *Kirinia climene* Esp. from a small colony found in the Smolikas massif (only once before recorded from Greece, as a singleton). Other species included *Elphinstonia charlonia* Donzel, *Zerinthia cericyi ferdinandi* Stichel, *Polyommatus eroides* Frv. and examples of moths, beetles and *Ascalaphus* species (Neuroptera).

(2). A case of species bred in captivity in 1983 included an unusual form of female *Colias croceus* Geoff., a series of *Archon apollinus* Herbst from Turkey, *Saturnia pyri*, and *S. pavonia* from Var, France, and *Acherontia atropos* L., F3 generation of Canary Islands origin.

Derry, N.J. and A.C.—(1). Canary Islands: 22 species of butterflies collected on Tenerife and Gomera, 19th July to 2nd August 1978. For details see *Ent. Rec. J. Var.* **91**: 275–278.

(2). From Corfu, 45 species of butterflies taken 16–29.viii.1976. These include five species not previously recorded from this island: *Artogeia manii* Mayer above Nissaki, 17.viii.76; *Quercusia quercus* L. Mt. Pantokrator, 18.viii.76; *Everes argiades* Pallas Sidari, 24.vii.76; *Hyponephele lupina* Costa Mt. Pantokrator, 18 & 21.viii.76. A specimen of *Erynnis marloyi* Bdv. from the summit of Mt. Pantokrator, 18.viii, is only the second recorded, and is the first of the summer generation. Identifications have been cross-checked, by dissection where necessary, with the help of I.G.F. McLean. The specific identity of a single female of the genus *Pyrgus*, Mt. Pantokrator, 21.viii.76, cannot be determined with certainty.

Hall, N.M.—A selection of moths collected in Andorra, June–July 1983.

Harman, T.W.—Five species of Sphingidae, of the genus *Marumba*, from Brunei, North Borneo.

Middleton, A.P.—A sample of 51 specimens of European butterflies taken in 1982 and 1983, mainly in the Italian Dolomites and the French and Swiss Alps.

Revell, R.J.—From Yugoslavia 1983, the moths *Panthea coenobita* Esp., *Calliergis ramosa* Esp., *Hada nana* Hufn., *Hadena caesia* D. & S., *Hypena crassalis* F., *Odonestis pruni* L., *Peribatodes secundaria* D. & S., *Amata phegea* L., and an unidentified geometrid, all from Bohinj, Slovenia; *Euphyia scriptulata* Hübn. from Mt. Ucka, Istria.

Robinson, Gaden, Tuck, K., Brendall, M., (British Museum (Nat. Hist.) expedition to Nepal, 1983)—Two drawers of selected specimens from above 10,000 ft., where the Lepidoptera become distinctly Palaearctic in character. Many specimens new to the Museum collections or even to science: of particular interest *Gaurena albifasciata nepalensis, G. forsteri, Xestia cervina, Diarsia tenuis,* previously unrepresented or only by single specimens in the BM(NH); also, among the microlepidoptera, long series of *Leontochroma* species.

Samuels, K.D.Z.—A representative selection of the 136 species of butterflies now known in Andorra: 265 specimens of 103 species, taken in seven weeks in 1981 and 1983. Notable species shown included *Carcharodus lavatherae* Esp., *Eumedonia eumedon* Esp., *Pseudaricia nicias* Meigen, *Agriades glandon* de Prunner, *Polyommatus eros* Ochs., *Erebia neoridas* Bdv. (previously reported only in 1926). Most of these species were in newly found colonies of which localities were given.

Torstenius Stig, and Ashby B.C.—a sample case of butterflies and Geometridae from Scandinavia. This included some additions to the Society's permanent collection of Scandinavian Lepidoptera, and a short series of the geometrid *Baptria tibiale* Esp. ssp. *fennica* Lank. from the central Swedish county of Jämtland. This mainly Asiatic species is scarce and local in Europe.

Trembath, D.A.—butterflies collected in the spring of 1983 in the Algarve, Portugal, including *Iphiclides podalirius feisthamelii* Dup., *Zerynthia rumina* L., *Euchloe ausonia* Hübn., *E. belemia* Esp., *Colias croceus* f. *helice* Hübn., *Gonepteryx cleopatra* L., *Lycaena phlaeas* L., *Celastrina argiolus* L., *Eurodryas aurinia beckeri* H.-S., *Melanargia ines* Hoffsg., *Maniola jurtina hispulla* Esp., *Pararge aegeria* L., *Lasiommata megera* L.

Tremewan, W.G.—Zygaenidae from Morocco, High and Middle Atlas mountains.

Z. algira telealgira Dujardin, *Z. algira selenion* Dujardin, *Z. alluadi dedita* Wiegel, *Z. youngi youngi* Rothschild, *Z. maroccana gundafica* Reiss & Tremewan, *Z. trifolii mideltica tizeragis* Wiegel, *Z. aurata blachieri* Rothschild. The specimens of *Z. maroccana gundafica* were re-discovered in the type locality near Kasbah Goundafa at 1500 m. in the High Atlas, where it has not been found since the original type-series was caught in 1914.

WALKER, D.H.—Eastern Arabia. Examples and account of *Melitaea persea sargon* Hemming (Persian Fritillary), from Tuwayq Hills, Central Saudi Arabia: flight time February to April, larval food *Teucrium oliverianum*. Only five specimens are known to exist outside the collections of D.H. Walker and A.R. Pittaway. For further details see forthcoming publication on 'Insects of Central and Eastern Arabia'.

COLEOPTERA

APPLETON, D.—Two melyrids (Coleoptera) from South Hampshire. *Sphinginus lobatus* Olivier new to Britain 15.viii.82 by beating oak at Titchfield Common. I am grateful to Mr A.A. Allen and Mr P.Hammond for naming this beetle. It is widespread in western Europe. *Axinotarsus marginalis* (Lap.) This species was added to the British list from examples collected at Botley Wood in the 1960s. This locality is only a couple of miles from Titchfield Common where the *Sphinginus* was found. *A. marginalis* is now to be found in many Hampshire sites. The example exhibited is from Emer N.R. by sweeping 9.vii.83.

DARBY, M.—Coleopterological literature. (1) T. Martyn, *The English Entomologist*, 1792, the first volume entirely on Coleoptera. (2) A set of all the separately published catalogues of the British Coleoptera from G. R. Waterhouse (1861) to R.D. Pope's revision of 'Kloet and Hincks' (1977). (3) Several early exchange lists. (4) *The Coleopterist's Newsletter*, to solicit subscriptions. (5) The biographical dictionary of British coleopterists being serialised in the newsletter.

FOSTER, A.P.—A selection of rare and local species taken in 1983 on the Somerset Levels during an NCC survey: *Oodes helopioides* (Fab.), Catcott Heath, 18.v.1983; *Ocacantha melanura*, Catcott Heath, 18.v.1983, *Haliplus mucronatus* Steph., Westhay Moor, 21.v.83; *Laccornis oblongus (Steph.)*, Catcott Heath, 24.v.83; *Hydrochara caraboides* (L.), Tadham Moor, 21.iv.83; *Cantharis fusca* L., Catcott Heath, 24.v.1983; *Donacia crassipes* F., Muchelney, 14.vi.83; *Donacia dentata* Hoppe, Wet Moor, 14.vii.83; *Bagous nodulosus* Gyll., West Moor, 20.vi.83.

GARLAND, S.P.—six species collected from Chatsworth Park, Derbyshire—a rich site for lignicolous Coleoptera. *Stenostola ferrea* (Shrank) 3.vii.1983; *Dorcatoma chrysomelina* Sturm and *Anitys rubens* (Hoffm.) bred from red-rotted oak wood, collected June 1982, hatched spring 1983. *Rhizophagus ferrugineus* (Payk.) 7.ix.1982 from *Polyporus sulphureus*; *Leiopus nebulosus* (L.) 16.vii.1983; *Ctesias serra* (F.) 16.vii.1983, larvae abundant.

HODGE, P.J.—A selection of recently taken British Coleoptera including the following species. *Agonum sexpunctatus* (L.) new to West Sussex; *Quedius maurus* (Sahl.); *Dryops ernesti* des Gosis; *Hadrobregmus denticollis* (Crev.); *Apion intermedium* new to E. & W. Sussex; *Amara praetermissa* (Sahl.); *Ceutorhynchus pilosellus* Gyll.; *Gabrius keysianus* Sharp; *Tychius quinquepunctatus* (L.) from S. Wales; *Pseudocistela ceramboides* (L.) bred from larvae taken in Herefordshire; *Tachys scutellaris* Steph; *Philonthus punctus* (Grav.); *Malachius vulneratus* Abeille from Essex (perhaps a northerly extension to the range of this species in Britain); *Gabrius velox* Sharp and *G. subnigritulus* (Reitter) from the New Forest;

Stenolophus teutonus (Shrank) and *Apion gyllenhali* Kirby, although not nationally rare are noteworthy in Sussex.

Jones, R.—*Panagaeus bipustulatus* (F.) from flood refuse, Camber, E. Sussex, 26.viii.81 and from grass tussocks, Arundel Park, W. Sussex, 2.iii.81; *Harpalus azureus* (F.) crawling on sand, Newhaven Undercliff, 8.viii.78; *Leiodes cinnamomea* (Panzer) swept under trees, Friston, nr. Eastbourne, 27.iii.76; *Hydnobius perrisi* Fairmaire swept rushes, Rye gravel pits, E. Sussex, 30.vi.76; *Xestobium rufovillosum* (Deg.) flying, Lewes, 21.v.80; *Trigonogenius globulus* Sol. crawling on an office wall, Holborn, London WC1 (usually associated with stored food); *Strangalia aurulenta* (F.) Rewell Wood, nr. Arundel, 22.vii.79 (quite common in this part of W. Sussex); *Platycis minutus* (F.) Arundel Park, 1.ix.79, very common sitting on small logs at dusk; *Pycnomerus fuliginosus* Erich. in wooden palings, Kingspark Wood, 4.viii.79 (recently established in this country: now has a foothold in Sussex); *Oryzaephilus surinamensis* (L.) in a sugar bowl in a hotel in London WC1; *Dasytes niger* (L.) swept under trees, Ambersham Common, W. Sussex, 4.viii.79; *Malachius vulneratus* Abeille and *Dolichosoma lineare* (Rossi) swept from grasses, Faversham saltmarshes, 1.vii.78; *Orsodacne lineola* (Panzer) on hawthorn blossom, Ashington, W. Sussex, 25.v.80; *Donacia sparganii* Ahrens on water-lily pads, Wicken Fen, 13.viii.83; *Orthocerus clavicornis* (L.) under lichen-covered stones on sandy bank, Camber, E. Sussex, 26.viii.81; *Helops caeruleus* (L.) in rotten willow log, West Ichenor, Chichester Harbour, 11.ii.78; *Anthicus bimaculatus* (Ill.) running on sandy bank, Rye gravel pit, 17.v.78; *Mordellistena parvula* (Gyll.) swept, Mildenhall, Suffolk, 14.viii.83; *Hypera dauci* (Oliv.) under *Erodium cicutarium*, Mildenhall, 14.viii.83; *Dorytomus validirostris* (Gyll.) under poplar bark, Hampstead Heath, 24.ix.83; *Baris lepidii* Germar under *Reseda lutea*, Mildenhall, 14.viii.83 and on leaf of *Mercurialis perennis*, Southwater, W. Sussex, 17.v.80; *Sibinia primitus* (Herbst) swept Bognor Common, W. Sussex, 27.viii.79.

Knill-Jones, S.A.—Coleoptera all taken in a small area of Spinfish, Freshwater, I.O.W. and at the exhibitor's address, an area of half a mile by 300 yards. *Oedemera nobilis* (Sp.), *Clytus arietis* (L.), *Pyrochroa coccinea* L., *Staphylinus olens* Mu.: *Dorcus parallelipipedus* L., *Chrysolina staphylaea* (L.), *Arhopalus tristis* (F.) 17.viii.83 (at m.v. light trap) and *Chrysolina banksi* (F.).

Owen, Prof. J.A.—Beetles from Scotland, with photographs of specimens and habitats, including specimens of: *Harminus undulatus* (Deg.) Glen Lyon, Perthshire, May 1983 and Rannoch, Perthshire, July 1983; *Endectus whitei* Sharp, in moss at 900m, Sgurr Mor, Wester Ross, July 1982; *Thalassophilus longicornis* (Sturm), in riverside shingle, Glen Fruin, Strathclyde, July 1983; *Ptenidium brenskei* Flack, under a small stone at the edge of a stream, near Hawick, Roxburghshire, July 1983; *Gabrius scoticus* Joy & Tomlin, in moss at 700m, Speyside, Invernesshire, September 1983; *Atheta procera* (Kraatz), from carrion, Loch Morlich, Invernesshire, July 1976; *Neohilara subterranea* (M. & R.), in pitfall trap in pine wood, Loch Garten, Invernesshire, September 1983 and *Coeliodes nigritarsis* Hart., beaten from birch, Loch Garten, Invernesshire, July 1983.

DIPTERA

Appleton, D.J.—Ten species of Diptera, chiefly Syrphidae, from South Hants in 1983, including *Asilus crabroniformis* (L.) (Asilidae) about horse dung, Portsdown, 14.viii.83; *Eriozona syrphoides* (Fallén) (Syrphidae), new to Hampshire from Botley Wood, 18.vi.83, at *Oenanthe* flowers.

CHANDLER, P.J.—The single female on which *Pseudopomyza atrimana* (Meigen) (Pseudopomyzidae) was added to the British list (1983, *Proc. Trans. Br. ent. nat. Hist. Soc.* **16**: 87–91).

GODFRAY, H.C.J.—An exhibit on the parasite complex of leaf mining Diptera also included examples of *Chromatomyia (Phytomyza* partim) *spinaciae* (Hendel), mining *Cirsium vulgare* and an undescribed related species mining *Chrysanthemum leucanthemum*, running to *spinaciae* in keys but distinguished by genitalia and a yellow face.

JONES, R.A.—The elusive conopid *Leopoldius signatus* (Wiedeman in Meigen), from *Hedera* blossom, Street churchyard, East Sussex, 26.ix.83.

KNILL-JONES, S.A.—A selection of Diptera from near Freshwater, Isle of Wight, included *Chorisops nagatomii* Rozkošný (Stratiomyiidae), 11.ix.83 and *Zophomyia temula* (Scopoli) (Tachinidae), 6.vii.83, both local southern species; an older specimen of *Asilus crabroniformis* from the same area, vi.1965.

WALKER, D.H.—A very striking newly discovered mydaid fly, *Rhopalia* species, the holotype from the Tuwayq Hills of Saudi Arabia, 2.v.1980.

HEMIPTERA (HETEROPTERA)

APPLETON, D.—Some Heteroptera collected in 1982–83 in Hampshire and the Isle of Wight. Specimens from the latter area taken in late Sept. 1983 were *Sehirus dubius* Scop., at roots of Bastard Toadflax; *Berytinus hirticornis* Brulle, in grass roots; *Heterogaster artemisiae* Sch., *Peritrechus gracilicornis* Puton and *Drymus latus* Douglas and Scott, all from chalky soil; *Saldula arenicola* Schultz, on damp sandy cliff. From Hants were *Spathocera dahlmanii* Sch., 12.viii.82 at roots of sorrel, Browndown; *Ceraleptus lividus* Stein, 2.vii.83, sand dunes, Hayling Island; the rare winged form of the common *Himacerus mirmicoides* Costa, 29.vii.83 swept at Browndown; *Pachybrachius fracticollis* Sch., 29.i.83 in sphagnum, Emer N.R.; *P. luridus* Hahn, 24.viii.83, swept in bog, New Forest; *Nysius helveticus* H.-S., 23.vii.83, swept from heathland, New Forest; *Lasiosomus enervis* H.-S., 6.iii.83, in moss, Portsdown; *Lamproplax picea* Flor, 28.viii.83 in sphagnum, Shedfield Common; *Drymus pumilio* Puton, 16.ix.82, in moss, Oxenbourne N.R.; *Capsodes sulcatus* Fieber, 29.vi.83, swept at Browndown; *Tuponia carayoni*, 16.vii.83 on tamarisk, Hayling Island.

HODGE, P.J.—Some recently taken uncommon or local Heteroptera. *Pachybrachius fracticollis* Sch. from Moccas Park, Herefordshire; *Berytinus hirticornis* Brullé—a species originally discovered in S. Devon, but now found in most coastal counties from Cornwall to Essex; *Catoplatus fabricii* Stål, a very local lace bug taken at Uckfield, Sussex; *Brachysteles parvicornis* Costa, new to Sussex, swept in an old clay pit at Uckfield; a variety of *Halticus luteicollis* Panzer from Barton Mills, Suffolk.

JONES R.—Some Heteroptera taken mainly in southern England in recent years. *Thyreocoris scarabaeoides* L., in grass tussock 4.iii.77 S. Heighton, E. Sussex; *Odontoscelis fuliginosa* L., under herbage near sea wall, 31.vii.77, Deal Sandhills, Kent; *Sciocoris curtisans* F. swept, 8.ix.76, Deal Sandhills; *Rhacognathus punctatus* L., swept from heather, 4.viii.79, Ambersham Common, W. Sussex; *Alydus calcaratus* L., netted, 14.viii.83, Mildenhall, Suffolk; *Ischnodemus sabuleti* Fallén, a formerly rare species now locally common, taken 11.v.75 at Henfield, W. Sussex; *Beosus maritimus* Scop., under herbage, 8.ix.76, Deal Sandhills; *Graptopeltus lynceus* F., under herbage, 14.viii.83, Mildenhall; *Macrodema micropterum* Curtis, beaten from pine, 27.viii.77, Chobham Common, Surrey; *Berytinus hirticornis*

Brullé, a species spreading eastwards along the south coast from Devon, taken 26.viii.81, Camber Sands, E. Sussex; *B. montivagus* Meyer, in grass, 26.viii.81, Camber Sands; *B. signoreti* Fieber, in grass 26.viii.81, Camber Sands and 4.iii.77 at S. Heighton, E. Sussex; *Neides tipularis* L. in grass 14.viii.83, Mildenhall; *Gampsocoris punctipes* Germar, in dead grass, 18.vii.76 Newhaven, E. Sussex and 24.viii.81, S. Heighton; *Dictyonota stichnocera* Fieber, swept 24.viii.81 S. Heighton Downs, 15.viii.77, White Downs, Dorking, Surrey and 3.ix.77 Cuckmere Haven, E. Sussex; *D. tricornis* Sch., beaten from pine, 27.viii.77, Chobham Common; *Catoplatus fabricii* Stål swept 26.vi.76 at Lewes Downs and 19.vi.77 at Friston Forest near Eastbourne, E. Sussex; *Agramma laeta* Fallén, swept from sedges 26.viii.81, Nagden salt marshes, Faversham, Kent; *Empicoris culiciformis* Deg., in office, 26.ix.83, London, W.1; *Capsus wagneri* Remane, swept 13.viii.83 at Wicken Fen, Cambs.—the classic location of this very local bug; *Pilophorus clavatus* Douglas and Scott, beaten from broom, 14.viii.76, Dungeness, Kent; *P. cinnamopterus* Kirsch. and *P. perplexus* Douglas and Scott, beaten from pine, 27.viii.77, Chobham Common.

ODONATA

Davies, A.L.—Vacuum-dried exotic species of dragonflies were displayed together with freeze-dried fungi and lepidopterous larvae, showing the good retention of colour patterns.

Knill-Jones, S.A.—Six species of Odonata from Freshwater, Isle of Wight.

HYMENOPTERA

Allen, Dr A.A.—(1) A display of British Phaeogenini which are solitary ichneumonid parasites of microlepidopteran larvae and pupae. The specimens from Salfords, Surrey, were all beaten from wild privet in old woodland. Assistance with naming was given by Herr. E. Diller of Munich. The species shown were *Nematomicrus tenellus* Wesmael from Littlehampton, Sussex; *Herpestomus arridens* Grav. 2.v.82, Salfords; *H. nasutus* Wesmael, 6.iii.77, Salfords; *H. wesmaeli* Perkins, bred vi.80 ex pupa of *Cedestis subfasciella*, Brownsea Island, Dorset; *Eriplatys ardeicollis* Wesmael, bred 16.vi.79 from pupa on pine, Reigate Heath, Surrey; *Thyraeella collaris* Grav., i.v.83, Salfords; *Diadromus varicolor* Wesmael, 22.v.83, Salfords; *Colpognathus divisus* Thom., 1.ix.82, Hawkhurst, Kent; *C. celerator* Grav., 8.viii.83, Brixham, Devon; *Centeterus confector* Grav., 24.viii.79, Brownsea Island; *C. opprimator* Grav., 13.viii.83, Widecombe in the Moor, Devon; *Aethecerus discolor* Wesmael, 10.v.82, Salfords; *A. nitidus* Wesmael, 28.viii.82, Gomshall, Surrey; *Phaeogenes opthalmicus* Wesmael, 22.v.83 Salfords; *P. maculicornis* Stephens, 5.v.80, Salfords; *P. elongatus* Thom., 9.viii.81, Ashcombe, Devon; *P. coriaceus* Perkins, Brownsea Island.

(2) Some parasites taken or bred in 1983. These included the braconids *Aleoides geniculator* Nees, bred from a mummified larva of *Arctia villica* found 4.vi at Eastbourne, Sussex; *Meteorus pulchricornis* Wesmael, bred from a larva of *Apocheima pilosaria* on oak 9.v, Brownsea Island, Dorset; *M. versicolor* one of several bred singly from late instar larvae of *Euproctis chrysorrhoea* taken 25.v at Camber, Sussex on sea buckthorn. The other specimens were collected by sweeping. Two uncommon braconids were *Microgaster russatus* Haliday, 13.viii, Widecombe in the Moor, Devon; *Protomicroplitis abdominator* Nees, one of two females taken

27.viii near viper's bugloss at Rye, Sussex. The remainder were the ichneumonids *Heteropelma amictum* F., 8.viii Galumpton, Devon; *Eurylabus torvus* Wesmael, 26.vi, Gomshall, Surrey; *Chasmias motatorius* F., one of two females found under the bark of pine logs, 13.iv. Little Haldon, Devon; *Aoplus ochropis* Gmelin, beaten from wild privet 22.v, Salfords, Surrey; *Ichneumon bucculentus* Wesmael, under pine bark, 13.iv, Little Haldon; *Ctenichneumon panzeri* Wesmael, 13.viii, Widecombe in the Moor; *Limerodes arctiventris* Boie, 6.viii, Dawlish Warren, Devon; *Barichneumon maculicauda* Perkins, one of several taken in August at Dawlish Warren.

Chipperfield, H.E.—A specimen of the wood wasp *Sirex gigas* L. and its ichneumonid parasite *Dolichomitus mesocentrus* Grav. Both taken at Wicken Fen, Cambs.

Garland, S.P.—Some Sphecidae collected at Chatsworth Park, Derbys. between 3–16.vii.83 included *Pemphredon lugubris* F., *Passaloecus gracilis* Curtis, *Crossocerus annulipes* Shuckard, *C. tarsatus* Shuckard, *Psenulus pallipes* Panzer, *Nysson spinosus* Forster and *Ectemnius continuus* F. Also displayed were some uncommon species collected by D. Gibbs from the Ford (Moss) Valley, S. Sheffield, S. Yorks. These were *Stigmus solskyi* Morawitz, 5.viii.83; *Rhopalum coarctum* Scop. 9.viii.83 and *Pemphredon moria* Van der Linden, 5.viii.83. The last mentioned was new to Derbyshire and not previously recorded north of Cambridgeshire.

Godfray, Dr H.C.J.—display of the parasite complex of the leaf-mining fly *Chromatomyia (Phytomyza) syngenesiae* Hardy.

Halstead, A.J.—Some uncommon or local sawflies, the following taken at R.H.S. Garden, Wisley, Surrey. *Diprion simile* Hartig, bred 6.iv.83 from a cocoon found on *Pinus radiata*; *Allantus togatus* Panzer, 7.vii.83 in a polythene tunnel; *Tomostethus nigritus* F., found 23.v.83 on grass under the host plant ash; *Rhadinoceraea micans* Klug, on *Iris* sp. taken 17.v.83; *Nematus lucidus* Panzer, 7.vi.83 in a polythene tunnel. Other specimens were *Strongylogaster xanthoceros* Stephens and *Amauronematus lateralis* Konow from Baynes Wood, Greenham Common, Berks., 14.v.83; *Brachythops flavens* Klug, netted Wisley Common, Surrey, 9.viii.83; *Selandria sixii* Voll., netted on Horsell Common, Woking, Surrey, 18.vi.83; *Tenthredo moniliata* Klug, in a water trap, East Fen, Malham Tarn, N. Yorks, 21.viii.83. A specimen of *Sterictiphora geniculata* Gmelin, collected by A.A. Allen at Salfords, Surrey, 2.v.82 was also shown.

Heath, J.—A female ichneumonid *Megarhyssa macrurus* Westwood taken 21.vii.77 at Inglis Falls, Owen Sound, Ontario, Canada. Its 5″ ovipositor is used to locate the larvae of a wood wasp *Tremex columba* Say.

Knill-Jones, S.A.—Some common Sphecidae and Ichneumonidae, together with other Hymenoptera, Hemiptera and Orthoptera taken at Spinfish and the exhibitor's home, both at Freshwater, I.o.W.

ARACHNIDA

Knill-Jones, S.A. An example of the spider *Argiope bruennichi* collected 29.viii.83 at Spinfish, I.o.W. This is the second record for the island.

ILLUSTRATIONS

L.W. Burgess exhibited three water colour paintings; two of rather novel appearance. The first depicted five butterflies as arranged on a setting board, and looking very realistic. The second, equally realistic, consisted of a display case containing eleven species of tropical butterflies. The third and more conventional picture showed the butterflies *Morpho menelaus* and *M. deidamia* resting on a leaf plant.

TERRY JENVEY showed photographs of butterfies and moths seen flying at the New Forest Butterfly Farm during 1983.

RICHARD REVELS displayed colour prints of butterflies, dragonflies, hoverflies, birds and wild flowers.

ALAN STUBBS and STEPHEN FALK displayed a mock-up of the text and illustrations of the Society's forthcoming publication on the British Hoverflies. There were favourable comments from many people on the twelve coloured plates executed by S. Falk, a talented young artist. On top of this there were no less that five hundred and forty thumb-nail sketches throughout the text by A. Stubbs, who also, it appears, seems to have a flair for illustration. The identification of this family of flies has now been made easier for anyone showing an interest in them. This will surely encourage more people to take up the study of hoverflies. All in all a very fine book to add to other publications by the Society.

One map which caught the eye was shown by KEVIN D.Z. SAMUELS. It was a nicely delineated and coloured map of Andorra, visually attractive and easy to understand. The place names however could have been printed somewhat larger without losing the locations.

INDOOR MEETINGS

BENHS Meeting 14.vii.1983—*Exhibits*. Mr. B. C. EVERSHAM exhibited a stratiomyid fly, *Stratiomys potamida* taken on 2.vii.83 in a fenland ditch near Thorne Moors, South Yorkshire. This is the first authenticated record for the county of this scarce and mainly southern species. Also shown was a specimen of *Stratiomys furcata* F. taken on 10.vii.82 in a saline ditch near Thorne Moors. The only previous northern record for this species was from Spurn Point in the 1940s. Mr. Eversham reported that Mr. P. Skidmore of Doncaster Museum has since taken another specimen of *S. potamida* at Thorne Moors and found that *S. furcata* was abundant in the area. Mr. A. Stubbs thought these records remarkable and well beyond the usual range of the species.

Announcements. The Exhibitions Secretary asked for a volunteer to take over Mr Ventom's role in selling the Society's Christmas cards etc at the Annual Exhibition.

The Secretary reported that the Society had sent a donation of £25 to the Hampshire and Isle of Wight Naturalists' Trust to help pay for their recent purchase of Emer Bog. She also announced that Andrew Halstead had taken over the post of Field Meetings Secretary for the 1984 season. Anyone wishing to lead a field meeting should contact him to make the necessary arrangements.

Communications. Dr. B.J. MCNULTY, reported by letter from Rhossili, near Swansea that he was catching at light *Bupalus piniaria* (L.), including 15 in one night which were all female, even though he was not aware of any pine trees within 3–5 miles of his home. He wondered if this was evidence of a migration or whether there was an alternative non-coniferous host plant.

Mr. K. EVANS stated that catches of *Autographa gamma* L. and *Phlogophora meticulosa* L. at his East Grinstead trap were unusually low for the time of year.

Mr. A. STUBBS said that Baddesley Common, Hants, which is adjacent to Emer Bog, has been the subject of the first appeal against SSI notification. Entomological evidence was given at the enquiry and the case was decided in favour of the conservation interests.

Mrs. F. Murphy noted that there had been large numbers of egg nests of the spider *Pisaura mirabilis* on plants in her garden.

Lecture. Dr. G. C. McGavin gave a lecture on the acorn gall of oak, in which he described the life cycle and biology of the cynipid wasp *Andricus quercuscalicis*.

BENHS Meeting 28.vii.1983—*Exhibits*. Mr. A.J. Halstead exhibited a pheromone trap for Codling Moths (*Cydia pomonella*). The pheromone emitted by female Codling Moths can be sythesized and used as a bait in a trap where males are caught on a sticky surface. Such pheromone traps are being used increasingly by commercial apple growers to indicate the main period of moth emergence. Sprays against the hatching larvae can then be timed more accurately. Similar types of trap are now available for monitoring some other tortricid moths, such as Pea Moth, Plum Moth and Carnation Tortrix. In answer to a question, Mr. Halstead confirmed that a few related species were attracted.

Mr. S.N.A. Jacobs exhibited a female specimen of the megalopteran *Corydalus cornutus* L. taken at Putnam, Connecticut, U.S.A.

Communications. Several members commented on the abundance of the Clouded Yellow (*Colias croceus*) this summer.

Lecture. Dr. M.S. Warren gave an illustrated talk on *The ecology and conservation of the Wood White butterfly*. This produced many questions and comments from the audience.

BENHS Meeting 8.ix.1983.—The President announced the deaths of Messrs. H.C. Allcard and J.H.C. Phillips.

Exhibits. Col. A.M. Emmet: (1) Two living larvae of *Stigmella minusculella* (H.-S.) mining leaves of pear (*Pyrus communis*) collected at Lampton Park, Middx, 8.ix.83. This is one of three currently known British localities for this species. (2) Larvae of *Bucculatrix thoracella* (Thunb.) feeding on leaves of common lime (*Tilia* × *vulgaris*), also from Lampton Park. This species is normally univoltine in Britain, with the larvae feeding in July. It is regularly bivoltine on the continent and the exceptionally warm weather in July and August seems to have induced it to adopt its continental behaviour in this country.

Colin Penney: larvae of *Hyppa rectilinea* (Esp.) (feeding on bramble) from eggs laid by a female caught at mercury vapour light in July near Inverness.

Mr. P.A. Sokoloff: (1) An aberration of *Caradrina clavipalpis* (Scop.), Orpington, Kent, 11.vii.83) a dark specimen with the orbicular and reniform stigmata clearly outlined in white. (2) Specimens of *Calamotropha paludella* (Hbn.) from Mucking, Essex, including one with almost pure white forewings.

Lecture. Mr. J.G. Blower spoke on *The natural history of centipedes and millipedes*. The speaker related structure to function in the various families and dwelt on the number of instars and lengths of life varying from one to several years demonstrated by recent sampling studies.

BENHS Meeting 22.ix.1983.—Exhibits. Mr. S.N.A. Jacobs: Galls of the Cynipid gall wasp *Andricus quercuscalicis* Burgsdorf which have appeared in quantity on a 50-year old oak in his Bromley (Kent) garden for the first time. The galls consist of distinctive outgrowths from the acorn cup and are covered, whilst on the tree, with a sticky-sweet substance. They drop at the same time as the acorns, and the sweet coating disappears. Parthenogenetic females emerge from the galls in the following spring. These deposit eggs on the catkins of the Turkey Oak, causing galls which produce a bisexual generation, the females of which produce the parthenogenetic female generation. Turkey Oak is not known to occur in the region of this Bromley garden, and probably the spring females oviposit also on the *Quercus robur* catkins, but this is unconfirmed. The species was first recorded as British by M.F. Claridge (*Entomologist* **95**: 60–61).

Mr. P.A. Sokoloff: Larvae of *Rhodometra sacraria* (L.), the Vestal moth, from a female taken in Orpington, Kent 20.viii.1983. On the night in question, no other immigrant species were noted, but two males of *Orgyia antiqua* (L.) (Vapourer) and over 100 *Acentria nivea* (Olivier) were also noted in the trap, *nivea* being an uncommon species at the trap site. Other members present commented on the occasional appearance of large numbers of *nivea*.

Announcements. Mr. Evans appealed for help in manning the Society tables at the Exhibition.

Communciations. Col. Emmet recorded *Polygonia c-album* (L.) in the grounds of the BM(NH) today, and Mr Fairclough reported the capture of a female *Mythimna loreyi* Dup. on 30th August at Reigate, Surrey. Mr. Valetta reported two *Colias croceus* Geof. at Rotherhithe on 16th September. Members commented on the small numbers of *Autographa gamma* (L.) seen this year.

Lecture. Mr D.M. Armitage gave an interesting talk on insectivorous plants illustrated by slides and specimens of a range of carnivorous plants.

BENHS Meeting 24.ix.1983.—*Exhibits*. Alan Stubbs showed copies of 'British Hoverflies' recently published by the Society.

Membership. Messrs. J.W. Lavery, C.W.D. Gibson, J. Taplin, E.G. Smith, M.H. Smith, J.A. Hollier and M.E. Archer were elected.

Communications. Mr Jacobs reported that he had seen no spangle galls on oak leaves this year as compared with the large numbers he had reported last year.

Col. Emmet reported observations concerning the defaecating habits of *Rhodometra sacraria* larvae. He noted that the frass pellet remains attached to the 'tail' and has to be removed by the larva grasping it with its true legs and mouth. Dr. Sattler reported similar behaviour in *Eupithecia actaeata*.

Lecture. Dr. P. Brakefield then gave a most interesting talk on 'The Evolutionary Significance of Spot Pattern in Satyrine Butterflies'. Dr. Brakefield proposed a model linking spot frequency with butterfly activity which was supported by many examples. A lively discussion following questions indicated the interest generated by this talk.

BENHS Meeting 13.x.1983.—*Exhibits*. Dr. A.A. Allen Several empty shells of the Gastropod *Patina pellucida* L. (Archaeogastropoda) taken when live from all parts of the seaweed *Laminaria digitata* Hudson, 11.viii.1983 nr. Brixham, Devon. Although common, the species (sometimes known as the Blue-rayed Limpet) is seldom observed, for the seaweeds on which the species feeds are only uncovered at spring low tides, these occuring on only a few days each year. *Laminaria* species are very tough plants but they are considerably weakened by the depredations of the gastropod. The specimens shown were rather young, but can reach 15 mm when fully grown.

Membership. Mssrs. P.C. Hooker and J.A. Abbot were elected.

Communications. Mr. K. EVANS reported his observations on the larvae of *Rhodometra sacraria* (L.) (Vestal moth). Apparently a larva discovering a pellet of frass on a piece of leaf it wishes to consume studies the offending object for some time, then strikes the pellet with its head, thus removing the frass from the food. Strikes of up to 5 inches had been recorded by Mr. Evans. On some occasions the rear end of the larva is used for this purpose. Mrs. MURPHY noted that some spiders could eject excrement for some distance, presumably to assist in keeping the web clean.

Dr. A.A. ALLEN recorded the capture of 9 specimens of *Parocystola acroxantha* Meyr. at light, Dawlish, Devon on 1st & 2nd October, suggesting an unusual second brood for this species. He also commented that *A. gamma* had occurred regularly at this locality during 1983, in contrast with the experience of other members.

Mr. M. JORDAN had recently taken *Macroglossum stellatarum* (L.) at mercury vapour light at around 10.45 pm, an unusual time for this day-flying species.

Mr. S. MEREDITH reported seeing a crane-fly imbibing liquid on a discarded mint sweet. Other members commented on the attraction of insects for unusual substances.

Dr. D. LONSDALE reported an instance of cannibalism in woodlice when an injured specimen was attacked by others.

Mr. S.N.A. JACOBS reported that the apple sawfly had been troublesome this year, although the codling moth had caused little damage in his garden.

Lecture. Mr. P.H. STERLING gave a talk on the natural history of Aldabra, an island of the Seychelles complex. He described his experiences as part of a joint university survey team on the island, a unique habitat currently threatened by political instability in the area. The talk focused on the large population of tortoises and the problems they encountered in this often hostile environment. The talk was copiously illustrated with slides, and a lengthy discussion followed.

Field Meetings. A brief report was received from Mr Softly on the recent meeting at Hampstead Heath. The Swanage meeting had been rained off, but Mr K. Webb had attended as the sole member, and been rewarded with a specimen of *Agrius convolvuli* (L.)

BENHS Meeting 10.xi.1983.—*Exhibits.* Mr. R.W.J. UFFEN: Machine colour prints of insects and plants photographed mostly in poor natural light on Kodak VR1000 film. The results are imperfect, but could not have been obtained on slower film.

Mr. K. MERRIFIELD: *Ctenophora flaveolata* (F.) (Dipt: Tipulidae), a scarce species which breeds in dead wood and is associated with ancient forests (probably less than six post-1960 sites known), found by Mr. M. CORLEY on the Society's field meeting at Wychwood Forest, 4th June 1983.

Mr. C.W. PLANT: Leaves of beech, *Fagus sylvaticus*, bearing galls induced by *Oligotrophus annulipes* Hartig (Dipt: Cecidomyiidae). The galls are unilocular, and at maturity become detached from the leaf. In late autumn they are fairly easy to spot as there is a conspicuous ring of green leaf around the gall on the otherwise completely brown background. This oasis is usually margined with yellow. In some years the gall, and presumably therefore the fly also, is abundant, whilst in other years it is often quite rare. 1983 appears to be a year of plenty. These specimens were from Wanstead Park, Essex, (TQ4187): 1983.

Mr. R.T. LOWE: Two exhibits from flowers imported into Covent Garden Flower

Market. (1) *A Plusia** species from Dutch spray chrysanthemum, found as a larva and bred out, the moth emerging 9.xi.1983. (2) Tree Frog from carnations imported from Bogota, Columbia as yet unidentified by BMNH.

Mr. P. SOKOLOFF: A very dark female *Ptycholoma lecheana* L. (Lep: Tortricidae), Shooters Hill, S.E. London, 6.vii.1983. The normal yellow-ochreous colouration is absent from the forewings, and is represented by only a few yellowish hairs on the thorax.

Announcements. Dr. K. SATTLER: A workshop dealing with elementary techniques for the dissection of small Lepidoptera for identification and taxonomic studies will be held in the Entomology Department, British Museum (Natural History), Cromwell Road, London SW7 5BD, on Saturday, 25th February 1984 (10 am to 4 pm). Members interested in participating should contact Dr. G.S. Robinson at the above address for further details. This meeting will be limited to 12 people.

Mr. G. MULFORD: Mr Barry Watson was beginning an ecological survey of Thames Side Park, and would be glad to hear from anyone with records (of all natural history objects?), or would otherwise be interested. Mr. Watson's address is 54 Bromhall Road, Dagenham, Essex RM8 2HN. (Tel. 592-8941, home; 594-8449, office).

Slides. An interesting selection with running commentaries was shown by Mrs. F.M. Murphy, Dr. A.A. Allen, Mr. N.A. Callow, Mr. R.W. Uffen, Mr. R.A. Jones and Mr. K. Merrifield.

BENHS Meeting 8.xii.1983.—The PRESIDENT announced the death of Mr. A. Bliss, a Special Life Member who joined the Society in 1926.

Exhibits. Mr. A.J. HALSTEAD: A poster, circulated by the Ministry of Agriculture, publicising the recent outbreak of the vine *Phylloxera*.

Mr. R. SOFTLY: a male winter moth, *Operophtera brumata* L., taken on the evening of the meeting, *in cop* on a poplar trunk in Hyde Park. He observed that males seen at rest head down were invariably *in cop*, unencumbered males resting head up.

Mr. P.A. SOKOLOFF: A sample of domestic flour, which had been stored for some months in a "tupperware" container, infested with *Tribolium confusum* Jacq. (Coleoptera: Tenebrionidae), and when examined in early December several hundred beetles were found in an estimated 300–400 g flour. Origin: Bromley, Kent.

Lecture. Mr J. Muggleton gave a talk entitled "Fungi observed" copiously illustrated with slides of fruiting bodies from a wide range of families, and several localities. This indoor fungus foray was well received by the members present.

* Later determined as the American *Pseudoplusia includens* Walker, presumably transferred from asparagus from Florida. An Indian weevil *Xanthochelus faunus* (Oliver), also on Dutch flowers, may have come off orchids from Bangkok.

BOOK REVIEWS

The Lepidoptera of the Orkney Islands, by R.I. Lorimer. E.W. Classey Ltd, Faringdon, 1983. ISBN 0 860960 17X. 103pp. and map. Price £6.00 inclusive.

This is a valuable addition to our knowledge of island fauna, by an author who is now resident in Orkney and who has previously published records of many species new to it.

Early pages give a brief critical history of previous collecting and recording, followed by some general notes on the environment and on the conservation which is now needed; on predation by birds; and on the origins and affinities of the Lepidoptera. These are shown to owe much to past and continuing immigration, both long distance from the south, from the east in Scandinavia, and locally, usually in smaller numbers, from the British mainland; some other established species probably result from accidental importation with plants and trees. But influence from Shetland appears to be negligible, being probably prevented by lack of flight in north easterly air streams.

Most of the book consists of a detailed systematic list of species, their recording, and particular forms in Orkney. Though no total is mentioned, 379 species are covered, though 25 are discounted in square brackets as being probably based on early misidentifications, which the author has himself avoided by the deposit of voucher specimens with the British Museum (Natural History). In the net total, macrolepidoptera, including 15 butterflies, slightly exceed the micros; but it is evident that among the latter many discoveries remain to be made.

Appendices give map references for all localities mentioned, thus, supplementing the cover maps of Orkney parishes and minor islands, and also a list of entomological visitors since 1950. There are full references to previous publications, and indexes of both scientific and vernacular names of species.

The title CUCULLINAE is mis-spelt on p.72. Otherwise this is an accurate and clearly printed work, which could be a model for other, much needed, accounts of the Lepidoptera of British off-shore islands.

R.F.B.

The study of Stoneflies, Mayflies and Caddisflies, by T.T. Macan. *The Amateur Entomologist*, vol.17. 44pp., 10 line drawings. The Amateur Entomologists' Society, Hanworth, Middlesex. 1982. AES Publications, 4 Steep Close, Green Street Green, Orpington, Kent. £2.70 p.p. incl.

In his introductory remarks, the author, whilst admitting that these three orders have never been popular among amateur naturalists, concedes that there is still an important niche for the amateur to play in the study of natural history. However, on reading the following 42 pages one might be forgiven for thinking that the information therein is more for the academic than for the amateur. This is readily understandable for the author, an eminent scientist and long-standing member of the staff of the Freshwater Biological Association, has been responsible for a number of that Association's scientific publications. Following the introduction there are notes on Collection and Preservation; Equipment; Methods and Identification—all amply dealt with though we learn with regret that that excellent and long-tried piece of equipment, the F.B.A. net is no longer made for sale.

The rest of the volume is given over to aspects of study of the three orders with least space (8½ pages) going to the Plecoptera, 12½ pages to the Ephemeroptera and 13½ to the Trichoptera. Section headings are simplest for the Plecoptera (Habitat of larvae; Habitat of adult; Life History and Food of larvae), and most detailed for the largest order, Trichoptera.

There is indeed a wealth of interesting detail packed into these pages but the emphasis is always on the 'study' of the insects as implied by the title of the volume. Perhaps a little more of the flavour of the Society's leaflet of 30 years ago on 'Collecting Caddises' would not have come amiss—this leaflet also had a plate of set adults intimating that there is a place for pinned specimens as an attractive addition to the essential fluid collection.

The list of references completing this scholarly A.E.S. publication is preceded by a statement that there is 'space only for a selection other than for those devoted to taxonomy'. With space unused on the last page some notable names could have been included. One can understand the exclusion of the time-honoured Mosely whose keys would nowadays need much modification, but not to have mentioned Nickin's considerable contribution to the study of Trichoptera seems unexplainable.

B.R.B.

The Dragonflies of Great Britain and Ireland (Second Edition), by the late Cyril O. Hammond, revised by Robert Merritt. Harley Books, Colchester. 1983. 116pp., 20 colour plates.

The first edition of this excellent introduction to the Odonata appeared only in 1977 but its popularity has made a further edition desirable. The format, centring on Cyril Hammond's beautiful illustrations of all native and regular immigrant species, remains the same although the order of plates and maps has changed a little. A newly discovered species, *Coenagrion lunulatum*, proving to be widespread in Ireland, is described and is illustrated by Roderick Dunn in the same style as other plates.

The work of the Odonata Recording Scheme has, however, enabled the addition of a further 7,500 records to the distribution maps, indicating unexpectedly larger ranges of several species. Some records on the first edition maps have been omitted but without explanation. The distinction of *Sympetrum nigrescens* from *S. striolatum* is doubted and a single distribution map is provided for the two species.

The introduction has been rewritten, with additional comments on larval habitats and seasonal occurrence; paper envelopes rather than glass tubes are suggested for transporting live dragonflies and the preservation of colours by freeze drying is superseded by a method employing acetone. There is, however, less emphasis on collecting and photography is advised as an alternative.

A new section on conservation replaces the comments on decline of Odonata in the first edition; it is perhaps a little complacent, with the implications that most species are protected somewhere. This view, is no doubt, fuelled by additional data now available, suggesting that some species such as *Ceriagrion tenellum* are less in danger than had been supposed. The list of species considered extinct in Britain is, however, raised to four but a footnote in the Preface draws attention to the recent rediscovery of one of these, *Lestes dryas*.

In the text to the plates slight changes are made to the flight periods but the comments on distribution and status are thoroughly revised and unfortunately rendered more prosaic by the omission of the anecdotal comments in the first edition. Most technical information is reproduced as before but the wing span measurements of *Lestes* spp. are corrected and greater variation is indicated in the colour pattern of *Coenagrion hastulatum*. The contribution on larvae by Eric Gardner has not been revised except in respect of the description of habitats.

Some nomenclatural changes are introduced: *Agrion* becomes *Calopteryx* and *Sympetrum scoticum* becomes *S. danae*. These synonyms are curiously omitted from the check list, to which five vagrant species not discussed in the text are added. Vernacular names are wisely reduced to the entirely English versions introduced in the first edition.

New records for the Channel Islands have been added to the maps but four species absent from the mainland and thus not dealt with in the text are only mentioned in passing.

The overall map of records received to the end of 1982 clearly shows the much better coverage now achieved, but there are still very few records in the north and midlands of Ireland, the Scottish Lowlands and more remarkably an extensive area in central southern England. The further interest in Odonata that the second edition will engender should soon ensure that these gaps are filled.

A few typographical errors have crept in as a result of changes in text but the standard is almost as flawless as the first edition.

P.C.J.

Practical hints for collecting and studying the microlepidoptera by Paul Sokoloff. *The Amateur Entomologist* vol.16. The Amateur Entomologists' Society, 1980. pp.40. £3.30 incl. AES Publications, 4 Steep Close, Green Street Green, Orpington, Kent. BR6 6DS.

The tenor of recent AES publications has swung erratically from the academic to the practical and the standard from exemplary to poor. The output in this series has always been limited by the availability of willing and suitable authors. The title under review is surely one of the finest booklets of practical technique that the AES has ever issued. It is the perfect complement to the BENHS *Field guide to the smaller British Lepidoptera* and the reviewer is left wondering why something very similar was not provided as an introduction to our own publication.

Practical hints is divided into chapters on collecting adult insects, collecting immature stages, rearing, preparing for the collection and finally bibliographical and trade sources. A balanced view of the value of the techniques is presented, leavened with wry comment on things that can go wrong, which are uncomfortable reminders of one's own avoidable failures. The differences of emphasis from modern methods of collecting macrolepidoptera are clearly stated, such as the lower value of light traps and the importance of searching for individual larvae in their feeding places.

The chapter on immature stages describes symptoms of attack on the various parts of plants, with simple sketches of some of the commonest types. Bryophytes and other pabula are briefly dealt with. Considerable attention is paid to the best methods of maintaining pabula in healthy condition and to providing larvae with the correct conditions for overwintering, pupation and emergence.

The account of killing, setting and storing is conventional wisdom applied to modern materials. As an inept setter myself, I consider the usual description of pinning irrational and wholly inadequate. Many micros, especially plumes, have a muddle of legs beneath them which does not offer a predictable resistance to the pressure of a pin from above. Others have short front legs folded against the body and tip forward and scuttle backward when one attempts to pierce the top of the domed thorax. Legs can be shed in relaxed specimens. The safest procedure is sometimes to pin from beneath. For this reason and to facilitate mounting some specimens upside down to show the occasional diagnostic character, a supply of double-ended pins would be useful. Upwardly directed points would not be a significant hazard in a collection mounted on fine headless pins that already have to be handled exclusively with forceps.

We can tease the author that he has misidentified the moths on his sketch of a sample mount in fig. 11. This does make the point that multiple labels on a mount without some unique cross-referencing are at some risk of muddling when a staged strip of moths has to be removed from its mount for examination.

The section on identification and bibliography makes concise and apt comment on the value of available works and the gaps therein. The author rightly points out that the beginner's basic problem is to deduce the family of a moth from the key literature.

The advice in this booklet is equally valuable to students of other phytophagous insects. It deserves wide sales.

R.W.J.U.

British Hoverflies, by Alan E. Stubbs and Steven J. Falk. B.E.N.H.S., London, 1983. 253pp., 13 col.pl., many figs. £18 softback ISBN 09502891 4 0, £21 hardback, ISBN 09502891 3 2 (reductions to members).

This splendid work, subtitled, 'An illustrated identification guide' begins by setting out our state of knowledge of the hoverflies with chapters on observing and photographing hoverflies, collecting, habitats and seasons, early stages, and the character of adult hoverflies. These chapters enable the beginner to pick up the subject and indicate how he can help to fill out the picture.

Chapter 7 begins with some highly practical advice on the use of keys. Next, a key directly to tribes, apart from Syrphinae, seems a lot simpler than interpolating a subfamily key. There follow new keys to genera and species of all groups. The couplets are commendably simple and are copiously illustrated by thumbnail diagrams in the margin. Other admirable features of the keys include an illustrated glossary of terminology for features of pattern, a separate key to melanic female hoverflies, keys to furry bee-mimics, and an introductory key to common *Cheilosia*.

Chapters 8 to 10 give further distinguishing features of each species and brief notes on habitat, distribution and life cycle where known. Several species are recognised as British for the first time. It has not always been possible to ascribe the correct names to these. In *Cheilosia*, five species have to be referred to as 'species A to E' to permit keying and discussion.

A major aim is to provide workable keys for recorders in the British mapping scheme.

The bold approach in this work is spelt out by the introduction to the check list in chapter 11, which begins:

'A stark choice has developed during the final years of preparation of this book. Either wait for five to ten years while a revised check list sorts itself out or press ahead regardless. A delay of publication would stifle work on British hoverflies when the main need is for a set of keys to which everyone can relate their specimens.'

In twenty years we have come from the complexity of Coe's typical Royal Entomological Society Handbook with its pseudo-completeness leaving the user bewildered, through failed sponsorship of the present work by an organisation that could not face our imperfect knowledge of the real world, to a book that is a milestone in scientific integrity in publication. This author states when he does not know the answer to a problem, and moreover states the problem clearly so that others can participate in its solution. The result is a book that should enable the beginner to tread confidently and to be spurred to tackling some of the problems raised as his experience grows. It should goad professional taxonomists (and editors) so fearful for their reputation that they can publish only stale news.

The twelve coloured plates by Steven Falk are very fine and a worthy follow-on to those by Cyril Hammond in *Flies of the British Isles*. They depict 190 of the 256 species in dorsal view, including the major variation in the common Syrphini and even a sample of the subtly hair-patterned *Cheilosia*. A monochrome plate illustrates mainly the front legs of *Platycheirus*, more convincingly than Coe's figures and better arranged for comparison. The coloured cover and frontispiece by Ken Merrifield showing courtship behaviour of *Eristalis nemorum* is eloquent testimony both to the alertness of the photographer and the part that photography can play in recording the often swift events in insects' lives. It is fitting that this book should have been dedicated to Cyril Hammond, whose generous legacy helped to launch it, along with a grant and loan from the Royal Society.

R.W.J.U.

FURTHER RECORDS OF SPRING BUTTERFLIES IN CORFU

by A.J. SHOWLER

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The recent article by McLean (1983) on butterflies in Corfu reached me just before I left for a spring holiday in the island and by reference to this paper and that of Baldock & Bretherton (1981) it seems that the period I spent there was earlier than that of all the authors referred to by those above. For this reason, my findings seem worth recording.

In fact the visit proved to be a little too early, since for the first few days the weather was rather poor, so that only 20 species were noted in all. Botanically, however, the holiday was of much more interest, with a very large number of interesting plants in flower, including 23 different species of orchid (for which a pilgrimage to the British Cemetary in Corfu Town is a must).

Of the butterflies, only *Colias croceus, Gonepteryx cleopatra, Leptidea sinapis, Cynthia cardui* and *Lasiommata megera* could be described as common; *Iphiclides podalirius, Pieris brassicae, Artogeia rapae, Euchloe crameri, Anthocharis cardamines, Lycaena phlaeas, Polyommatus icarus, Nymphalis antiopa, N. polychloros, Vanessa atalanta* and *Pararge aegeria* failed to reach double figures (of most of these only 4 or 5 were seen). Single specimens only were seen of *Callophrys rubi, Lampides boeticus* and *Glaucopsyche alexis*. Since all the above have already been recorded, further detail seems unnecessary.

Of particular interest was a yellow orange-tip seen only briefly in the hills above Nissaki; its bright yellow colour suggests that it was *Anthocharis damone* (Bdv.) rather than *A. gruneri* (H-S.), but further observations are needed in early spring to positively identify a species not previously recorded on the island.

PLATE 1. ANNUAL EXHIBITION 1982

Chesias rufata Dartford 17.iv.66, B.K.West	*Earias biplaga* Lymington 23.vii.82, A.J.Pickles	*Timandra griseata* E. Sussex 2.ix.82, M.Parsons
Herminia tarsicrinalis E.Suffolk bred 1982, B.F.Skinner	*Ecliptopera silaceata* S.E.Kent bred 1982, T.W.Harman	*E. silaceata* Ninfield 27.v.82, M.Parsons
Aglais urticae ab. *semiichneusoides* Sittingbourne 9.ix.82, P.J.Jewess		*A. urticae* ab. *lutea* 1982, R.C.Revels

Maniola tithonus, N.Forest 26.vii.82, A.D.A. Russwurm — *Cynthia cardui*, Lymington 15.ix.82, I.G.Farwell

Tetheella fluctuosa, Conaglen vi.82, R.F.McCormick — *L. coridon* ♂, Portland 1982, R.Barrington

PLATE 2. ANNUAL EXHIBITION 1983

Thymelicus acteon
Lulworth 30.vi.82, S.C.Pittis

Maniola jurtina ♀ homeotic
E.Knoyle 29.vii.78, G.D.Trebilcock

Vanessa atalanta ab. *klemensiewiczi*
Gwithian 16.viii.83, W.G.Tremewan

Papilio machaon
3rd. gen. bred L.D.Young

Lysandra bellargus ab. *parallela*
Purbeck 30.viii.83, A.S.Harmer

L. bellargus ab. *discojuncta*
Purbeck 6.ix.83, A.S.Harmer

Melitaea cinxia
I.o.W. reared 1983, H.G.M.Middleton

Colias croceus
Dorset 2 bred 1983, A.S.Harmer

Colias croceus ab. *striata*
Corfe 5.viii.83, A.D.A.Russwurm

PLATE 3. ANNUAL EXHIBITION 1982–3

Arctia caja, Addington 17.vii.83, B.F.Skinner — *Angerona prunaria*, Ham Street 3.viii.83, B.F.Skinner

Ochropleura leucogaster Walberton 17.ix.83, J.T.Radford — *Rhodometra sacraria* — *Rhodometra sacraria* bred E.Grinstead 1983, K.Evans

O. plecta for comparison B.F.Skinner — *Calamotropha paludella* Mucking 12.vii.83, P.Sokoloff — *Xanthorhoe alternata* Caversham 20.viii.83, B.R.Baker

Apamea anceps, Essex vii.83, A.M.Emmet — *Grammodes algira*, Swanage 23.ix.83, P.Davey

Plusia festucae (1982 exbn.) Hickling 3.viii.82, T.N.D.Peet — *Pyralis lienigialis* Faringdon 9.vii.82, M.Corley — *Thalpophila matura* (1982 exbn.) Wroughton 15.vii.82, D.J.Brotheridge

PLATE 4.

Ornithoptera victoriae archeri, subsp. nov. (top) male holotype, upperside; (bottom) female allotype, upperside.

A NEW SUBSPECIES OF *ORNITHOPTERA VICTORIAE* GRAY (PAPILIONIDAE) FROM CHOISEUL, SOLOMON ISLANDS

by PETER CALDERARA

Blake Cottage, Malthouse Lane, West Ashling, nr Chichester, West Sussex

The spectacular birdwing butterfly *Ornithoptera (Aetheoptera) victoriae* Gray is endemic to the Solomon Islands, in the South West Pacific. The females of Queen Victoria's Birdwing, particularly those found on Malaita, are amongst the largest butterflies in the world. This species was first captured by gunfire, having been shot down by John McGillivray, naturalist on the voyage of the 'Herald', in about 1854. The precise location at which this specimen was captured is not known, but it is now the holotype of *victoriae*, it is preserved in the British Museum (Natural History) at South Kensington, and is considered to have originated from Guadalcanal. The first male *victoriae* was obtained some 30 years later, also by gunshot, off Malaita Island. Subsequently, most of the major islands of the Solomons (including Bougainville, which politically belongs to Papua New Guinea), and a few smaller islands in the group, have proved to be habitats for the butterfly.

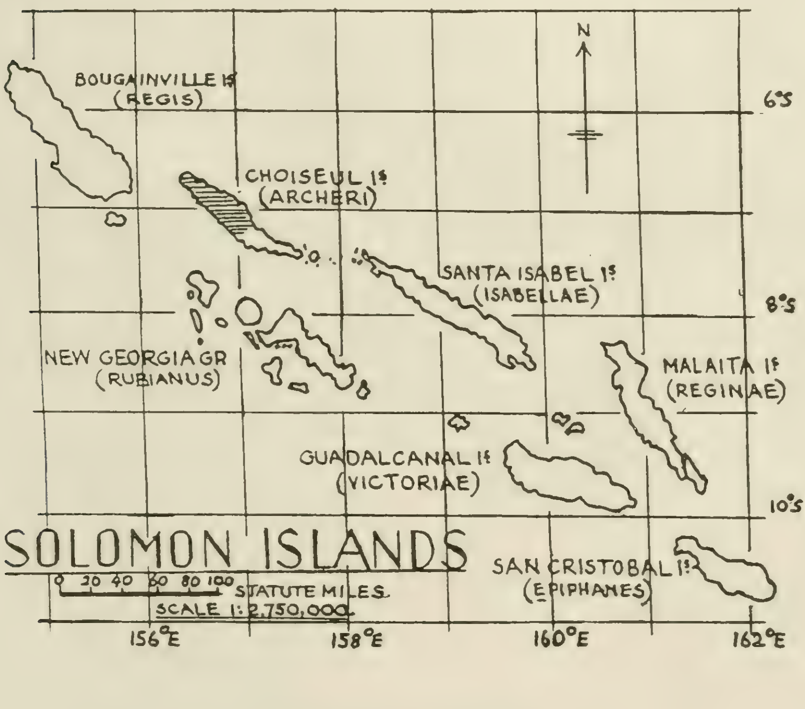

Fig. 1 Map of Solomon Islands
indicating known distribution and subspecies of *Ornithoptera victoriae*.

The volcanic Solomon Islands are surrounded by deep ocean, and form a relatively close chain—some of the main islands are only 20 miles apart (fig. 1). Local differentiation of *O. victoriae* occurs, and six subspecies are generally recognised:

O. victoriae victoriae Gray, 1856.	Type-locality: Guadalcanal
O. victoriae reginae Salvin, 1888.	Type-locality: Malaita
O. victoriae regis Rothschild, 1895	Type-locality: Bougainville
O. victoriae isabellae Rothschild, 1901.	Type-locality: Santa Isabel
O. victoriae rubianus Rothschild, 1904.	Type-locality: Rendova
O. victoriae epiphanes Schmid, 1970.	Type-locality: San Cristobal

Subspecies *rubianus* is known from several of the New Georgia group of islands, including New Georgia (Racheli, 1980), Vella Lavella (material in BMNH), and Ganongga, Gizo, Kolombangara, Rendova and Gatukai (Ohya, 1983), and shows quite considerable variation in size and pattern from island to island. The nominotypical subspecies, taken to be from Guadalcanal, also occurs on the nearby Florida Islands. In addition to San Cristobal, subspecies *epiphanes* also flies on the offshore islands of Bauro (Schmid, 1970), Santa Ana and Ugi. The Bougainville race, *regis*, has also been doubtfully recorded from Alu (Haugum & Low, 1978), Shortland (Ohya, 1983), and Choiseul (see discussion below). The two remaining subspecies are only known to fly on their respective major islands (*reginae* on Malaita, and *isabellae* on Santa Isabel). With the possible exception of *rubianus*, the known subspecies show considerable phenotypic instability and 'overlap' (Haugum & Low, 1978: 48).

The six subspecies also account for the occurrence of *O. victoriae* on all the main islands of the Solomons—except Choiseul. Until now there have been conflicting reports and opinions concerning the presence of *victoriae* on this island. According to Haugum & Low (1978), in their extensive account of the butterfly, 'The populations of Choiseul Isl. was given the name *resplendens* by Ehrman [sic] (1925) but placed in synonymy of *regis* by Schmid (1970).' They also write that 'Whenever new data and material enables a wider survey of the *victoriae*-complex to be undertaken, we suggest that the Choiseul Isl. populations of *victoriae regis* (= *resplendens* Ehrm.) also be taken into consideration.' Ehrmann (1926) described *O. resplendens* from Choiseul, apparently based on abundant specimens secured by 'Prof. Wm Reiff'—however, the wording of the original description is ambiguous. Of potentially greater significance is the fact that Ehrmann compared *resplendens* with *victoriae* from Guadalcanal, Malaita, New Georgia group and Santa Isabel—but not Bougainville. His rather surprising ignorance of Rothschild's earlier description of *regis* is made understandable by the introductory comments of Holland (1927), who also illustrated the 'male and female types' of *resplendens*, noting that the female was said to have been collected by Meek'. A.S. Meek is known to have collected many *regis* on Bougainville for Walter Rothschild (Haugum & Low, 1978), but the Rothschild Collection (now in BMNH) appears never to have contained any *victoriae* from Choiseul.

Schmid (1970), who studied eight males and fifteen females of *victoriae* in the American Museum of Natural History labelled 'Choiseul', in addition to the 'male and female types' of *resplendens*, was emphatic that the latter was a synonym of *regis*—an opinion easily appreciated by comparing the illustration of the female type in Holland (1927) with typical Bougainville *regis*. Schmid's synonymy has been

Fig. 2 *Ornithoptera victoriae archeri*, subsp. nov. (top) male holotype, underside; (bottom) female allotype, underside.

followed by D'Abrera (1975), Racheli (1978), Haugum & Low (1978) and Ohya (1983) (but not by Igarashi, 1979, who treated *resplendens* as a valid Choiseul race). In the light of the fresh Choiseul material described below, which is quite unlike *regis* from Bougainville, or the *victoriae* races from neighbouring Santa Isabel or the New Georgia group, I am forced to conclude that the provenance of Ehrmann's *resplendens*, and the AMNH Choiseul *victoriae* studied by Schmid, is erroneous. However, this possibly does not apply to the bright *reginae*-like male reported from 'Choiseul, Sasamuga, 5.iii.1970, *D.M. Wilson*' by Schmid (1970)—this specimen is either a natural variation of the newly described Choiseul race, or a migrant individual which had flown to Choiseul from another island (a possibility suggested by the discussion of Haugum & Low, 1978: 48).

In 1974 Mr E.N. Archer spent over a month exploring the long and rugged island of Choiseul, where he found *victoriae* flying in many areas. The butterfly was immediately noticed to be very different from the much more colourful *regis* of Bougainville. Surprisingly, the Choiseul race appears to differ much more sharply from its neighbours *regis* and *rubianus* than it does from eastern Solomons subspecies. A prominent feature, in the male, is the absence of golden markings (save two small submarginal spots in hindwing cells M_2 and M_3). In the Choiseul race, all the more extensive golden areas of typical *regis* are replaced by a non-iridescent sap green colour, somewhat like that of *rubianus*. The female has much larger white patches and spots than *regis*, and a brownish base to the wings in place of yellow. All specimens observed were essentially constant in appearance; Mr Archer brought back four males and three females, which form the basis for the following description.

Ornithoptera victoriae archeri **subsp. nov.** (Pl.4 upperside and fig.2 underside)

Male. Forewing length 75 mm. (average).

Upperside. Ground colour velvety black. Forewing preapical patch non-iridescent sap green, roughly triangular, and divided into three sections by veins R_4 and R_5. Forewing base also broadly sap green, with an overtone of burnished scales. Hindwing broadly pastel green from base to just beyond discal cell, with this area connected through the anterior cells to a distinct green submarginal band which encompasses two bright, golden-yellow submarginal spots in cells M_2 and M_3. The black ground colour of the hindwing upperside is largely restricted to a narrow marginal band, and an interrupted, curved post-discal band, extending from cell R_5 through M_1, M_2 and M_3, becoming wider and more solid posteriorly, until it becomes confluent with a large wedge-shaped marking filling the anal angle. The veins delimiting the discal cell are clearly marked with green scaling, which also follow the branches of the median up to the black margin. The central area of the discal cell is blackish, having an overlay of green scales. Overall, the dorsal hindwing pattern is most similar to that of *O. v. reginae*.

Underside. Ground colour and veins black. A large part of the forewing and most of the hindwing sap green. On forewing a large triangular black mark extends broadly about the anterior apex of the discal cell. In addition, a series of five black, chevron-shaped submarginal marks runs from cell R_3 to cell M_2, both points of each chevron in the three posterior cells being confluent with the black marginal band. On hindwing, apices of veins R_5 to Cu_{1b} marked with black, the marks on M_2 and M_3 being largest and somewhat rounded. Gold spots occur in cells M_2 and M_3, corresponding to the gold spots of upperside. Anal margin suffused with golden scales. Overall, the underside is quite similar to that of other races (e.g., *O. v. regis*, as illustrated by Ohya, 1983: pl. 1, fig. 4).

Abdomen. Light cream ground colour, with lateral black spots on each segment, dorsal surface creamy mauvish-pink, claspers yellow.

Female. Forewing length 105 mm. (average).

Upperside. Dull black ground colour with a pattern of white patches, similar to nominotypical subspecies, i.e. much larger patches than in subspecies *regis*. On forewing white patches occur in discal cell, with up to nine large and small post-discal white areas, a preapical white spot in cell R_3, and a row of seven submarginal white spots, from cell R_4 to cell Cu_{1b}. Base of discal cell has a brownish streak, and a similar sized and coloured mark occurs at base of anal cells, with a small brown streak in cell Cu_{1b} adjacent to base of vein 2A. On hindwing, five whitish submarginal patches in cells R_5 to Cu_{1a}, and a post-discal series of six larger patches from R_5 to Cu_{1b}. The posterior portion of cell R_1 and extreme base of discal cell brownish-biscuit coloured, with the anterior margin of the patch strongly sinuate.

Underside. Forewing very similar to upperside, but brownish marking at base of discal cell slightly more orange, smaller and clearly defined. Hindwing also similar to upperside, but all anterior and posterior pale areas coloured brownish-biscuit.

Abdomen. Creamish above except at extreme base, black beneath with orange-brown spots on the more distal sternites, ostial area all orange-brown.

Holotype ♂. Solomons, west Choiseul Island, Siravanga, 7.ix.1974, E.N. Archer.
Allotype ♀. Solomons, west Choiseul Island, Vudutaru Village, 11.ix.1974, E.N. Archer.
Paratyes, 3♂, 2♀, Choiseul Island, 1974, E.N. Archer.
All specimens in collection of E.N. Archer, Barnet, England.

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VESPULA GERMANICA (F.) WASPS HUNTING DUNG BEETLES *APHODIUS CONTAMINATUS* (L.)

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On 24.ix.1983 the BENHS held a field meeting on Hampstead Heath. A patch of fresh, strong-smelling dog dung was attracting a number of flies—*Scatophaga stercoraria* (L.), *Lucilia, Calliphora* and *Sarcophaga* spp. On approaching, I noticed a wasp, flying low around the dung, stop in mid air, and fall the few inches to the ground. It seemed to struggle for a few seconds before resuming its hovering/ searching flight about the dung. The wasp shortly repeated this act, and I was able to see that it had attacked a beetle on the wing. The beetle however, easily escaped, leaving the wasp searching through the grass.The beetle was the common *Aphodius contaminatus* (L.) which was on the wing in the warm sunshine, also being attracted to the dung.

Four or five workers of *Vespula germanica* (F.) were all hunting in the same manner around the dung. While I watched, several *Aphodius* flew towards the dung and, as each closed in, a wasp darted towards it in mid-air, and both insects fell to the ground. Each time, the beetle escaped from the wasp's grip and pushed its way through the grass leaving the wasp urgently searching about for its lost prey. After a few seconds the wasp got up and resumed its stalking flight.

Not once did I see a wasp successfully capture and carry off one of these beetles, although several wasps were attacking them. The wasps paid very little attention to the other insects in the area. Occasionally a wasp collided with a fly or another wasp in the crowded grass around the dung, but no attempt at capture was ever made. Neither did the wasps pay any attention to the other beetles which were flying about—*Philonthus* spp. and other, smaller staphylinids.

Rau (1934) described a wasp hunting around a patch of dung, but that insect sat in wait on the dry dung and pounced upon flies as they flew down; he did not mention beetles.

Because of their hard bodies, Coleptera are only rarely recorded as prey of other insects. Hobby (1931, 1932, 1933) lists several beetle species preyed upon by Asilidae, including two species of beetles (*Polydrosus mollis* (Ström) and a *Phyllobius* sp.) as prey of *Vespula*. All of the predated beetle species (weevils, chafers, cantharids and dung beetles) can be hunted on the wing or in flowers and this may explain why asilids are able to capture them, but wasps are not.

Asilids are said to kill instantaneously (Hobby 1933) whereas wasps knock their prey to the ground before killing it. Perhaps asilids are able to capture beetles more easily by piercing the relatively soft abdomen under the elytra while the beetle's wings are extended. Wasps however, after knocking their target to the ground may find that the elytra close too quickly, rendering the beetle much more difficult to deal with.

Spradbury (1973) lists several flies as prey of wasps (including *Lucilia, Fannia, Polietes, Mesembrina* and *Phaonia* spp.) but why these wasps continued their apparently futile quest after *Aphodius*, ignoring the many, more vulnerable flies remains a mystery.

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EMPOASCA PTERIDIS AND OTHER HEMIPTERA FROM THE GARDEN OF BUCKINGHAM PALACE

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INTRODUCTION

In August 1981 a collection of Hemiptera was made from herbaceous plants in the Chelsea Physic Garden in order to see what species were adapted to living on cultivated plants in urban areas. Twelve of the family beds were sampled separately (105 genera in all) and these yielded 15 species of Heteroptera and 11 species of Homoptera Auchenorhyncha (Davis 1983a). The most abundant insect genus was *Empoasca* which was repesented by three species of leaf hopper *E. vitis* (Göthe), *E. decipiens* (Paoli) and *E. pteridis* (Dahlbom). This last species had not previously been definitely recorded elsewhere in Britain, but it was clearly polyphagous and, in view of its occurrence here in large numbers, it seemed unlikely that it did not occur in other similar situations. The next largest area of cultivated herbaceous plants in central London is probably the herbaceous border in the garden of Buckingham Palace. This was briefly described by McClintock (1964) when the natural history of the royal garden was the subject of a special natural history study. The insect survey in that study produced a list of 34 Heteroptera and 14 Auchenorhyncha, but almost all appeared to have been taken in a light trap, or off trees by beating. Several of the more common Hemiptera found at Chelsea Physic Garden were not recorded in that survey and it seemed probably that a collection specifically from the herbaceous border might produce additional species.

SAMPLING

Insects were sampled in Buckingham Palace Garden on 11.viii.82 with a petrol driven vacuum net (Dietrick 1961). Nine large patches of flowers in the border were chosen on the basis of contrasting botanical affinity and growth form though these were mainly bedding plants rather than perennials. Insects were also collected from patches of heather and dwarf azaleas growing at the western end of the border, and a single bulk sample was taken from mixed lakeside vegetation for comparison. Details of the plants sampled are given in Table 1.

TABLE 1 Plants sampled at Buckingham Palace garden.

Plant	*Cultivar*	*Family*
Salvia × superba		Labiatae
Antirrhinum majus	Coronette hybrid	Scrophulariaceae
Calceolaria hybrid	Sunshine	Scrophulariaceae
Pelargonium zonale	Princess of Wales	Geraniaceae
Tagetes erecta	African marigold—Jubilee mixed	Compositae
Tagetes patula	French marigold—Nell Gwyn	Compositae
Solidago hybrid	Golden thumb	Compositae
Chrysanthemum ptarmicaefolium	Golden moss	Compositae
Verbena hybrid	Tropic	Verbenaceae
Calluna vulgaris and *Erica × darleyensis*	(Heathers)	Ericaceae
Rhododendron	Kurume hybrids	Ericaceae

Lakeside vegetation: grasses, sedges, *Convolvulus arvense* and *Oenanthe crocata*

RESULTS AND DISCUSSION

Empoasca species were among the most abundant leaf hoppers from the herbaceous border. All males were dissected and 61 *E. pteridis* were identified from seven of the samples, thus confirming the hypothesis that the species is more widespread, at least on garden plants, than hitherto recognised. The preferred hosts here were *Tagetes* species. Now that the species can be more readily distinguished from its close relatives (le Quesne & Payne 1981; Davis 1983b), it should be possible to determine its distribution more fully. The species has recently been found on or near field beans (*Vicia faba* L.) in Cambridgeshire and Buckinghamshire (Le Quesne, pers. comm.).

Altogether eight species of Heteroptera and eighteen Auchenorhyncha were collected. Half of the Heteroptera had been recorded in the 1960s survey of the garden but only one of the Auchenorhyncha. This was the introduced *Graphocephala fennahi* (formerly recorded as *G. coccinea)*, heavy attacks by which reduce flowering in *Rhododendron*. Eight species were quite widespread on the cultivated plants but the rest were mostly confined to single samples. Thus eight occurred only on the lakeside vegetation and are all known to be associated with sedges and grasses. Four are associated mainly with trees and bushes and were probably from trees growing behind the herbaceous border. The heather sample produced a single species of bug known to be associated with these particular host plants. The absence of the normally common bug *Anthocoris nemorum*, which was commented on in the earlier survey, may again be noted. Its relative in the Cimicidae, *Orius minutus*, was particularly abundant on *Solidago*.

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This survey was made by gracious permission of H.M. the Queen. I am also most grateful to the Head Gardener, Mr David Mitchell who conducted me around the garden and supplied the names of the plants that were sampled in the herbaceous border. I should also like to thank Dr M.G. Morris for checking my specimens of *Amblytylus*.

TABLE 2 Occurence of Hemiptera
on plants sampled in Buckingham Palace garden 11.8.1982.

* = species recorded in 1960s study. T = species associated with trees and bushes.

	Salvia	*Antirrhinum*	*Calceolaria*	*Pelargonium*	*Tagetes erecta*	*Tagetes patula*	*Solidago*	*Chrysanthemum*	*Verbena*	Heathers	*Rhododendron*	Lakeside
HETEROPTERA												
Orius minutus (L.)	1	–	–	–	–	–	35	–	–	–	–	–
Amblytylus nasutus (Kirsch.)	–	–	–	–	–	–	–	35	–	–	–	–
* *Dicyphus errans* (J.F. Wolff) (1)	–	3	147	1	–	–	–	–	1	–	–	–
T * *Malacoris chlorizans* (Panzer)	–	–	–	–	1	–	–	–	–	–	–	–
Orthotylus ericetorum (Fallen)	–	–	–	–	–	–	–	–	–	6	–	–
* *Lygocoris pabulinus* (L.)	–	–	7	11	–	1	–	–	–	–	–	–
Stenodema calcaratum (Fallen)	–	–	–	–	–	–	–	–	–	–	–	1
* *S. laevigatum* (L.)	–	–	–	–	–	–	–	–	–	–	–	1
HOMOPTERA-AUCHENORHYNCHA												
* *Graphocephala fennahi* Young	–	–	–	–	–	–	–	1	–	–	30	–
Arthaldeus pascuellus (Fallén)	–	–	–	–	–	–	–	–	–	–	–	1
Cidadula ? quadrinotata (F.) (2)	–	–	–	–	–	–	–	–	–	–	–	1
Macrosteles sexnotatus (Fallén)	–	1	2	–	8	1	–	3	–	–	–	6
Notus flavipennis (Zett.)	–	–	–	–	–	–	–	–	–	–	–	36
Empoasca decipiens (Paoli) male	1	–	–	–	7	2	1	–	–	–	–	–
E. pteridis (Dahl.) male	–	4	9	–	34	6	2	2	4	–	–	–
T *E. vitis* (Göthe) male	–	–	1	–	–	–	–	–	–	–	–	–
Empoasca spp. female	2	6	4	–	32	11	5	6	3	–	2	–
Eupteryx aurata (L.)	12	–	1	–	6	4	–	1	1	–	–	–
E. florida Ribaut	12	–	–	–	–	–	–	–	–	–	–	–
E. melissae Curtis	15	–	1	–	2	–	–	–	1	–	–	–
E. stachydearum (Hardy)	5	–	–	–	–	–	–	–	–	–	–	–
T *Fagocyba carri* (Edwards)	–	–	–	–	–	–	–	–	–	–	1	–
T *Zygina flammigera* (Geoff.)	–	–	–	–	–	–	–	–	–	–	3	–
Kelisia punctulum (Kirsch.)	–	–	–	–	–	–	–	–	–	–	–	11
K. vittipennis (Sahlberg)	–	–	–	–	–	–	–	–	–	–	–	1
Javesella dubia (Kirsch.)	–	1	3	–	–	1	–	1	–	–	–	–
J. pellucida (F.)	–	–	–	–	–	–	–	–	–	–	–	4

Notes: (1) *Calceolaria* sample includes 128 nymphs. (2) female could be *C. persimilis*.

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CYRIL HAMMOND MEMORIAL LECTURE 1983

THE CONSERVATION OF DRAGONFLIES

by N.W. MOORE

The Farm House, Swavesey, Cambridge

INTRODUCTION

It is a great honour to be asked to give the first Cyril Hammond Memorial Lecture. I hope, and believe, that the subject of my talk would have pleased him. The last time I saw him was on a survey of the dragonflies of the Norfolk Broads, which he undertook for the Nature Conservancy Council: I know how strongly he felt about the conservation of dragonflies.

To the scientist nearly all life is valuable and should be conserved, but we have to admit that some groups are more equal than others. Of course I am biased, but I do think dragonflies are particularly worth preserving. They belong to an immensely ancient group: close relations of many living species were contemporary with the dinosaurs, and there are some which have changed little since the Trias. Huge insects allied to dragonflies were on the wing in the Carboniferous. To look at a dragonfly and realise that it is a contemporary with the dinosaurs and *Archaeopteryx* is very exciting.

Also, they are extremely beautiful—large and diurnal; elsewhere I have called them the "Birdwatcher's Insect" (Corbet et al., 1960). Like birds and ourselves they are dependent on vision: theirs is extremely good.

Dragonflies have no close relations today, and they have numerous features which are unique among insects. For example, the larva has a prehensile labium which is shot out under hydrostatic pressure to catch its prey. The larval rectum is used for respiration and, in the Anisoptera, for jet propulsion. Adult dragonflies, unlike most other insects, move their wings by direct musculature. The secondary accessory genitalia on the second and third abdominal segments of the male, and hence the method of copulation "in a wheel" are unique among insects, and so is the use of the head as a balancing organ. Like birds, most dragonflies are territorial and many species have spectacular displays.

Over 5,000 species of dragonflies have been described and there may well be twice that number. Again, they resemble birds, of which about 9,000 forms have been described. Dragonflies are essentially tropical, their main centres of speciation being South America and South East Asia including Indonesia, although very rich faunas also occur in tropical Africa and Australia. Not surprisingly for a tropical group we have a very poor fauna in the British Isles and there are far more species in the south than the north. There is only one in Shetland. However we are fortunate in having representatives of no less that nine families out of the world's total of 28.

THE STATUS OF BRITISH DRAGONFLIES AND THEIR CONSERVATION

In 1945 we had 41 regularly breeding species and received three species as immigrants, but since then no less than four species have become extinct. The only known habitat of the little damselfly *Coenagrion scitulum* was destroyed by the North Sea floods of 1953. *Oxygastra curtisii* was exterminated in the 1960s by sewage pollution in its only habitat, incidentally, the habitat where it was first discovered in 1820 and subsequently described as a new species. Another rare European species, *Coenagrion armatum*, was lost in the Norfolk Broads in the 1950s as a result of habitat changes caused by lowering the water table. Similar causes exterminated *Lestes dryas* throughout East Anglia and South East England, though it still survives in Ireland*. These cases all demonstrate how vulnerable a species is when it is confined to a few localities (Moore, 1976 & 1980).

It is the duty of the Nature Conservancy Council to notify Sites of Special Scientific Interest, and the more important dragonfly sites have been notified as SSSI. However, until the passing of the Wildlife and Countryside Act in 1981 there was no mechanism by which farmers and landowners were obliged to consult about agricultural changes on SSSI, and so there was no way of preventing them draining notified wetlands. Informal persuasion saved many sites, but many others were lost. On the other hand, the NCC's policy of selecting National Nature Reserves on a habitat basis has been successful in providing refuges for most of our species. Although no NNR was declared for its dragonflies alone, no less than 32 of our 38 species occur in National Nature Reserves and of the remainder, 4 occur on reserves managed by Naturalists' Trusts and a river species occurs on rivers the water quality of which is well protected by the relevant Water Authorities. Nevertheless some of the protected populations are small and further conservation measures are required.

Many water bodies are transient habitats and therefore the species which breed in them have evolved good dispersal mechanisms. This means that if you dig a pond or lake it quickly becomes colonised by dragonflies. Therefore, there is great scope for providing habitats for dragonflies in gardens, farms, and above all, in nature reserves.

The local *Coenagrion mercuriale* has been persuaded to colonise one of the NCC's NNRs in Dorset in this way, and another local damselfly, *Ischnura pumilio*, an RSPB reserve in the same county. I had 20 small ponds dug in a field at Wood Walton Fen NNR in 1961 for experimental purposes. Fourteen species have subsequently visited the ponds and eight breed in them regularly, including the local *Sympetrum sanguineum*.

At one time much of the Fens were covered by acid peat and dragonflies dependent on acid water—*Aeshna juncea*, *Sympetrum danae*, *Orthetrum coerulescens* and *Ceriagrion tenellum* used to breed there. They disappeared from the Fens in the first quarter of this century when the acid water disappeared. Three more ponds were dug at Wood Walton Fen ten years ago. They were dug in acid peat in order to discover whether they would be recolonised by the acid water species. Individual *Aeshna juncea* have visited the ponds, but have not yet bred in them, although they have bred in the much larger mere excavated nearby at the Holme Fen NNR. The other species are under close surveillance in East Anglia. They are now extremely rare there and so it is not surprising that they have not reached the experimental ponds. Meanwhile, experiments are being made in order to introduce *Ceriagrion tenellum*, the species most unlikely to reach Wood Walton under its own steam. This damselfly has bred on one of the ponds, but the population has not been maintained, and further work is required before it can be established. I would like to make a strong plea for work of this kind, because reintroductions of species to nature reserves will become increasingly necessary if rare species are to survive at a time when the total amount of available habitat is in decline. Such studies must be based, of course, on careful autecological work.

* Since this lecture, *Lestes dryas* has been found again in several places in England. This was probably, though not certainly, due to recolonisation from the continent.

WORLD CONSERVATION OF DRAGONFLIES

The British dragonfly fauna is a poor one and has no endemics; the main conservation effort must be done overseas, principally in the tropics. Until 1980, dragonfly conservation throughout the World was purely incidental, but that year the International Union for the Conservation of Nature and Natural Resources decided something should be done. Sir Peter Scott, at that time the Chairman of IUCN'S Special Survival Commission asked me to set up an Odonata Specialist Group to advise IUCN and the World Wildlife Fund on the conservation requirements of dragonflies, with particular emphasis on research and research priorities. In doing this I received much help from Dr Robert Pyle, the Chairman of the Lepidoptera Specialist Group.

We held the first meeting of the Odonata Specialist Group at Kyoto in Japan in August 1980 on the occasion of the 16th International Entomological Congress. Each member represents a Continent or large subcontinental region. At the Kyoto meeting we reviewed the present state of knowledge, drew up a list of research priorities and made suggestions for species to be included in IUCN's International Red Data Book (Moore, 1982). Our main problem is the great unevenness of knowledge—we are particularly ignorant about the status of dragonflies in the Third World, where species are most abundant and the most threatened. However, we could make some proposals. Our first was for a study of *Epiophelebia laidlawi* in Nepal. This species, and a related one in Japan, are living fossils; they are the only surviving members of a suborder, the Anisozygoptera, which is intermediate between the Anisoptera (the true dragonflies) and the Zygoptera (the damselflies). *E. laidlawi* is threatened by forest clearance in the Himalayan foothills. With financial help from the World Wildlife Fund, Professor Syoziro Asahina, who represents East Asia on the Odonata Specialist Group, made a survey in the mountains in 1981, and discovered the local requirements of the species. (Asahina, 1982).

In 1982 I was able to help with another of our priority projects. This one was in Hawaii. The Hawaiian Archipelago is extremely isolated, being about 2,000 miles from Japan, Alaska and California. Very few insects have got there naturally—for example only two butterflies. The entire dragonfly fauna is descended from three insects. There is a gigantic aeshnid (*Anax strenuus*), a small aberrant sympetrine Libellulid (*Nesogonia blackburni*) and about 27 species of *Megalagrion. Megalagrion* is an outstandingly interesting endemic genus of damselflies. It has "done a Darwin's Finch" in a most spectacular way. Its species have radiated out and become adapted to every possible niche on the Hawaiian islands, so that there is as much variation of life history in this one genus as in the whole of the Odonata. The larvae of different species have become adapted to living in ponds, rivers, mountain streams, wet moss, the axils of epiphytic plants and even leaf litter. Most of the species have survived in the rain forest, but one, *Megalagrion pacificum*, which was once abundant in the lowlands, is practically extinct. In 1982 Wayne C. Gagné and I made a search for this species. We rediscovered it where it had last been seen, found another locality for it and obtained evidence that its disappearance was largely due to the introduction of the Mosquito fish *Gambusia* to control mosquitoes (Moore & Gagné, 1982). Fortunately the two localities occur on land bought by the American Nature Conservancy and we were able to make suggestions to them on how this much endangered species might be conserved.

The Odonata Specialist Group meets biennially on the occasions of the international symposia of the Societas Internationalis Odonatologica. For example, the second meeting was at Chur in Switzerland. At this meeting we drew up a resolution for the use of IUCN. It emphasised that habitat destruction was a much more important cause of dragonfly decline than collecting—a point that is obvious to entomologists but not to politicians. We considered further research projects and made further recommendations to IUCN. The Group publishes occasional reports by a much appreciated arrangement with the Editor of Odonatologica.

There is of course an immense way to go. There is no possibility of Third World countries setting up nature reserves for dragonflies alone, but we have already found that the information which we provide can strengthen the case for conservation of particular waters and forests which should be conserved both on economic and conservation grounds. At least we have made a start; yes, I hope Cyril would have been pleased.

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LATE AND PARTIAL THIRD BROODS AND SIGHTINGS OF RARE BUTTERFLIES IN WEST WIGHT

by S.A. KNILL-JONES

Roundstone, Freshwater, Isle of Wight, PO40 9AL.

1983 will be remembered for having one of the most prolonged summers this century. The first frost occurred on the morning of 23rd October, although there was no marked drop in temperature until 14th November, a day that had the first true nip of winter during a month in which local people reported having apple and pear blossom on their fruit trees.

The fine weather began in June after a series of hail storms at the beginning of the month. On 5th June there was a heavy hail storm shortly after mid-day which lasted for ten minutes and I recorded hail stones measuring up to $^3/_4$ inch in diameter and recall that the tennis court assumed a white blanketing which remained for over an hour. July was an exceptionally dry, warm and sunny month with only three days of rainfall, the wettest day being 31st July. A temperature of 32°C (90°F) was recorded on 12th July making this the hottest and driest July this century with less than 6mm of rain being recorded. August, September and October were also exceptionally dry months with few wet days, the wettest period being in mid-October when there was some quite wet and stormy weather with over 25mm of rain falling on 16th October.

This fine spell produced a memorable year for butterflies and all other flying insects and I was able to spend a great deal of my time observing the wild life in a small district of Freshwater known as Spinfish (Sheepwash) and in my Mother's private garden which is not more than a stone's throw from this locality.

The most notable migrant butterfly was the Clouded Yellow *Colias croceus* (Geoff.) and the emergence of a second brood in this country is unusual. The original migrants arrived in southern England at the beginning of June and British bred imagines were on the wing up to the end of October. They were in welcome abundance at Compton Bay in early August and were regarded as an unusual but pleasing sight by local people and holiday makers.

RECORDS

The main purpose of this paper is to recall some exceptional late sightings of some species together with observations & capture of some of our rare butterflies.

The most notable capture was a male Large Tortoiseshell *Nymphalis polychloros* which flew into the sitting room during the afternoon of 29th July. There have been very few records of this butterfly in recent years and with a sighting last year at Shanklin by Lt. Cdr. J.M. Cheverton it is quite possible that it is breeding on the Island. Before 1939 it was found in the north west of the Isle of Wight notably the Bouldnor district and now that the elm tree saplings are of a considerable size it is quite likely that this lovely insect will make a come-back, as it has characteristically done so in the past.

On the following day I saw a worn White Admiral *Ladoga camilla* on a blackberry. This must have strayed some distance from its breeding ground. It is known to occur at Cranmore which is over four miles from the centre of the village of Freshwater.

A sighting of a Camberwell Beauty *Nymphalis antiopa*, was reported to me on 5th September by Mrs. M.C. Kiszely which she witnessed with her husband sunning itself on their patio at Totland Bay.

There was a partial second brood of Small Heaths, *Coenonympha pamphilus* in September and on the 23rd of this month I captured a fine ab. *partimtransformis* in the meadow. This also happened to be the last Small Heath to be seen there this year.

It is always pleasurable for the entomologist to see insects, especially butterflies on the wing after October and I shall now diarise my findings.

On 4th October I saw my last Painted Lady, *Cynthia cardui*. This was freshly emerged and was sunning itself in the meadow at Middleton. This butterfly was quite numerous at the height of the summer and there was a second brood which appeared in September. A rather battered female seen feeding on flowers of *Plumbago willmottiae*, on 14th November was the last butterfly seen in West Wight. The disappearance of the September brood so soon in favourable weather supports existing evidence of southward autumnal migration.

Also on 4th October I saw a freshly emerged Small Tortoiseshell *Aglais urticae* and another worn example on 10th October. This butterfly was not at all plentiful this year and I am of the opinion that needless cutting of its foodplant nettle (*Urtica dioica*) may account for it being less numerous in a number of localities.

One of the more interesting captures was again on 4th October when I netted a female Chalkhill Blue, *Lysandra coridon*, which had white streaks on both forewings,

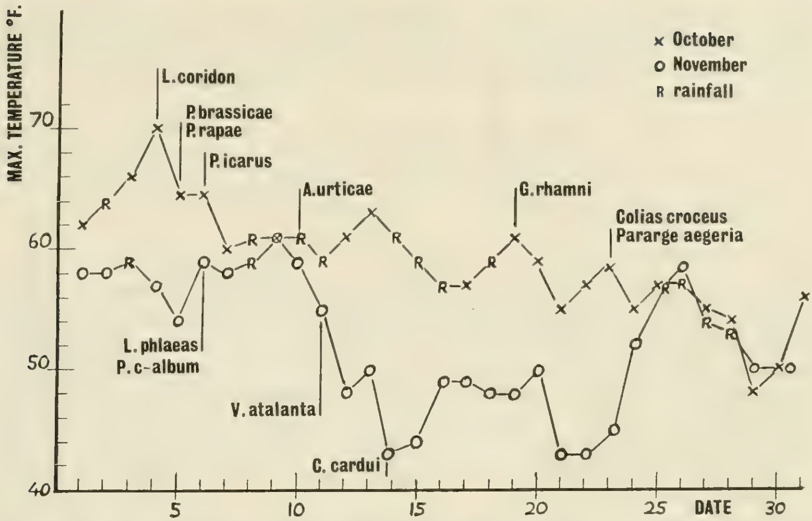

Fig. 1 Last sighting dates of butterflies in West Wight in 1983, set against daily maximum temperatures and days with rainfall recorded at Totland Bay by P. Lucas.
October rainfall totalled 52mm on 8 days.
November rainfall totalled 47mm on 6 days.

notably the right one. This was a freshly emerged butterfly and the streaks were probably caused through difficulty whilst emerging. In 1962 this species was seen as late as the third week of October and I suggest that it is probable that *Lysandra coridon* may occasionally overwinter as a pupa. I saw four examples of this butterfly in late September which were all females.

On 5th October I netted a Large White, *Pieris brassicae* and a pair of Small Whites, *Pieris rapae*. It is recorded that only in exceptional years may there be a third brood of *Pieris brassicae*, which are small in size. The male which I netted sunning itself on the flowers of a single artichoke plant in the back garden was 47mm expanse, about three quarters the normal size of the summer brood. *Pieris rapae* has a partial third brood in favourable years, although these specimens were no smaller than the accepted norm, the male being slightly darker but more lightly spotted.

On 19th October a male Brimstone *Gonepteryx rhamni* was seen flying by the side of the brook in the mid-day sunshine. This was only the third that I had occasion to see this year.

The last two *Colias croceus* were seen on 23rd October after the first frost of winter, the first flying high over buildings at the entrance to Spinfish and a second, a female, was netted in the garden. It deposited ova, but due to a marked drop in temperature I was only able to breed as far as fully grown larvae. The last died on 1st December, in spite of my making use of an airing cupboard, which was also subject to variations in temperature. A male undersized example of a third brood, reared from a wild female of a second generation taken at the end of September, emerged on 17th November.

The Comma, *Polygonia c-album*, has proved to be quite common locally and I was fortunate to net some fine abberations, which included an extremely pale f. *hutchinsoni* and ab. *extincta*. Aberrant forms of this butterfly seem to be concentrated at Freshwater. The autumnal brood was nearly as numerous as the summer one and the undersides of these imagines were much darker with the majority approaching black. Ab. *variegata* was present in this brood although these were dark compared with the earlier brood. I saw this species in the garden as late as 6th November.

There was an exceptional third brood of Small Coppers, *Lycaena phlaeas*, and the numbers observed were considerably higher than in either of the earlier broods. I saw a half a dozen pairs in copula, an event that was occasioned by early morning sunshine and which lasted for over two hours. I saw this butterfly on 6th November, an unusually late date for this species.

Red Admirals *Vanessa atalanta*, were observed in November on several occasions. One was seen in the village on 3rd November and I saw a freshly emerged example basking in the sun by a hedge at Middleton on 7th November, which was an unusually warm day for this month with the temperature rising to over 15.5°C (60°F). Dr. John Waring of Totland saw this butterfuly, which was also a recent emergent, feeding in the sun on an *Arbutus* plant (Strawberry Tree) on Friday 11th, Veterans' Day. I now believe that in some years, when there has been a prolonged summer coupled with a mild and dry autumn, a partial second brood of *Vanessa atalanta* may occur in October and November and that it seems likely that the afore-mentioned sightings were such speciments.

Dr. Waring's observation of *Cynthia cardui* on 14th November has been detailed above.

The prolonged summer of 1976 will also be remembered for some late sightings, notably Peacocks, *Inachis io*. Baron Charles de Worms observed fully grown larvae at the end of September and second brood adults in his Surrey garden during October. Mr. G.R. Else reported seeing this species on the wing as late as 27th November. I also reported seeing *Vanessa atalanta* on the wing as late as 21st November, which gives further evidence of a second brood.

In conclusion the most significant difference between these two years was that there were more species (12) on the wing after 1st October in 1983 and that *Colias croceus* was seen in fair numbers right up to the end of this month and was the third most numerous butterfly. Whereas 1976 was the greatest year since 1872 for *Nymphalis antiopa*, 1983 was the greatest year for *Colias croceus* since 1947.

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INTRASPECIFIC VARIATION IN THE LEAF-MINER PARASITE *EXOTELA CYCLOGASTER* FÖRSTER (HYMENOPTERA: BRACONIDAE)

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INTRODUCTION

Exotela cyclogaster Förster (Braconidae, Alysiinae, Dacnusini) is a common parasite of leaf-mining *Phytomyza* species (Diptera, Agromyzidae) on Umbelliferae and less frequently on Compositae. In the most recent treatment of this genus, Griffiths (1966) recognises three subspecies on morphological grounds which also correlate with host associations. As part of a wider study of the parasitoid community structure of Dipterous leaf-miners, a number of specimens of two of the subspecies have been reared. Measurements indicate that the chief characters used to separate the two subspecies are linearly related to parasite size which in turn is related to the size of the host.

Though *Exotela cyclogaster* was described by Förster (1862), it remained unrecognised until Griffiths (1964) re-examined the type. In the interim, Nixon (1937) had described this species as *Dacnusa bellina*. Later, Nixon (1954) transferred *bellina* to *Toxelea* and described a second species *umbellina,* which differed from *bellina* in colour and in the number of antennal segments. Between 1964 and 1968, Griffiths revised the Dacnusini parasitizing agromyzids using both morphological and biological criteria. In discussing the parasites of *Phytomyza* (Griffiths 1966), he reduced *umbellina* to a subspecies of *cyclogaster* (= *bellina*). He also described a third subspecies, *sonchina* which was not encountered in this study and is not considered further.

Griffiths (1966) gives the following differences between *cyclogaster* and *umbellina.*

Antennal segment number. *E.c. cyclogaster*, 24–28; *E.c.umbellina,* 20–25.

Thorax length/height ratio. *E.c. cyclogaster,* 1.1–1.2; *E.c. umbellina, c.*1.0

Colour. The legs, the base of the antennae and the mouthparts of *E.c. cyclogaster* are more extensively yellow than in *E.c. umbellina.*

Hosts. *E.c. cyclogaster: Phytomyza heracleana* Hering, *P. spondylii* Robineau-Desvoidy, *P. pastinacae* Hendel, *P. spondylliivora* Spencer and *P. aegopodii* Hering (all miners on Umbelliferae), a total of 23 specimens bred from these hosts. In addition Griffiths records single specimens from two Compositae miners, *P.?.simmi* Beiger and *P. virgaureae* Hering. *E.c. umbellina: Phytomyza adjuncta* Hering, *P. anthrisci* Hendel, *P. aurei* Hering, *P. chaerophylli* Kaltenbach, *P. conii* Hering, *P. conopodii* Hering, *P. ferulae* Hering, *P. melana* Hendel and *P. obscurella* Fallén (all miners on Umbelliferae), a total of 42 specimens bred from these hosts. In addition, a series from *P. angelicastri* Hering was considered intermediate.

BREEDING RECORDS

E. cyclogaster was reared from the following hosts.

Phytomyza chaerophylli (= *anthrisci sensu* Griffiths 1966) 38 females, 30 males. Silwood Park, Ascot, Berkshire. Collected May 1982, emerged October–November 1982.

Phytomyza angelicae Kaltenbach (new host record) 5 females, 1 male. Silwood Park, Ascot, Berkshire. Collected May–June 1981, emerged June 1981–March 1982.
Phytomyza spondylii
1 female, 2 males. Selbourne, Hampshire. Collected and emerged July 1981.
2 females. Roddam Dene, Northumberland (mines collected by M.J. Crawley). Collected June 1981, emerged July 1981.
12 females, 1 male. Windsor Great Park, Berkshire (mines collected by A. Sheppard). Collected September 1982, emerged November 1982.

The specimens from *P. chaerophylli* agreed with Griffiths' description of *E.c. umbellina* while those from *P. angelicae* and *P. spondylii* conformed to *E.c. cyclogaster.*

TABLE 1 The distribution of antennal segment number in the subspecies of *Exotela cyclogaster.*

Antennal segments	*E.c. umbellina*		*E.c. cyclogaster*	
	male	*female*	*male*	*female*
20	1	1		
21	5	5		
22	14	10		
23	15	10		
24	1	4	7	1
25		1	9	
26		1	2	2
27				1

MORPHOLOGICAL MEASUREMENTS

For each specimen, the following data were recorded.

1. Sex
2. The number of antennal segments.
3. Length of the thorax (a measure of size that can be taken with less ambiguity than total length).
4. The ratio of the length to the height of the thorax.

In addition 20 fresh puparia of *Phytomyza chaerophylli* and *P. spondylii* were taken and the following measurements made.

1. Maximum length.
2. Maximum width (puparia viewed dorsally with both spiracles visible).
3. Maximum depth (puparia viewed laterally with one spiracle obscured by the other).

RESULTS

The number of antennal segments

Table 1 shows the distribution of antennal segment numbers in the two subspecies. In both cases there is a tendency for males to have more segments than females though neither comparison is significant (comparisons were made using a T test with independent variance estimates and 95% confidence limits). *E.c. cyclogaster* has a greater number of antennal segments than *E.c. umbellina* and this difference is highly significant ($T_{42} = 11.1$, $p < 0.001$). However, antennal segment number is strongly dependent on the size of the insect. If antennal segment number is regressed against the length of the thorax in *E.c. umbellina,* the resulting relationship is highly significant ($F_{1,66} = 41.7$, $p < 0.001$). Similarly for *E.c. cyclogaster,* the two measurements are related ($F_{1,20} = 12.9$, $p < 0.005$). However. *E.c. cyclogaster* is a bigger insect than *E.c. umbellina* with an average thoracic length of 0.675mm as opposed to 0.601mm, a small difference in absolute terms but highly significant ($T_{29} = 6.3$, $p < 0.001$). If the records of *E.c. umbellina* and *E.c. cyclogaster* are included together and antennal segment number plotted against thorax length (Figure 1), it can clearly be seen that the difference in antennal segment number between *E.c. umbellina* and *E.c. cyclogaster* is merely a reflection of the differences in the sizes of the insect.

In Table 2 the dimensions of the 20 puparia of *P. chaerophylli* and *P. spondylii* are given together with the significance of the difference. *P. spondylii* is larger than *P. chaerophylli* in length, depth and width. Larger hosts frequently give rise to larger parasites (Charnov 1982) thus the larger size and antennal segment number of parasites from *P. spondylii* is probably only a reflection of the size of the host.

TABLE 2 The differences in the dimensions and the ratios of the dimensions of *Phytomyza spondylii* Robineau-Desvoidy and *P. chaerophylli* Kaltenbach puparia.

	P. spondylii	*P. chaerophylli*	*Significance of difference*
Length (L)	2.03	1.74	$p < 0.001$
Depth (D)	1.06	0.94	$p < 0.001$
Width (W)	1.14	1.07	$p < 0.01$
L/D	1.92	1.86	$p < 0.05$
L/W	1.78	1.64	$p < 0.001$
D/W	0.93	0.88	$p < 0.001$

The ratio of the length to the height of the thorax

The average ratio in *E.c. cyclogaster* was 1.13 and in *E.c. umbellina* 1.08. The difference is significant ($T_{32} = 5.1$, $p < 0.001$). The thorax of *cyclogaster* is thus more elongate than *umbellina* but it can be seen from Table 2 that the puparium of the host of *cyclogaster* is relatively more elongated and cylindrical in comparison with the puparium of the host of *umbellina*. At eclosion, the braconid almost completely fills the shell of the puparium and it is suggested that the shape of the thorax is probably influenced by the shape of the puparium.

Colour

E.c. umbellina in most cases appears a darker insect than *E.c. cyclogaster* and the differences noted by Griffiths normally hold. However, as Griffiths pointed out, colour is very variable and there is some overlap in this character with some specimens of *cyclogaster* in particular being very dark.

DISCUSSION

It is suggested here that the differences between the two subspecies are merely a result of differences in the hosts from which they were reared. The size of the host determines the size of the parasite and the number of antennal segments while the shape of the host puparium may influence the shape of the thorax. No suggestions of how host species influences colour are put forward but the minor, variable differences in colour are not considered significant in the absence of stronger morphological differences. The presence of intermediates from *P. angelicastri* also casts doubt on the distinctiveness of the subspecies. It is suggested that *E.c. umbellina* should be synonymised with the nominate subspecies and that the third subspecies, *E.c. sonchina*, should be examined to see if it too warrants reduction in status. The possibility of host-related variation should be taken into account in the taxonomy of other groups of parasitic Hymenoptera.

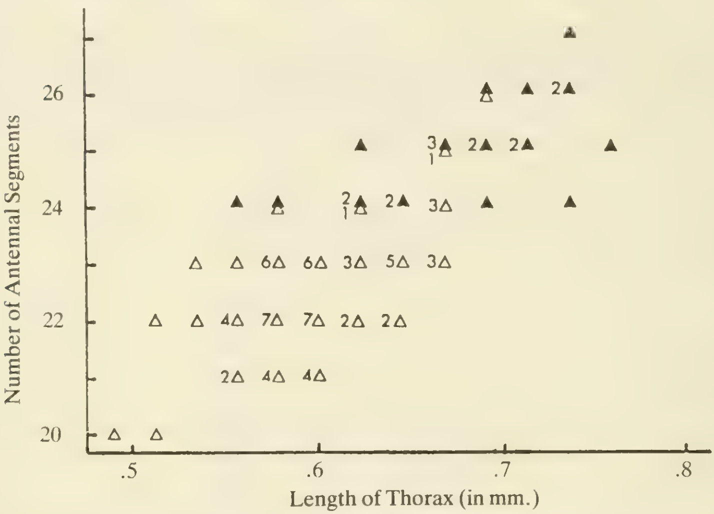

Fig. 1 The relationship between the length of the thorax and the number of antennal segments. Solid triangles refer to *E.c. cyclogaster* and open triangles to *E.c. umbellina*.

ACKNOWLEDGEMENTS

I would like to thank Andy Sheppard and Dr. Mick Crawley for giving me reared leaf-miners and their parasites and Tom Huddleston and Dr. Val. Brown for useful discussion.

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OBITUARY

ROBERT W. WATSON

Robert Watson was born on the 20th October 1916 in Bournemouth. His father was a Canadian killed in the first world war and Robert never saw him.

The family lived with his grandmother and it was in the parks of Bournemouth that he first discovered the commoner Lepidoptera. he knew no entomologists but was greatly encouraged by his mother. He received little help from his school teachers but friends brought him many specimens. His equipment was most primitive and he only acquired proper apparatus at fourteen.

In 1929 his mother married again and they moved to Hordle. For the next two years he happily explored the New Forest.

A flair for accountancy resulted in his being articled to an accountant. He had to live at home during training, but his stepfather refused to keep him and so Bob left home.

A farmer gave Bob an old cottage in return for work on the farm. He kept himself with a paper round, the sale of farm rabbits and by selling farm produce on a 50:50 basis with the farmer; but often went hungry. He also wrestled at fairs, usually winning. He was extremely strong and a photo of the period shows him to be thin and lanky. Later Bob became a milk roundsman. He was so efficient that within a year he was branch manager, a post he held until the outbreak of war.

In 1940 Bob joined the army: by memorising all the common eye-test charts he passed the medical despite being congenitally almost blind in one eye. After a year the disability was discovered and he was discharged. Bob then worked in A.R.P. until on the founding the R.A.F. regiment he re-enlisted. Again he was discharged after a year.

A variety of jobs linked to the military occupied him until 1945 when he set up his own accountancy business in Lymington.

In 1942 Bob had married Betty, eldest daughter of Mr. and Mrs. Haytor of Shaftsbury by whom he had a son and a daughter, but the marriage was not a success and they parted in 1945. Eventually Bob married his first wife's sister Nora who for seventeen years helped to build up the Watson collection, breeding and finding many rare varieties. In 1964, thinking she had cancer, she committed suicide.

Bob's dormant interest in Lepidoptera was rekindled on meeting F. S. Reeves and seeing his collection in 1943.

Bob aimed not for a complete collection, but one of perfect specimens perfectly set. Many times rare varieties, caught in the field, but slightly damaged were freed. Specimens obtained by gift or purchase were, if not to his satisfaction, relaxed and reset. When we remember that he was virtually one eyed his setting was a miracle of perfection. The magnificent collection housed in 65 Hills units is now in the British Museum (Natural History).

By the early fifties his business was flourishing and with the help of friends he built "Porcorum"* at Sandy Down, residing there from 1957. Because of the house name his friends began to give him china pigs and eventually the collection numbered several hundred.

In 1966 Bob obtained ten pupae from a female of the red form of the Cinnabar Moth (*Tyria jacobaeae*) which he subsequently named ab. *coneyi*. He also had access to the material of A.W. Coney and D.E. Dodwell. He bred from these and obtained a

* So called because of a bet that he would not name the house after his nickname "Porker".

magnificent assembly of the possible variations. These were shown at Annual Exhibitions and described in the Entomologist's Record. (1967, 1968, 1972, 1975.)

Two aspects of Bob's work do not seem to be generally known. Early work proved that ab. *coneyi* was dominant and that there were weak broods in *jacobaeae*, i.e. pairings produced few offspring. To preserve the strength of the stock and offset the results of inbreeding he occasionally introduced wild normal specimens into the stock. To combat the effect of weak broods he used to put six males and six females together and treat the progeny as a single brood. Certainly his methods were effective for he had a considerable and strong stock after twenty five years, whereas broods inbred in the normal way died out in two or three.

When Nora his second wife died Bob was desolate, but at length he remarried his first wife who was of great help to him in the early work on the Cinnabar moth. She died in 1968.

Within months Bob married Rosemary but it was a far from happy affair and by mutual consent they parted in 1975.

In December 1975 after a whirlwind courtship he married Amanda only daughter of Sir Charles and Lady Cooke; it was a stormy but on the whole a happy marriage.

In the early seventies Bob set up the "Watson Trust for Entomology" by which he gave his collection and books to the British Museum (Natural History) with the proviso that they remained at Porcorum during his life. At the same time Bob and his wife began to hold open days yearly for entomologists to view the collection. These were a great success and the hospitality lavish.

In 1982 Bob's health deteriorated rapidly. He attended the Verral Supper, entering hospital immediately afterwards. He rallied for the open days and was in great form, but it was obvious that he was not well. He died at home on 26th May, aged 65. Over one hundred and fifty mourners attended the funeral, at which the Society was represented by myself.

Bob left a thriving accountancy business in Lymington in his own name.He was very proud that his was the only firm that had not undergone an amalgamation. He served on many Accountancy Committees and was an authority on income tax and several other branches of the law.

He was a member of a local shoot and a first class shot. He was also a good fisherman.

He greatly encouraged young entomologists, often sending them away with gifts of store boxes and setting material. Besides his membership of this society he was a Fellow of the Royal Entomological Society, and a member of the AES, and of the Hampshire & I.o.W. Societies.

Personally I always found him a most kindly, helpful and generous soul. He will be greatly missed by all who knew him.

He is survived by his widow, Mrs. Amanda Watson who intends to continue some of the work on the cinnabars. We extend to her our deepest sympathy.

B.J.M.

LIST OF PUBLICATIONS

1967. New Aberrations of *Callimorpha jacobaeae* (Linn) (Lep. Arctiidae) *Ent. Rec. J. Var.* **79**: 33–35.

1967. Notes on larval habits of *Eriogaster lanestris* Linn. (Lep. Lasiocampidae) *Ent. Rec. J. Var.* **79**: 85–86.

1968. Notes on the Hod Hill, Dorset, Colony of *Euphydryas aurinia* Rott. (Lep. Nymphalidae) *Ent. Rec. J. Var.* **80**: 220–221.
1968. New Aberrations of *Callimorpha jacobaeae* Linn. (Lep. Arctiidae) *Ent. Rec. J. Var.* **80**: 181–183.
1969. Notes on *Melitaea cinxia* L. 1945–1968. *Ent. Rec. J. Var.* **81**: 18–20.
1972. Further Aberrations of *Callimorpha jacobaeae* Linn. (Lep. Arctiidae) *Ent. Rec. J. Var.* **84**: 11–12.
1975. Aberrations of *Diacrisia sannio* Hübner (Lep. Arctiidae) *Ent. Rec. J. Var.* **87**: 258.
1975. New Aberrations of *Tyria jacobaeae* L. (Lep. Arctiidae) *Ent. Rec. J. Var.* **87**: 258.

THE MACRO-LEPIDOPTERA OF MITCHAM COMMON, NORTH-EAST SURREY

by R.K.A. MORRIS
241 Commonside East, Mitcham, Surrey, CR4 1HB

INTRODUCTION

Mitcham Common has been described as a "dreary waste" (Abercrombie, 1944). This description was to some extent refuted by Lousley (1971), whose excellent record of the flora reflects some of the qualities of Mitcham Common. It was unfortunate that Lousley emphasised only the botanical aspects of the Common. However, Morris (1976) provided further evidence of the Common's richness in his review of the avifauna.

To date, entomological records for the Common are incomplete, although frequent references to Mitcham Common are made by Evans and Evans (1973). It is the purpose of this paper to provide a more complete and up to date record of the macrolepidoptera based upon my own observations and augmented by those of other recorders.

HABITAT

The Common is situated on the Taplow terrace of the Thames gravel deposits, overlying London Clay. It is these gravels that give the Common its varied habitat. Extraction of gravel during the 19th century left low-lying areas that developed as wetter ground providing to this day the habitat of a number of rare plants.

Geographically the Common can be divided into six separate areas (fig. 1):

1. Golf course: varied with roughs providing a valuable habitat for many grassland plants, whilst the ditches have a rich wetland flora.
2. Football pitches: quite barren and uninteresting.
3. Modern rubbish dumps: these are still in the process of ecological stabilisation. However they have a distinct ecological significance, being the home of Creeping Thistle *Cirsium arvense* L. Mallow *Malva sylvestris* L., Stinging nettle *Urtica dioica* L. and Hemlock *Conium maculatum* L.
4. Landscaping: a recent addition to the geography, which is increasing pressure on the original ecology. It is noteworthy that the original pH of the Common is acidic, however, included in the recently deposited material is lime. This policy was intended

to provide the required conditions for a downland flora. It is quite conceivable that this action may in the long term, have a deleterious effect on the original flora and fauna.

5. Original gravel deposits upon which the majority of grassland and woodland is situated.

6. Ponds: these are the result of early gravel extraction. The varied fauna of these sites is too extensive to consider in this paper. Worthy of mention is the presence of the Bogbean *Menyanthes trifoliata* L.

Botanically the Common can be divided into seven major habitats:

1. Grassland, invaded in places by such species as Petty Whin *Genista anglica* L., Dwarf Furze *Ulex minor* Roth, and Spiny Restharrow *Ononis spinosa* L. Much of the more varied grassland is to be found on the golf course and the site opposite The Goat public house.

2. Temporary wetland, with standing water throughout much of the winter. Associated with these conditions are such species as Tufted Hair Grass *Deschampsia cespitosa* L., Parsley Water Dropwort *Oenanthe lachenalii* C.C. Gmelin, and Marsh Cudweed *Gnaphalium uliginosum* L. These damp areas are on the decline, hence much of their flora is in jeopardy. Unfortunately, space does not permit a full review of the flora of these sites.

3. Deciduous woodland, mainly mature oak. Very few mature oaks exist on the Common, the best being small patches of woodland on the golf course and the area opposite The Goat public house.

4. Sallow scrub, mainly associated with the areas of standing water. Remarkably this habitat is on the increase. This environment is mainly to be seen in the area bordered by the Croydon Road, Commonside East, Windmill Road and Cedars Avenue.

5. Dense hawthorn scrub in two forms:

(a) Tight canopy of hawthorn with very little ground cover. Botanically rather sterile but it provides a valuable food source and roost for birds.

(b) Loose canopy with many other species present. This would appear to be the transition from hawthorn scrub to oak/birch woodland.

6. Open scrub consisting of hawthorn, blackthorn, some small oaks, and in places dense thickets of birch. Left alone, much of this would form dense oak and birch woodland.

TECHNIQUES

Most records have resulted from a static mercury vapour light trap run in my back garden. This site is directly opposite the Common. Because of the close proximity of this site to the Common, it is reasonable to assume that its records are representative of the Common. In addition to these records, searching by day and night has provided much useful information on distribution.

RECORDS 1979–1983

For convenience these have been subdivided into Heterocera and Rhopalocera.

The records include all migrant species taken during the survey period.

* denotes a single record during the survey period.

** denotes species which are locally common but do not visit the static trap regularly. Some of these species have been considered in greater depth in the final analysis.

HETEROCERA

HEPIALIDAE: *Hepialus humuli* L., *H. sylvina* L., *H. lupulinus* L.

COSSIDAE: *Zeuzera pyrina* L.

ZYGAENIDAE: *Zygaena filipendulae* L., *Z.trifolii* Esp.

LASIOCAMPIDAE: *Malacosoma neustria* L.

DREPANIDAE: *Falcaria lacertinaria* L., *Drepana binaria* Hufn. *D. falcataria* L., *Cilix glaucata* Scop.

THYATIRIDAE: *Thyatira batis* L., *Habrosyne pyritoides* Hufn. *Tethea ocularis* ssp *octogesimea* Hbn.

GEOMETRIDAE: *Alsophila aescularia* D. & S., *Pseudoterpna pruinata* ssp. *atropunctaria* Walker, *Geometra papilionaria* L., *Hemithea aestivaria* Hbn., *Cyclophora albipunctaria* Hufn., *C. punctaria* L., *Timandra griseata* Petersen, *Scopula marginepunctata* Goeze, *S. immutaria* Hbn., *Idaea vulpinaria* ssp. *atrosignaria* Lempke, *I. fuscovenosa* Goeze, *I. seriata* Shrank, *I. dimidiata* Hufn., *I. subsericeata* Haw., *I. trigeminata* Haw., *I. emarginata* L., *I. aversata* L., *Rhodometra sacraria* L., *Orthonama obstipata** F. *Xanthorhoë spadicearia* D. & S., *X. ferrugata Clerck, X. montanata* D. & S., *X. fluctuata* L., *Scotopteryx chenopodiata* L., *Catarhoe cuculata* Hufn., *Epirrhoe alternata* Müller, *Camptogramma bilineata* L., *Larentia clavaria*** Haw., *Pelurga comitata* L., *Cosmorhoë ocellata* L., *Eulithis prunata* L., *E. mellinata* F., *Ecliptopera silaceata* D.& S., *Chloroclysta truncata* Hufn., *Plemyria rubiginata* D. & S., *Thera obeliscata* Hbn., *Thera britannica** Turner, *Electrophaes corylata* Thunb., *Hydriomena furcata* Thunb., *Horisme tersata* D. & S., *Epirrita dilutata* D. & S., *Operophtera brumata* L., *Perizoma alchemillata* L., *P. flavofasciata* Thunb., *Eupithecia tenuiata* Hbn., *E. linariata* D. & S., *E. venosata* F., *E. centaureata* D. & S., *E. intricata* ssp. *arceuthata* Freyer, *E.* absinthiata Clerck, *E. vulgata* Haw., *E. tripunctaria* H.-S., *E. icterata* ssp. *subfulvata* Haw., *E. succenturiata* L., *E. nanata* ssp. *angusta* Prout, *E. abbreviata* Steph., *Chloroclystis chloerata* Mabille, *C. rectangulata* L., *Gymnoscelis rufifasciata* Haw., *Aplocera efformata* Guenée, *Asthena albulata* Hufn., *Hydrelia flammeolaria* Hufn., *Lobophora halterata* Hufn., *Pterapherapteryx sexalata* Retz., *Acasis viretata* Hbn., *Abraxas grossulariata* L., *Lomaspilis marginata* L., *Semiothisa clathrata* L., *S. wauaria* L., *Pterophora chlorosata* Scop., *Opisthograptis luteolata* L., *Ennomos alniaria* L., *E. fuscantaria* Haw., *E. erosaria* D. & S., *Selenia dentaria* F., *Odontopera bidentata* Clerck, *Crocallis elinguaria* L., *Ourapteryx sambucaria* L., *Colotois pennaria* L., *Apocheima pilosaria* D. & S., *Lycia hirtaria* Clerck, *Biston strataria* Hufn., *B. betularia* L., *Agriopis leucophaearia* D. & S., *A. aurantiaria* Hbn., *A. marginaria* F., *Erannis defoliaria* Clerck, *Menophra abruptaria* Thunb., *Peribatodes rhomboidaria* D. & S., *Alcis repandata* L., *Serraca punctinalis* Scop. *Ectropis bistortata* Goeze, *Aethalura punctulata* L., *Cabera pusaria* L., *C. exanthemata* Scop., *Lomographa bimaculata* F., *L. temerata* D. & S., *Campaea margaritata* L., *Hylaea fasciaria* L.

SPHINGIDAE: *Sphinx ligustri* L., *Mimas tiliae* L., *Smerinthus ocellata* L., *Laothoe populi* L., *Deilephila elpenor* L., *D. porcellus* L.

NOTODONTIDAE: *Phalera bucephala* L., *Cerura vinula* L., *Harpyia furcula* Clerck, *Notodonta dromedarius* L., *Pheosia gnoma* F., *P. tremula* Clerck, *Ptilodon capucina* L., *Pterostoma palpina* Clerck, *Drymonia ruficornis* Hufn., *Clostera curtula* L.

LYMANTRIDAE: *Orgyia antiqua* L., *Euproctis chrysorrhoea* L., *E. similis* Fuessly, *Leucoma salicis* L.

ARCTIIDAE: *Thumatha senex** Hbn., *Eilema complana** L., *E. lurideola* Zincken, *Arctia caja* L., *Spilosoma lubricipeda* L., *S. lutea* Hufn., *Diaphora mendica* Clerck, *Phragmatobia fuliginosa* L., *Tyria jacobaeael L.*

*NOLIDAE: Meganola albula** D. & S., *Nola cucullata* L.

NOCTUIDAE: *Euxoa nigricans* L., *Agrotis segetum* D. & S., *A. clavis* Hbn. *A. exclamationis* L., *A. ipsilon* Hufn., *A. puta* Hbn., *Axylia putris* L., *Ochropleura plecta* L., *Noctua pronuba* L., *N. comes* Hbn., *N. fimbriata* Schreber, *N. janthina* D. & S., *N. interjecta* ssp. *caliginosa* Schawerda, *Graphiphora augur* F., *Paradiarsia glareosa* Esper, *Lycophotia porphyrea* D. & S., *Peridroma saucia* Hbn., *Diarsia mendica* F., *D. rubi* Vieweg, *Xestia c-nigrum* L., *X. triangulum* Hufn., *X. sexstrigata* Haw., *X. xanthographa* D. & S., *Naenia typica* L.

HADENINAE: *Discestra trifolii* Hufn., *Hada nana* Hufn., *Polia nebulosa* Hufn., *Mamestra brassicae* L., *Melanchra persicariae* L., *Lacanobia w-latinum* Hufn., *L. oleracea* L., *Ceramica pisi* L., *Hecatera bicolorata* Hufn., *Hadena rivularis* F., *H. perplexa* D. & S., *H. compta* D. & S., *H. confusa* Hufn., *H. bicruris* Hufn., *Cerapteryx graminis* L., *Tholera cespitis* D. & S., *T, decimalis* Poda, *Orthosia cruda* D. & S., *O. miniosa* D. & S., *O. opima*** Hbn. *O. gracilis* D. & S., *O. stabilis* D. & S., *O. incerta* Hufn., *O. munda* D. & S., *O. gothica* L., *Mythimna conigera* D. & S., *M. ferrago* F., *M. pudorina* D. & S., *M. impura* Hbn., *M. pallens* L., *M. comma* L.

CUCULLINAE: *Cucullia absinthii* L., *C. umbratica** L., *Aporophyla lutulenta* D. & S., *A. nigra* Haw. *Lithophane ornitopus* ssp. *lactipennis** Dadd, *Xylocampa areola* Esper, *Allophyes oxyacanthae* L., *Polymixis flavicincta* D. & S., *Eupsilia transversa* Hufn., *Conistra vaccinii* L., *C. ligula* Esper, *Agrochola circellaris* Hufn., *A. lota* Clerck, *A. macilenta* Hbn., *A. helvola*** L., *A. litura* L., *A. lychnidis* D. & S., *Atethemia centrago* Haw., *Opmhaloscelis lunosa* Haw., *Xanthia citrago* L., *X. togata* Esper, *X. icteritia* Hufn., *X. gilvago* D. & S., *X. ocellaris*** Borkhausen.

ACRONICTINAE: *Acronicta megacephala* D. & S., *A. aceris* L., *A. leporina* L., *A psi* L., *A. rumicis* L., *Cryphia domestica* Hufn.

AMPHIPYRINAE: *Amphipyra pyramidea* L., *A. berbera* ssp *svenssoni* Fletcher, *A. tragopogonis* Clerck, *Mormo maura* L., *Dypterygia scabriuscula* L., *Rusina ferruginea* Esper, *Thalpophila matura* Hufn., *Euplexia lucipara* L., *Phlogophora meticulosa* L., *Ipimorpha subtusa* D. & S., *Enargia ypsillon* D. & S., *Cosmia trapezina* L., *C. pyralina* D. & S., *Apamea monoglypha* Hufn., *A. lithoxylea* D. & S., *A. characterea* Hbn., *A. remissa* Hbn., *A. sordens* Hufn., *A. scolopacina* Esper, *A. ophiogramma* Esper, *Oligia strigilis* L., *O. latruncula* D. & S., *O. fasciuncula* Haw. *Mesoligia furuncula* D. & S., *M. literosa* Haw., *Mesapamea secalis* L., *Photedes minima* Haw., *P. pygmina* Haw., *Luperina testacea* D. & S., *Amphipoea oculea* L., *Gortyna flavago* D. & S., *Hydraecia micacea* Esper, *Celaena leucostigma* Hbn., *Charanyca trigrammica* Hufn., *Hoplodrina alsines* Brahm, *H. blanda* D. & S., *H. ambigua* D. & S., *Caradrina morpheus* Hufn., *C. clavipalpis* Scop., *Heliothis peltigera* D. & S., *Pyrrhia umbra* Hufn.

ACONTIINAE: *Eustrotia uncula* Clerck. CHLOEPHORINAE: *Earias clorana** L., *Bena prasinana* L., *Pseudoips fagana* F. SARROTHRIPINAE: *Nycteolina revayana* Scop.

PLUSIINAE: *Diachrysia chrysitis* L., *Polychrysia moneta* F., *Autographa gamma* L., *A. pulchrina* Haw., *A. jota* L., *Abrostola trigemina* L., *A. triplasia* L.

CATOCALINAE: *Catocala nupta* L., *Callistege mi* Clerck, *Euclidia glyphica* L.

OPHIDERINAE: *Tyta luctuosa** D. & S., *Lygephila pastinum* Treits., *Scoliopteryx libatrix* L.

HYPENINAE: *Laspeyria flexula* D. & S., *Rivula sericealis* Scop., *Hypena proboscidalis* L., *H. rostralis* L., *Polypogon tarsipennalis* Treits. *P. nemoralis* F.

RHOPALOCERA

The following are confirmed sightings by the author, during the survey period.

HESPERIIDAE: *Thymelicus sylvestris* Poda, *T. lineola* Ochsenheimer, *Ochlodes venata* ssp. *fauna* Turati.

PIERIDAE: *Pieris brassicae* L., *P. rapae* L., *P. napi* L., *Anthocharis cardamines* ssp. *britannica* Verity.

LYCAENIDAE: *Quercusia quercus* L., *Lycaena phlaeas* ssp. *eleus* F. *Polyommatus icarus* Rott., *Celastrina argiolus* ssp. *britanna* Verity

NYMPHALIDAE: *Vanessa atalanta* L., *Cynthia cardui* L., *Aglais urticae* L., *Inachis io* L., *Polygonia c-album* L.

SATYRIDAE: *Pararge aegeria* ssp. *tircis* Butler, *Lasiommata megera* L., *Maniola jurtina* L., *Coenonympha pamphilus* L.

Other records:

PIERIDAE: *Colias croceus* Geoff. Seven in 1983 by B.W. Conway.

LYCAENIDAE: *Callophrys rubi* L. By B.W. Conway.

HISTORICAL RECORDS (HETEROCERA)

A number of records have been made by other observers over the past 25 years. Included below are those which have not been revealed during the recent survey. It is possible that these species are still extant on the Common, but do not reach the catchment area of the static M.V. light trap.

LASIOCAMPIDAE: *Poecilocampa populi* L. Larva by J. Porter.

GEOMETRIDAE: *Colostygia pectinataria* Knoch. Recorded as common by D.J. Wilson in Evans & Evans (1973). *Lampropteryx suffumata* D. & S. One at m.v. light by P.A. Martin.

NOTODONTIDAE: *Harpyia bifida* Brahm. Not uncommon in the vicinity during the 1960's, but has not been seen during this survey despite many searches.

LYMANTRIIDAE: *Dasychira pudibunda* L. Larvae beaten by J. Porter.

CUCULLINAE: *Lithophane semibrunnea* Haw. One by J. Porter.

AMPHIPYRINAE: *Rhizedra lutosa* Hbn. Two at m.v. light by P.A. Martin. This is an unusual record since the pabulum of *R. lutosa, Phragmites*, is not found on the Common.

PLUSIINAE: *Plusia festucae* F. Earlier records suggest that *P. festucae* was resident; 1970 several (A.A. Wilson in Evans & Evans 1973). Mid 1970's to m.v. light, by P.A. Martin.

SESIIDAE: Records are few. *Synanthedon vespiformis* L. One in July 1970 (Evans & Evans 1973). *Conopia myopaeformis* Borkh. Regular records until 1972 (Evans & Evans 1973). The author has found old exit holes but no new ones. *C. formicaeformis* Esper. One record in 1950 (Wild in Evans & Evans 1973). After many searches I have yet to find this species on the Common.

ASSESSMENT OF THE MORE LOCAL SPECIES

Probable vagrants

Meganola albula D. & S. One specimen in 1981. This was presumably a vagrant from its breeding grounds on the N. Downs.

Lithophane ornitopus ssp. *lactipennis* Dadd. A single specimen taken in September 1983 represents this species. To my knowledge this is only the 4th record of this species in N.E. Surrey. Until further specimens are taken, this species cannot be considered a resident. *L. ornitopus* is apparently increasing its range nationwide and may possibly become resident on the Common with the increase in the number of mature oaks.

Residents

Xanthia ocellaris Borkh. This species is well estabished although rather local. It is not a regular visitor to the static trap although the adult is seen most years at brambles.

Eustrotia uncula Clerck. An infrequent visitor to the static trap. This species is threatened by proposals for further landscaping.

Tyta luctuosa D. & S. Although this species is known to be resident, it is not a regular visitor to the static trap. Over the past 15 years, 3 specimens have been taken at m.v. light: two by P.A. Martin and one by myself. The known breeding ground for this species is also threatened by further landscaping.

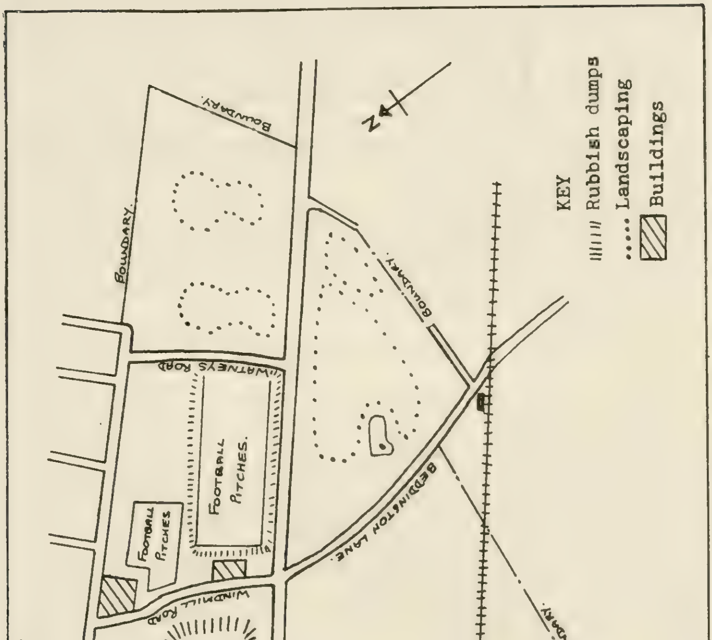

Fig. 1. Plan of Mitcham Common, N.E. Surrey. (Map ref. SK 290678). Scale 1cm = 100m

CONCLUSION

It is obvious from the records that the macrolepidoptera are well represented on Mitcham Common. A number of resident species have either national or local significance, including: *Tyta luctuosa, Eustrotia uncula, Xanthia ocellaris* and *Orthosia opima*. The first two are threatened by further landscaping. *Harpyia bifida* Brahm has not been seen during this survey despite many searches and may have been lost.

The apparent decline of such species as *Colostygia pectinataria* Knock and *Plusia festucae* F. is hard to explain although the latter seems to have declined after a number of the marshy areas were filled in.

With further landscaping proposed, it is hoped that this account will provide a basis upon which an assessment of the effects of man's intervention can be made.

ACKNOWLEDGEMENTS

I am most grateful for the supplementary records provided by B.W. Conway, P.A. Martin and J. Porter.

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Are some rogadine (Hym.: Braconidae) puparia hoverfly mimics?—During the late summer I found the puparia of several species of *Rogas* Nees and *Aleiodes* Wesmael attached high up on dry grass flower stalks. These dark-red to brown-black puparia, formed within the larval skin of their hosts, displayed a considerable resemblance to small, dark hoverflies which frequently settled in the same sort of situation. The latter are very quick in taking flight when disturbed, making these relatively unprofitable prey items for insectivorous birds which may therefore avoid (ignore) them. The fast escape reactions of some tropical flies apparently gives them sufficient protection from predation to allow the evolution of Batesian mimics and of Mullerian convergence (Hespenheide, 1973 *J. ent.* (A) **48**: 49–56). It seems possible therefore that the resemblance of these rogadine puparia to resting hoverflies may be at least partly mimetic. Similar mimetic resemblance by *Rogas* puparia has been reported by Giard (1894, *Ann. Soc. ent. France* **63**: 124–128) in which instance the parasitized larvae and mummies of an arctiid moth mimic fungus infected *Zygaena* larvae which are avoïded by birds.—D.L.J. Quicke

Correction—The specimen of *Acherontia atropos* L. attributed to Saffron Walden, Essex by Mr Bretherton (*Proc. Trans. Br. ent. nat. Hist. Soc.* **16**: 4) was in fact taken in Cambridgeshire as stated in the reference cited (*ibid.* **7**: 47). The exact locality was Shudy Camps—A.M. Emmet, Labrey Cottage, Victoria Gardens, Saffron Walden, Essex, CB11 3AF.

FIELD MEETINGS

BEHNS Field Meeting: Markway Bridge, Ober Water, New Forest, Hants 7.v.83. Leaders: E.H. Wild and A. Pickles.—This was one of the four meetings held in the Forest as part of the N.C.C. conservation study of river valley fauna.

17 members and friends joined Tony Pickles and myself in rather cool grey conditions. The afternoon was spent searching and beating, especially the old blackthorn hedges where larvae of *Chloroclystis chloerata* Mab. were obtained. This is a new locality. Some eight M.V. lights were run that night and 41 species of macros, but only 6 micros were recorded. The macros included most of the species of mixed woodland to be expected. Mention may be made of *Orthosia miniosa* D. & S., *Eupithecia irriguata* Hbn., *E. dodoneata* Guen., and *Trichopteryx carpinata* Bork. The only micro of interest was *Pammene argyrana* Hbn. Much of the area was under water following the very wet spring here, so there was much cheerful splashing about in 'wellies'. The area south of the A.35 was very unproductive and difficult to work under these conditions.

BEHNS Field Meeting: Baynes Reserve, Thatcham, Berkshire, 14/15.v.1983. Leader: Caroline Peachey.—The meeting was attended by ten members and friends in bright, sunny weather. The morning was spent exploring the alder woodland in the valley—a habitat of considerable interest in the Newbury area. After lunch the party moved onto the higher ground consisting of birch woodland and bracken-dominated heathy slopes. Although the season was late, the sunshine brought out a number of flower-visiting insects including the butterflies *Gonepteryx rhamni, Pieris napi, P. rapae, Anthocharis cardamines, Polygonia c-album* and *Pararge aegeria*, and the moth *Saturnia pavonia*. Minings of *Sesia bembeciformis* were found in *Salix* stumps.

Amongst the hoverflies, 2 old woodland species were seen—*Ferdinandea cuprea* and *Criorhina berberina*. Other woodland species of note include the harvestman *Megabunus diadema*, the tree slug *Limax marginatus*, and the beetles *Orchesia undulata* and *Mycetophagus quadripustulatus*—both dead wood feeders found under elm bark.

Ten species of sawflies were recorded, including 2 local species: *Amauronematus lateralis* and *Strongylogaster xanthoceros*.

In the evening 5 lights were run and a number of good woodland species of Lepidoptera were recorded. The most notable species were *Lithophane semibrunnea, Ectropis consonaria, Cyclophora albipunctata, Cerastis rubricosa* and *C. leucographa*.

The entomological interest of these alder gullies has only recently been appreciated. The presence of several good woodland species indicates that further surveys are likely to be productive.

BEHNS Field Meeting: Chobham Common, Surrey, 2.vii.1983. Leader: P.J. Baker— The day started dull with occasional drizzle, but the sun appeared about mid-day to give a hot afternoon. The morning was spent hunting for caterpillars, those of *Saturnia pavonia* (L.) being found on *Calluna vulgaris, Orgyia antiqua* (L.) on *Salix* spp. and *Tyria jacobaeae* (L.) on *Senecio jacobaea*. Several cinnabar moths were also seen.

Relatively few adult Lepidoptera were seen—the season appearing to be some 7 to 10 days later than normal—but the following were noted, either flying in the afternoon sun or flushed from vegetation: *Coenonympha pamphilus* (L.), *Maniola* *jurtina* (L.), *Plebejus argus* (L.), *Ochlodes venata* (B. & G.), *Schrankia costaestrigalis* (Steph.), *Diacrisia sannio* (L.) (including two females), *Lithacodia pygarga* (Hufn.), *Anarta myrtilli* (L.), *Ematurga atomaria* (L.), *Phytometra viridaria* (Clerck), *Eupithecia nanata* (Hubn.), *Pseudoterpna pruinata* (Hufn.), *Chlorissa viridaria* (L.) (this moth has been quite common in a narrow band right across the common in 1983), *Xestia c-nigrum* (L.) and *Petrophora chlorosata* (Scop.).

Undoubtedly the best record for the day was of a couple of specimens, found some distance apart, of *Buckleria paludum* (Zell.), the small Plume which feeds on *Drosera*. This insect has been sought for many years on the common, until now without success.

Diptera noted included *Anasimyia lineata* (F.) and *Hybomitra distinguenda* (Verrall). *Rhogogaster viridis* (L.) and *Eumenes coarctatus* (L.) were the only Hymenoptera recorded.

The local flora produced several items of interest including a number of plants of the white form of *Erica tetralix* and a beautiful stand of one of the species of marsh orchids.

BENHS Field Meeting: Orlestone Forest, Kent, 16/17.vii.1983. Leader: J.M. Chalmers-Hunt.—The weather on this occasion was dry, sunny and very warm. Around mid-day, the party enjoyed a walk through Burnt Oak with Michael Enfield (the KTNC warden), noting the usual butterflies there for the time of year, including *Ladoga camilla* L., which was clearly enjoying a good season as evidenced by the numbers. After a picnic lunch, with the temperature around 90°F., there was naturally little inclination for exercise until early evening, when more members joined the party, some of whom hailed from as far as Hampshire, Bedfordshire, Oxfordshire, Suffolk, Norfolk and one, Mr. C. Nissen, from France!

The night was exceptionally favourable for moths, with the light traps operating in Long Rope producing over 150 different species of macro and a great many micro species. Both *Peribatodes secundaria* D. & S. and *Dioryctria schuetzeella* Fuchs appeared in numbers, including a few of the black ab. of the former; also, the interesting oecophorid *Bisigna procerella* D. & S. of which at least a dozen examples put in an appearance. Other notable species were: *Pelosia muscerda* Hufn., *Hylaea fasciaria* L. (about six of the green form), *Heterogenea asella* D. & S. (both sexes in numbers), *Moma alpium* Osbeck, *Parascotia fuliginaria* L., *Schrankia taenialis* Hbn. (about 15, including several at dusk), *Paracolax derivalis* Hbn. (a few), *Coleophora currucipennella* (two), *Stathmopoda pedella* L., *Spatalistis bifasciana* Hfn., *Mellissoblaptes zelleri* Joannis (male, doubtless a casual) and a host of other local and interesting species.

Many of those present found it worthwhile to collect till the early hours of the 17th, with several remaining till nearly 5am.

The leader wishes to thank the Forestry Commission and the Kent Trust for Nature Conservation, for kind permission to lead this meeting.

BEHNS Field Meeting: Monks Wood National Nature Reserve, Abbots Ripton, Huntingdon, 17.ix.1983. Leader: J. Heath.—Nine members and friends attended, and after lunch at the Wheatsheaf Hotel the afternoon was spent searching for microlepidoptera. Some 40 species were recorded, the outstanding species found being *Stigmella confusella, Coleophora taeniipennella, C. tamesis* and *C. caespititiella,* all new to Monks Wood. Five species of butterflies were noted and in the evening six species of macrolepidoptera were seen at sugar and fifteen at M.V. lamp.

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LIGHT AND TEMPERATURE EXPERIMENTS ON THE COMMA BUTTERFLY *POLYGONIA C-ALBUM* (LEP.: NYMPHALIDAE)

by K. E. J. BAILEY

Ashbrook, Lincombe Lane, Boars Hill, Oxon.

INTRODUCTION

The Comma Butterfly is one of the few British species that has increased its range during fairly recent decades. From a very restricted area around Herefordshire and Monmouthshire in the early part of this century, it has spread and is now not uncommon throughout the southern half of Britain.

There are two generations each year, the first in midsummer and the second in late summer and early autumn. The majority of midsummer specimens are slightly different from the type form, having a paler, brighter upperside and a more straw-coloured underside, but with the dark pattern unaltered in shape. The wings are a little less jagged and the butterflies are sexually mature on emergence, for they mate and lay eggs shortly after emergence and then die off. This form is called *hutchinsoni*. A small proportion of this summer brood is of the type form, having a darker ground colour with more jagged wings. These do not mate, but after feeding for a short period appear to go into hibernation or blend with the second (autumn) brood that arises from eggs laid by *hutchinsoni* stock. All the autumn brood are type commas and these feed for a while before hibernating. In the following spring, the awakened hibernators (all type commas) mate and lay eggs which give rise to the next midsummer brood—mainly form *hutchinsoni*.

There are other very rare colour variations which have from time to time been seen in the wild, some with the normal ground colour replaced by different shades, probably genetic in origin, and some with the black markings distorted and blurred together as if the 'paint had run'. Many of these varieties have received special names.

EXPERIMENTS WITH DAY LENGTH

In the spring of 1983, the author decided to test the effect of day length during the larval period relative to the production of the type or the *hutchinsoni* form.

In April 1983, several awakened wild females of the type form were captured and placed in a cage over nettle. Eggs were laid but these proved to be infertile, the females presumably not having paired before capture, no doubt due to the shortage of summery weather prevalent that spring. This incidentally strongly suggests that type comma pairings must occur after hibernation.

On 21st July 1983, a female *hutchinsoni* form was captured and placed in a cage over nettle. She commenced laying the next day. Some of the eggs were transferred to another nettle as controls. After about one week with the eggs about to hatch during the continual warm weather, the whole nettle plant was placed inside a large box in darkness but artificial lighting was arranged using a single 60 watt tungsten reflector bulb suspended 1 m over the plant. This was connected to a time switch set to give an 18 hour day length and the whole system was kept in a warm greenhouse. The average day temperature was about 30°C and fell to around 18°C. The controls were placed alongside but were subjected to natural day length (August). The larvae under 18 hours day length developed rapidly compared to the controls and by the time these larvae were beginning to pupate, the control larvae were still only in the second instar. On 17th August 1983 the first 18 hours stock pupa hatched—a male *hutchinsoni* form. In all nineteen commas were bred from the 18 hour stock of which eighteen were *hutchinsoni* and one was the type form. All the controls subsequently gave the type form. This test suggests that *hutchinsoni*/type forms can be produced artificially by varying the day length.

EXPERIMENT TO TEST THE FECUNDITY OF ARTIFICIALLY INDUCED *HUTCHINSONI* STOCK

On 17th August 1983, the first male *hutchinsoni* of 18 hour stock was placed in a pairing cage in the greenhouse and on subsequent days, the rest of this stock were placed in the cage (all *hutchinsoni* form). These were fed on fresh flowers and 10% honey solution on pads. On 22nd August 1983, at about 5.30 p.m., the first pairing occurred and on 23rd August 1983 the female was placed in a separate cage over nettle. On 24th August 1983 she started laying the first of many eggs and these started hatching one week later. Further pairings occurred among the 18 hour stock and the females were then liberated to give the local population a boost.

This shows that artificially induced *hutchinsoni* commas are sexually mature on emergence.

TEMPERATURE EXPERIMENTS TO MODIFY WING PATTERN

During the early summer of 1982, the author subjected comma pupae, resulting from eggs laid by a wild hibernated female, to cold shocks. The pupae were placed in a refrigerator for four periods of three hours per day at −5°C. This was for the first two days of pupal life and starting when the pupae were about six hours old. Each pupa received eight cold shocks and was then allowed to develop at room temperature. About 20% of the resulting butterflies had aberrant wing patterns. A full range of varieties were produced from extreme varieties with the black markings on fore and hind wings confluent and extended to minor varieties with only the wing margin pattern altered. All were of the *hutchinsoni* form as might be expected from the day length that the larvae were reared in.

On 30th August 1983 one pupa from the control series of the light experiments was placed in an electric incubator when about twelve hours old and was given a single heat shock of 42°C for twelve minutes. It was then returned to room temperature for the rest of its development. On 12th September 1983 a male comma emerged with extreme hindwing pattern variation. It was of the type form, as was to be expected from the day length that the larva was reared in.

From eggs laid by the artificially induced female *hutchinsoni* on and after 24th August, a further batch was raised again under 18 hour day length but in slightly cooler conditions. (The remainder were set aside as controls). When the resulting larvae pupated, they were given three 12 minute heat shocks at 43°C at 12 hour intervals starting at around the twelfth hour of pupal life.

Out of thirty-six pupae, thirty-four were of the *hutchinsoni* form and six of these specimens exhibited varying degrees of variation of the black pattern. All the control stock gave type form specimens with normal wing patterns.

CONCLUSION

The form *hutchinsoni* of the comma can be induced artificially over several generations by manipulating the day length and this is very probably the main factor governing its occurrence naturally in the midsummer brood. Towards the north of Britain the comma becomes a rarity. In that region with a shorter summer but a longer day length there is probably only time for a single brood and these would all be *hutchinsoni*, leaving few if any, hibernators (type form) to continue the race into the next year.

The wing pattern may be altered by extreme temperature shocks (both high and low) on the young pupae and this may be an important factor where these rare forms occur naturally.

MONARCHS ON THE MOVE—*DANAUS PLEXIPPUS* (L.) AND *D. CHRYSIPPUS* (L.)

by R.F. BRETHERTON

Folly Hill, Birtley Green, Bramley, Guildford, Surrey GU5 OLE

INTRODUCTION

There were a dozen sightings of *Danaus plexippus* along the south coast of England in 1983, and one in Co. Wicklow, Ireland. Most of these were seen between 17 and 26 September, with further sightings in October. September arrivals coincided with a large invasion of other immigrant Lepidoptera. These clearly came from the south west, and a meteorological check kindly made by Mr P.A. Davey includes the Canary Islands and Madeira as probable sources.

In the second week of November, 1983, Mr D.W. Baldock, while on holiday in Funchal, Madeira, found *D. plexippus* to be almost the commonest butterfly present, and he has given me a specimen of each sex which he brought home. In the past it seems to have been only an occasional immigrant there, though it has been long established in the Canaries. Local inquiries showed that it had overrun Funchal in 1981 and has since spread inland more thinly (G.E.Maul). On 9 February 1984 another visitor, Mr C.F. Tebbutt, tells me that he witnessed an invasion which came up over the cliffs on the south of the island; this went on for several days and single butterflies were still about until he left on 22 February. These presumably came from the Canaries, 300 miles to the south, as no colony is known on the African mainland.

D. chrysippus is also established in the Canaries, and is the African and Asian counterpart of *D. plexippus*; but until recently it was known in Europe, apart from an ancient account of temporary residence near Naples in 1806 and 1807, only singly in Greece, some of the Aegean islands, and Malta. In that island, however, after a gap of 26 years, one was caught on 19 October 1978, 23 were seen between April and October 1980, and two in October 1981 (Valetta, *Ent.Rec.J.Var.* **93**: 210–12). In Spain it appears to have been first seen in September 1980, in numbers on the edge of a cotton field in prov. Alicante, where it was found again in 1982 (Fco. Gutierrez *et al. Shilap* no.31), and there are several later records of both adults and larvae in prov. Murcia and prov. Malaga in 1982 and 1983. At Torrox, prov. Malaga on 13 March 1983 plants of *Asclepias curassavica* were found defoliated by several hundred larvae of *D. chrysippus* and also by c.30 of *D. plexippus* (Fco. A.Naclo, *Shilap* no. 42:131). Adults of both were also found flying among *Asclepias* species near the coast in prov. Granada on 14 September 1982 (S. & D. Howell, *Ent.Rec. J.Var.* **95**: 120). To these records of *D. chrysippus* may now be added an account given to me by Mr S. Swanson of finding large numbers of imagines mating and ovipositing on a white flowered *Asclepias* (possibly *A. lanceolata*) on 13 October 1983 in the semi-dry Rio Fuengirola, prov. Malaga, the plants being covered with ova and larvae of various sizes. He kindly gave me one of his captured adults, and several more emerged between 29 October and 11 November from pupae which he brought back.

There is as yet no evidence of successful over-wintering of either *D. plexippus* or *D. chrysippus* in these new areas of relative abundance; it is still possible that this has resulted from successful local immigrations and local summer breeding, rather than from established residence. But it seems that both for some reason unknown have recently made determined attempts to extend their range. Their larvae are normally confined to various species of *Asclepiadaceae* (Milkweeds): several of these are common on waste ground in Mediterranean Europe, and some, including *A. syriaca*, are more or less hardy, but not frequently grown, in gardens in Britain.

I am much indebted to Mr D.W. Baldock, Dr G. E. Maul, Mr C.F. Tebbutt, and Mr S. Swanson for their unpublished accounts which I have used above.

Some Ichneumonidae reared from spiders and their eggs.—Four species of polysphinctine ichneumons that have been reared as ectoparasites of adult spiders are:

(1) *Schizopyga frigida* (Cresson) male and female reared from *Clubiona terrestris* Westring (Clubionidae).

The hosts were found inside the hollow stems of umbelliferous plants in early spring. Development of the parasite is rapid—approx. 9 days from 1 mm larva to full size (7 mm) and 12–14 days as a pupa.

(2) *Acrodactyla degener* (Haliday) male and female reared from *Lepthyphantes tenuis* (Blackwall) and *L. mengei* Kulczynski (Linyphiidae).

One host was found low down amongst long grass and the other was taken whilst attempting to 'balloon' from a fence post. In both cases the parasitic larvae were fairly well developed when discovered.

(3) *Zatypota bohemaini* (Holmgren) male and female reared from *Theridion mystaceum* L. Koch (Fam. Theridiidae).

The hosts were found on and under loose tree bark in early spring. Parasite larval development took approx. 17 days from 0.5 mm to full size (4.5 mm) and pupation lasted 16–18 days.

(4) *Polysphincta tuberosa* Gravenhorst male and female reared from *Araniella cucurbitina* Clerck (Fam. Araneidae).

The hosts were found on the leaves of low growing trees and bushes during spring and early summer. The development of this species is very slow with the larva taking 4–5 weeks to grow from 0.5 mm to full size (5 mm). Pupation took between 10 and 15 days.

Two species have been reared from spider egg cocoons.

(1) *Trichosis tristator* (Tscheck) male and female (Sub-family Phygadeuontinae) reared from *Pisaura mirabilis* (Clerck) eggs, (Fam. Pisauridae).

The host lays her eggs usually during July and August, at first carrying them around with her and later depositing them in a silk "tent" amongst herbage. These specimens were reared from cocoons found inside the "tents" and emerged the following year.

(2) *Tromatobia oculatoria* (Fab.) female (Sub-family Pimplinae) reared from eggs of *Philodromus cespitum* (Walckenaer) (Fam. Thomisidae).

The female spider was guarding the egg sac which was low down, amongst heather. The parasite had already pupated and emerged 3 days after collection.

The above material was exhibited at the 1982 exhibition.—I.R. Hudson.

LEPIDOPTERA RECORDS AND NOTES FROM NORFOLK ISLAND, 1981–1983

by J.D. HOLLOWAY

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The results of the monthly light-trap sampling programme conducted on Norfolk Island by Mrs M. Jowett since 1971 have been published up to the end of August, 1981 (Holloway, 1977, 1982). This paper presents the items of interest in the records from then to early August, 1983.

Most of these items concern migrant species and the six newly recorded species all fall into this category. The newly recorded species are *Crocidolomia binotalis* Zeller (Pyralidae), *Gnathothlibus erotus* Cramer (Sphingidae), and *Earias parallela* Lucas, *Avatha discolor* Fabricius, *Othreis fullonia* Clerck and *Speiredonia spectans* Guenée (Noctuidae). *Earias parallela* is found throughout Australia, *S. spectans* in the north and east of Australia, and the other four species are widespread in the Indo-Australian tropics and, except for *G. erotus*, are also found in Africa.

An analysis of the weather conditions over eastern Australia and the Tasman Sea at the times of major migrant arrivals will be the subject of a separate publication planned in conjunction with Dr R. A. Farrow. Major influxes were noted from 26 September to 4 October 1981 (51 individuals, 8 species) and on 24 and 25 February 1982 (16 individuals, 4 species) 'spring' and 'summer' migrations respectively (Holloway, 1982).

There is additional information on some of the resident species and discussion of a change of opinion on the taxonomic status and probable biogeographic affinities of the Norfolk Island *Agathia* species.

To date during the survey there have been no instances of moth species establishing on Norfolk Island though occasionally there are indications of migrants giving rise to one intrinsic generation. However, for butterflies there are two instances: of *Anaphaeis java peristhene* Boisduval in 1972 (Smithers & Evans, 1974) and of *Danaus chrysippus petilia* Stoll in 1980 (Evans, 1981).

MIGRANT RECORDS

Pyralidae

Loxostege affinitalis Lederer was taken amongst the large 'spring' influx of 1981, 9 individuals in all. Further singletons were taken on 22.v and 17.xi. 1982. The species has been recorded only once previously.

Crocidolomia binotalis Zeller was taken singly on three occasions: 23.v.1982 and 18.v and 8.vi.1983. All individuals were worn so the coincidence of the last two records at a site north of Mission Road in an area where *Brassica* crops are grown (the host-plant) may be fortuitous. The native *Crocidolomia* is a *Capparis* feeder (Holloway, 1982).

Maruca testulalis Geyer and *Terastia meticulosalis* Guenée were recorded singly on 16.v.1983, the third specimens of each taken during the survey and the second occasion when the two species have been taken on the same night. *M. testulalis* was also taken singly on 12.vii.1983.

Sphingidae

Hippotion scrofa Boisduval was recorded singly on 22.i.1982 after a long absence. The second and third specimens of *H. velox* Fabricius for the survey were taken on 24.ii (in the big influx) and 13.xii.1982 (in isolation).

A specimen of *Gnathothlibus erotus* Cramer was taken inside a house at the beginning of May 1982.

Several *Macroglossum hirundo* Boisduval were taken in January, February (6 in the major influx) and April 1982, singletons in June and November, and in 1983 the species was recorded in January, March and April (3 on one night). The frequency of records of this species has increased during the course of the survey, and it has been taken in most years since 1976, mainly in the early months of the year (Holloway, 1982).

Arctiidae

Utetheisa pulchelloides Hampson was only taken at the beginning of October 1981 in the large 'spring' influx mentioned.

Noctuidae

Agrotis munda Walker was a major component of the 1981 'spring' arrival with 25 individuals being taken. The species was recorded singly in February and September 1982 and in January and February 1983. *Agrotis infusa* Boisduval contributed one individual to the 1981 'spring' influx and three to the 1982 'summer' one. It was also taken in January and November 1982.

Heliothis punctigera Wallengren was only recorded in the 1981 'spring' influx (5 individuals). *Heliothis assulta* Guenée was taken singly on 30.iv and 16.xii.1982, and on 12.i.1983. These arrivals of *assulta* are consistent with the 'summer migrant' pattern noted for this species and *Macroglossum hirundo* by Holloway (1982).

Cosmodes elegans Donovan occurred singly in the 1981 'spring' arrival and also on 24.v and 16.xi.1982. In each case *Loxostege affinitalis* was also recorded within a few days.

Platysenta conducta Walker was represented by a singleton in the major 1981 arrival. *Platysenta dolorosa* Walker was recorded singly on 15.ii.1982 and 10.v, 5 and 11.vi.1983, arrivals that are consistent with the 'autumn' pattern noted for this species by Holloway (1982).

All the new noctuid species were represented by singletons, *Earias parallela* Lucas on 3.v.1982, *Avatha discolor* Fabricius on 11.vii.1983 and *Speiredonia spectans* Guenée on 17.vi.1983. *Othreis fullonia* Clerck was taken at light by an island resident in late January 1982 and given to Mrs Jowett.

Tathorhynchus exsiccata Lederer was represented only in the 1981 'spring' arrival (5 individuals). *Hypocala deflorata* Fabricius appeared only in the 'summer' arrival of February 1982 with six individuals, most with bleached hindwings suggestive of sustained flight during the daytime as noted before for this species (Holloway, 1982). *Anomis involuta* Walker was recorded in low numbers in May and June 1982.

NOTES ON RESIDENT SPECIES

Epermeniidae

Gaedike (1979) has published on material collected during the survey, describing a new species, *Epermenia insularis*, from material from the Mt Pitt Reserve. He related *E. insularis* to a Tasmanian species. Two further worn specimens of this family were labelled by Gaedike tentatively as being related to *aphronesa* Meyrick and allies, now placed in the genus *Gnathifera* which includes a dozen Australian species and one from New Caledonia (Gaedike, 1981).

Geometridae

Agathia jowettorum Holloway **stat. nov.** was originally placed as a subspecies of the Australian *asterias* Meyrick. Dissection of males of the various taxa attributed to *asterias* as subspecies from Kei through New Guinea to the Solomons and Fiji and also of related taxa such as *eromena* Prout, *subcarnea* Warren and *prasinaspis* Meyrick has revealed the existence of a species complex. Most taxa have some sort of process from the centre of the valve costa and a ventral lobe distal to the sacculus, usually with an interior excavation just dorsal to it.

The costal process is broadly double in *asterias*, narrowly so in *pisina* Butler (Solomons) and *subcarnea* Warren (Trobriand Is.), single, asymmetric, triangular in *diversilinea* Warren (Fergusson I.), *ampla* Prout (New Guinea), *irregularis* Prout (Kei) and the externally distinct *prasinaspis* Meyrick, and single, narrow, parallel-sided in *eromena* Prout (Sulawesi) and *dimota* Prout (Fiji). There is an undescribed species in the Solomons with an obtuse central angle and spatulate apical process to the valve costa, and with the distal lobe to the sacculus modified to a stout hook.

A. jowettorum has no costal process and the distal part of the sacculus is not significantly modified (Holloway, 1977: fig. 75), a loss of characteristics shared with the externally more heavily marked New Caledonian taxon (erroneously attributed to *dimota* Prout by Holloway (1979)), which is perhaps best regarded as a race of *jowettorum*, which itself cannot be subordinated readily to any of the taxa discussed above. It is therefore accorded specific status. This reassessment adds a New Caledonian connection to the group of forest species on Norfolk Island at the expense of an Australian one.

Chloroclystis insigillata Walker has been recorded infrequently during the period covered here, but always in the Mt Pitt Reserve, supporting the conclusion of Holloway (1982) that it is resident. The spring to early summer seasonal pattern is also endorsed by these records, made from November to March. *Eccymatoge callizona* Lower has also been recorded on a number of occasions in the forest area, again during the spring period.

A single female of *Ziridava smithersi* Holloway was taken near the summit of Mt Pitt in December 1982 but *Austrocidaria ralstonae* has not been captured since 1972.

The relationships of *Cleora idiocrossa* Turner have been re-examined by Holloway (1983). It is allied to three species in New Caledonia and Vanuatu, and the group of four appears to have more distant affinities with a pair of species in the Society Is. and on Rapa I.

Arctiidae

Nesiotica cladara Turner has been recorded on several occasions in the current period from the Rocky Point Reserve, which is densely vegetated with Norfolk Pine. The species is otherwise only known from the native forest of the Mt Pitt Reserve.

Noctuidae

Three *Amyna natalis* Guenée were taken in April and May of 1983 at Anson Bay and the Rocky Point Reserve respectively. The specimens were in good condition. Records to date suggest that this species is a rare resident and virtually restricted to coastal localities, especially the Rocky Point Reserve where six out of the nine specimens have been taken. The seasonal range is from January to May.

Pantydia sparsa Guenée was recorded singly in 1982 and on several occasions in 1983, mainly from the site north of Mission Road notable for numerous *Uresiphita ornithopteralis* Guenée which appear to be associated with an abundance of the introduced legume *Genista monspessulana* (Holloway, 1982). *Pantydia* species also feed on Leguminosae so the high numbers of *P. sparsa* at this site might also be related to the presence of the *Genista*. Other records during this period have been made in the Rocky Point Reserve, another area where the species has often been taken previously (Holloway, 1982).

Achaea janata Linnaeus was not recorded in 1982 but two specimens were taken in 1983 at Anson Bay and near Ball Bay. These records continue the coastal trend of occurence noted subseqent to the abundance in 1974 when the species was found all over the island. The species is most frequently encountered in the months from February to June; it has not been taken from August to October and is rare in other months. Year by year captures are as follows: 1972, 27; 1973, 11; 1974, 120; 1975, 0; 1976, 6; 1977, 5; 1978, 11; 1979, 25; 1980, 1; 1981, 6; 1982, 0; 1983, 2.

ACKNOWLEDGEMENTS

The records in this paper are due to the indefatigable enthusiasm of Maurge Jowett, supported by her husband Freddie. To both of them go my deepest thanks.

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BOOK REVIEW

Papilio International. Vol. 1, parts 1–2. The Lepidoptera group of 1968. Lundhusvej 33, 7100 Vejle, Denmark.

A new journal on papilionid butterflies might be expected to be a semi-popular one to cater for the large number of collectors attracted by these spectacular insects. Not so this publication, which lists its regular features as: lists of recent literature (these are mainly taxonomic and are abstracted with commentary), descriptions, taxonomic lists and revisions, papilionid genitalia illustrated, news and views of entomology, book reviews and notices, field studies, subscribers' wants and exchanges.

It may be questioned whether primary taxonomic studies should be committed to such a specialised and immature journal. The contents of these first two parts are well written, but almost entirely by the editors. The original contributions could have been published equally well elsewhere, assuming the availability of space. Of most general interest is the first part of a series illustrating the genitalia of selected species from dry dissections. There is also a preliminary list of threatened species for a papilionid Red Data Book.

The literature cited reveals another journal called *Papilio*, so this one is unfortunately titled.

R.W.J.U.

EVIDENCE FOR THE FUNCTION OF WHITE-TIPPED OVIPOSITOR SHEATHS IN BRACONINAE (HYMENOPTERA: BRACONIDAE)

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ABSTRACT

Museum specimens of 32 species of tropical, Old World Braconinae displaying white-tipped ovipositor sheaths have been examined in an attempt to discover what function(s) this distinctive feature of coloration might serve. Five hypotheses were formulated and for each of these, a set of predictions was derived concerning the relationships between a number of measurable variables (lengths of white sheath tip, ovipositor, fore costa (=C+SC+R) and body). Comparison of the observed and expected relationships permitted an assessment to be made regarding the validity of each hypothesis.

The length of the black basal sheath region was found to approximate to wasp body length, an observation which is in good agreement with a visual feedback hypothesis; i.e. the wasp in some way may assess the position of its ovipositor (or ovipositor sheaths) by observing the border between the black and white sheath regions. Some evidence was also consistent with an attack deflection hypothesis, both the relative lengths (compared with that of the fore costa) of the black basal and white apical ovipositor sheath regions increasing with relative ovipositor length. Thus if a potential predator mistakenly attacks the conspicuous sheath tip, the wasp will have a good chance of escaping without serious injury. It is suggested that this factor may be particularly important during oviposition when the wasp is likely to be especially vulnerable and the ovipositor not encased between its protective sheath halves.

INTRODUCTION

The adaptive significance of coloration amongst the aculeate Hymenoptera has been the subject of many studies (Wickler, 1968; Stiles, 1979; Plowright & Owen, 1980). However, considerably less work has been carried out on the adaptive features of coloration in the parasitic wasps. The involvement of several tropical Braconidae and Ichneumonidae in mimicry complexes together with noxious lycid beetles (Marshall, 1902), and the mimicry of these wasps by cerambycid beetles (Gahan, 1913; Linsley, 1959; Quicke, submitted) have been briefly described. Many of the larger species of parasitic wasp display aposematic patterns and are mimicked by other parasitic wasps.

The present work is concerned with a single, widespread, though not particularly common, aspect of the coloration of parasitic wasps, namely the presence of a white annulus or tip region on the ovipositor sheaths. In the Stephanidae, Gasteruptionidae and some Braconidae, the sheaths are marked white, whereas in the members of the subfamily Braconinae, the sheaths appear white due to the presence of pale coloured hairs. Sheaths which appear white distally are displayed by the members of several Afrotropical and Indo-Australian genera of Braconinae though this feature is apparently absent from the Palaearctic and New World species. The possible significance of this feature does not appear to have been discussed previously.

Unfortunately, the larger parasitic wasps, in which white ovipositor sheath tips are most frequently observed, are generally unsuitable for captive breeding and in the vast majority of species, oviposition has never been observed. In fact, there are very few host records for tropical braconines (Quicke, 1983), and only one pertains to a species with a white ovipositor tip: a species of *Zaglyptogastra* Ashmead is recorded as a probable parasite of a coffee stem boring cerambycid in Uganda. The majority of large braconines are parasites of either wood or stem boring Coleoptera or Lepidoptera larvae. Because of the practical difficulties of working with living tropical braconines, a non-experimental approach has had to be adopted. Thus, predictions based on each of five hypothetical functional roles of white ovipositor tips have been compared with observed correlations between the relevant factors. Using this approach, circumstantial evidence is presented supporting a visual feedback model.

HYPOTHESES AND ASSOCIATION EXPECTATIONS

Five possible explanations for the occurrence of white-tipped ovipositor sheaths have been considered; these are:

(1) *Warning coloration*—as a direct indication of the ability of the wasp to deliver a sting to a vertebrate predator.

(2) *Warning coloration*—as a part of a distinctive colour pattern probably shared by a number of species and related to general unpalatability; members of at least some braconine genera (e.g. *Bathyaulax* Szépligeti and *Zaglyptogastra*) emit a characteristic odour when handled (personal observations) and may thus be distasteful to birds.

(3) *Attack deflection*—to draw the attack of a bird away from the body to the less vulnerable ovipositor; although vital, the ovipositor is a very strong and resilient structure.

(4) *Visual feedback*—border between black and white sheath hairs could signal information to the wasp about the position of its ovipositor.

(5) *Inter-* and *intraspecific* signal—as an indication to other parasitic wasps that prey at a given range of depth, within an infested log for example, are likely to have already been parasitized by the signal senders; females of several, often similarly coloured, species often congregate around cerambycid infested trees and may share the same hosts.

The above hypotheses are discussed at greater length below, and a set of expected correlations are proposed for each.

(1) Females of the larger Afrotropical Braconinae at least, can often deliver a noticeable sting (personal experience—*Bathyaulax* sp.). Thus, in those species capable of delivering a relatively potent sting, evolution might be expected to favour an enhancement of the conspicuousness of the sting (ovipositor or its sheaths), because potential predators could more readily learn to avoid them. It seems unlikely that wasps with exceptionally long ovipositors (2–10 times the body length) would be able to manipulate these organs with sufficient accuracy to sting a potential predator during an attack; such species would not therefore be expected to have conspicuous ovipositor sheaths. However, for wasps with shorter, more easily manipulated ovipositors, stinging ability would probably be at most only poorly correlated with ovipositor length, and thus accordingly, no correlation would be expected between the length of the ovipositor and its conspicuousness (e.g. length of white tip, length of white hairs, contrast with rest of animal or its environment).

(2) The second warning coloration hypothesis suggests that the length of the white sheath mark relative to that of the body and ovipositor combined (i.e. total pattern length) should remain relatively constant for insects in a given area. From this it

follows that: (i) the length of the white tip relative to body size should increase linearly with the relative length of the ovipositor, with a positive intercept on the relative tip length axis; (ii) the length of the white tip relative to the ovipositor length, should decrease asymptotically with increasing relative ovipositor length.

(3) The attack deflection hypothesis suggests that white ovipositor sheath tips should occur most commonly in those species with long or relatively long ovipositors in which the risk of the body being damaged in an attack is most reduced. Similarly, the conspicuousness of the white tip (as determined by colour and length) should increase with ovipositor length, but not so much that the centre point of the white tip (target for attack) does not also recede from the body with increasing ovipositor length. Although the ovipositor is a resilient organ, it is undoubtedly important that it should not be damaged in an attempted bird attack, and therefore the white sheath mark should not present too good a target.

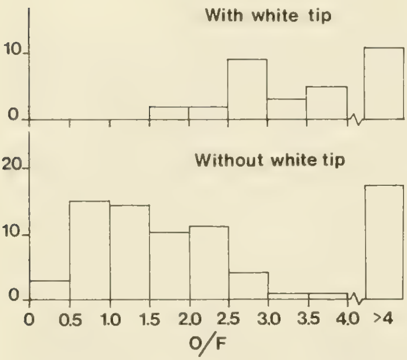
(4) At least some ichneumonoids which parasitize concealed hosts (e.g. *Rhyssa persuasoria* (L.)) bring their ovipositor and ovipositor sheaths forward between their fore legs during the initial phase of oviposition. Thus white markings on the sheaths could aid the wasp in positioning them prior to insertion of the ovipositor, or the border between the black and white sheath regions could signal information about their position and/or separation to their possessor. In both cases the white mark would need to be present only where it could be seen by the wasp. For many of the Braconinae with white tips this would be from just over one body length along the ovipositor because they nearly all have a long, thin, rather inflexible metasoma (= gaster; see Achterberg, 1979) that has been termed merinotoid by Quicke (1984) after the genus *Merinotus* Szépligeti. Under these circumstances, the length of the black basal sheath region should approximately equal the body length irrespective of overall size. Further, the length of the white mark relative to ovipositor length would be expected to increase with relative ovipositor length.

(5) Potential hosts for tropical braconines (mostly cerambycid larvae) occur at a range of depths in pieces of rotten wood, and consequently, different wasps have evolved ovipositors of a range of lengths in order to reach these. Presumably where there is an overlap in host ranges between species that differ in ovipositor lengths, the wasp with the longer ovipositor would be able to parasitize hosts living at a greater range of depths than the other. Thus those species with short ovipositors will therefore, on average, be subject to higher levels of inter-specific competition than those with longer ones. In consequence, it could be particularly advantageous for wasps with short ovipositors to advertise their presence at a prey locality to others with similar potential host ranges if as a result, the signal receiver searched for other prey localities with fewer potential competitors; both signal sender and signal receiver could therefore benefit. To be effective, such an ovipositor length indicating signal would need to be highly conspicuous; since the large tropical braconines usually display aposematic coloration, a conspicuous ovipositor would probably have little effect upon the incidence of bird predation.

MEASUREMENTS AND MATERIALS

Ovipositor length (O) was measured from the apex of the metasoma and the length of the white tip (W) was measured from the apex of the ovipositor sheath though in a few species the extreme apex of the sheaths was blackish. Ovipositors actually insert, and therefore flex, at the base of the hypopygium which is somewhat anterior to the metasomal apex; however, in many of the braconines displaying white ovipositor sheath tips the metasoma is merinotoid (see above) and the ovipositor insertion is relatively far closer to the metasomal apex than its base. When possible, body length was measured from the front of the head to the apex of the metasoma. Unfortunately some specimens were damaged or bent making it impossible to measure body length accurately, therefore fore costa length (F) was usually employed as an alternative estimator of size. For practical purposes, F is linearly related to body length, though the correlation is not perfect: for the 21 specimens with white ovipositor tips in which body length and F could be measured,

$$\textit{body length} = 2.13\,F + 0.59 \quad (r = 0.922; P < 0.01).$$



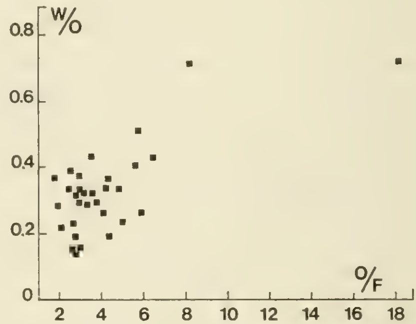
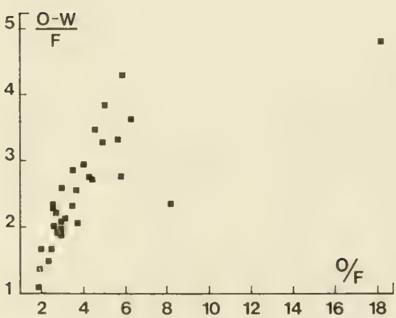


Fig. 1. Frequency histograms of relative ovipositor length (O/F) for 31 braconines with white-tipped ovipositor sheaths (above), and for 75 tropical species of Braconinae without white tips, selected at random from the author's collection.

Fig. 2. The relationship between relative ovipositor length (O/F) and the relative length of the black basal region, (O-W)/F.



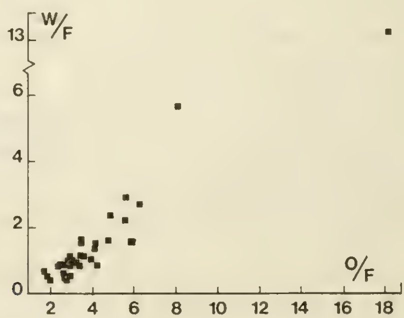


Fig. 3. The relationship between the proportion of the ovipositor sheath with white hairs (W/O) and relative ovipositor length.

Fig. 4. The relationship between the relative length of the white sheath region and that of the ovipositor.

Thirty two species of Braconinae with white-tipped ovipositor sheaths have been examined; these belonged to 9 genera of which seven appear to have been described—*Bathyaulax* Szépligeti, *Cratobracon* Cameron, *Monilobracon* Quicke, *Nesaulax* Roman, *Rostraulax* Quicke, *Shelfordia* Cameron and *Zaglyptogastra* Ashmead. Unfortunately, only a few of the specific names are known with certainty, and these are listed below (figures in parentheses are the number of species with white-tipped ovipositor sheaths examined in each genus): *Bathyaulax* (2), *B. cyanogaster* Szépligeti; *Cratobracon* (6), *C. kinabaluensis* (Cameron & Strand); *Monilobracon* (1), *M. speciosus* Quicke; *Nesaulax* (3); *Rostraulax* (6), *R. vechti* Quicke; *Shelfordia* (6), *S. lineativentris* (Cameron), *S. syleus* (Cameron); *Zaglyptogastra* (6), *Z. plumosus* (Kirby); undescribed genera (2).

RESULTS

The mean relative ovipositor length (O/F) of braconines with white-tipped ovipositor sheaths is considerably longer than that of those lacking this character (4.14 *cf.* 2.36; fig. 1). The smallest value of O/F found in the former group was 1.73 for a *Zaglyptogastra* species, whilst the largest was 18.06 for a member of a genus near *Rostraulax*; however, the latter value was for a species in which the white apical region was rather indistinct, and 95% of the white-tipped species had O/F values of less than 6.5. No other braconines with abnormally long ovipositors, such as *Rhamnura* Enderlein and *Euurobracon* Ashmead, in which the ovipositor may reach up to 14 times the body length (Achterberg, 1981), are known which possess white ovipositor sheath markings, but since these genera and species represent only a small proportion of tropical braconines, it is difficult to determine whether or not white tips are under-represented amongst these.

As relative ovipositor length (O/F) increases, both W/O and W/F increase, the former apparently tending towards a limit (Fig. 3); the relationships are even more pronounced when only the Indo-Australian species are considered. W/F is clearly correlated better with O/F than is W/O. However, without a knowledge of the underlying, non-linear distributions involved, it would be unwise to attempt to compare the correlations statistically. By eye, the intercept on the W/F axis of the relationship between W/F and O/F is close to zero. These observations are clearly inconsistent with the predictions of the second warning coloration hypothesis.

In addition to that of the white tip, the relative length of the black basal region of the ovipositor sheath (O–W)/F, also increases with relative ovipositor length, O/F (Fig. 2; see attack deflection hypothesis). The relationship is non-linear with the relative length of the basal region tending towards a limit with increasing relative ovipositor length; the variance of the data also increases with O/F. Importantly, if the length of the white region was independent of O/F (as for the second warning coloration hypothesis) then a positive, linear relationship would have been expected.

For the sample of wasps studied, relative ovipositor length has a significantly greater variance than the relative length of the black basal sheath region (F value = 11.8, n_1, n_2 = 32, $P<0.01$). Neither O nor O-W are correlated significantly with fore costa length ($r = 0.041$, $n = 32$ and $r = 0.241$, $n = 32$ respectively), but whereas O is not correlated with body length ($r = 0.12$, $n = 21$), O-W is ($r = 0.457$, $n = 21$, $P<0.05$) (Fig. 5). The regression slope obtained from the entire data set was 0.659, however, members of two Afrotropical genera (*Bathyaulax* and *Zaglyptogastra*) have relatively short black sheath regions (labelled "B" or "Z" in Fig. 5). This observation is particularly relevant to the visual feedback hypothesis, since in most *Bathyaulax* and *Zaglyptogastra* species the metasoma is not merinotoid (see above), but instead is shorter and clearly flexible between the 1st and 2nd, and 3rd and 4th tergites: thus, members of these genera can probably bring the base of the ovipositor further forward during oviposition than those with merinotoid metasomas. The data were therefore re-analysed, first omitting the measurements corresponding to the 2 *Bathyaulax* spp. (regression slope = 0.846, r = 0.55, n = 19) and secondly excluding the data from the total of 6 *Bathyaulax* and *Zaglyptogastra* spp., giving a regression slope of 1.057 (r = 0.65, n = 15).

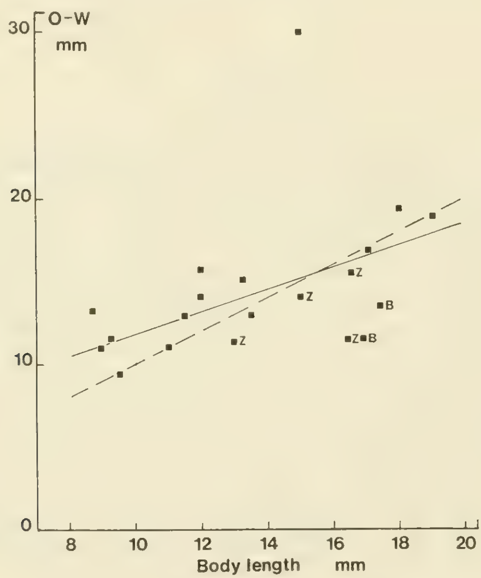


Fig. 5. The relationship between the length of the black basal ovipositor sheath region (O-W) and body length: data pertaining to members of the genera *Bathyaulax* and *Zaglyptogastra* are indicated by the letters 'B' and 'Z' respectively. The solid line is the best fit line for the whole data set, whereas the 45° line is shown broken.

In some *Zaglyptogastra* species (e.g. *Z. cristatula* (Szépligeti)) the hairs forming the boundary between the black and white sheath regions are abnormally long, thus emphasizing the boundary, but the white hairs become shorter distal to the boundary. Such coloration appears to reduce the conspicuousness of the white tip. Similarly, in numerous Indo-Australian species with especially long white sheath tips, the hairs involved are short, resulting in less obvious white coloration than that seen in species with shorter white tips.

Finally, before discussing the above data it should be emphasized that the incorporation in several of the correlated variables of a common divisor (F) is to avoid spurious correlations resulting from the considerable variation in the sizes of the wasps considered, i.e. larger wasps are likely to possess longer ovipositors and also therefore, longer white sheath tips.

DISCUSSION

The absence of white sheath tips in braconines with ovipositors shorter than the body (approximately 2F) seems to be strong evidence against the possible role of this coloration as an intra- or interspecific signal to other wasps to reduce time-wasting at an over-exploited oviposition site. In contrast, other aspects of coloration in braconines do appear to correlate body size or ovipositor length. Within the Afrotropical region, the majority of braconine species display one of about a dozen distinct colour patterns, some of which are characteristic of wasps with a particular range of body sizes or ovipositor lengths across numerous genera. The possible significance of these correlations will be dealt with elsewhere (Quicke, In preparation).

The relative ovipositor lengths of the braconines with white sheath tips do not appear to correlate particularly well with stinging ability. During recent visits to Sierra Leone and Kenya, the author encountered many braconines which were capable of delivering a sting but which did not possess white-tipped ovipositor sheaths.

The second of the warning coloration hypotheses, which proposed that the white tips are merely part of distinctive pattern signalling general distastefulness to potential predators, suggested that W/F should be positively and linearly related to O/F with a positive intercept on the W/F axis, and that W/O should be negatively related to O/F. Neither of these predictions was born out by the available data; W/F was not linearly related to O/F and the intercept was close to zero, while W/O was positively related to O/F.

Members of several Indo-Australian genera possess white markings at the apex of the metasoma (e.g. *Callibracon* Ashmead, *Megalommum* Szépligeti and *Poecilobracon* Cameron) which probably demark a Müllerian mimicry complex. However, these markings are transverse rather than longitudinal as is the case with the ovipositor sheath marking, and it therefore seems unlikely that the latter represents an extension of this particular pattern. Further, among the Afrotropical species with white sheath tips, there are representatives of at least two major colour pattern groups (*Monilobracon speciosus*, those *Zaglyptogastra* species with white tips and *Bathyaulax cyanogaster* are red-brown anteriorly with a black metasoma, whereas the second *Bathyaulax* species involved is bright yellow except for a black metasomal apex and dark wing tips).

Some of the regressions obtained clearly support the attack deflection hypothesis. White sheath markings do not occur in species with short ovipositors (Fig. 1), and both the relative length of the black basal region, (O-W)/F, and that of the white tip, W/F, increase with relative ovipositor length (Figs. 2, 4). However, white tips appear to get less conspicuous with increasing relative ovipositor length, and white tips are unknown among those species with exceptionally long ovipositors in which attack deflection would probably be most efficient. Both of these observations suggest that there may be some other factor influencing the extent and occurrence of white sheath tips in these wasps. The slope of the regression of O-W against body length (Fig. 5) is close to unity when only those species with merinotoid and therefore rather inflexible metasomas were considered, indicating that the border between black and white sheath regions would be just anterior to the insect's head if they and the ovipositor were held forward between the fore legs during oviposition. Unfortunately, there appear to be no published records of the manner of use of very long ovipositors in the Ichneumonoidea (Achterberg, 1981), and it is therefore only possible to offer conjecture upon this. The possibility that the white markings of some Ichneumonidae are used for visual feedback has already been suggested by Shaw (1980). The wasp

Mesostenidea obnoxius (Gravenhorst), a pupal parasite of the Burnet moth, *Zygaena filipendulae* (L.) appears to assess the size of a potential host pupae before oviposition by observing the separation of the white antennal markings when the antennae are moved along the host cocoon. It is important to note that unlike the warning coloration hypotheses, both the attack deflection and visual feedback hypotheses are likely to be distribution independent and therefore the same correlations would be expected for morphologically similar species from all parts of the world.

Ovipositor sheaths with white tips or with a white, pre-apical annulus are to be found in genera belonging to several other subfamilies of Braconidae, e.g. *Spathius* Nees (Doryctinae), *Zele* Curtis (Zelinae) and *Macrocentrus* s.l. (Macrocentrinae). In many of these, O-W is often much shorter than the body length. In *Zele albiditarsus* Curtis, the ovipositor is considerably shorter than the metasoma and the sheaths are almost entirely whitish. This species displays a typical 'ophionoid' facies (Gauld & Huddleston, 1976), and is parasitic upon free living lepidopteran larvae (Achterberg, 1979). During oviposition, this species probably bends its whole metasoma ventrally and forward, and thus it could easily bring its ovipositor sheaths into view. Despite being largely nocturnal, *Z. albiditarsus* has large compound eyes indicating that vision may play an important role during its crepuscular and nocturnal activity.

In conclusion, variation in the length of the white apical region of the ovipositor sheaths of some Braconinae suggests that this coloration may enable a wasp to assess visually the position of its ovipositor during oviposition, assuming that the latter and its sheaths are brought forward at that time. A second, possibly subsidiary, function of the white tip could be to deflect a bird attack away from the body of the wasp; this function may be particularly important at the time of oviposition when the insect is especially vulnerable because of its inability to escape quickly and when the ovipositor is not encased between its sheaths and therefore liable to damage. If the visual feedback hypothesis is correct, there are essentially two possible ways in which the wasps could be using the white sheath mark: (i) they could detect the boundary between the black and white region thereby gaining information about the anterior extension of the ovipositor; (ii) the white mark may simply contrast against a darker background thus allowing lateral displacement of the ovipositor to be assessed. Unfortunately, because of our ignorance about the mechanisms of oviposition in these wasps we cannot distinguish between these possibilities with any certainty, however, it should be noted that they are not mutually exclusive.

SUMMARY

The ovipositor sheaths of several tropical braconid wasps appear white distally. In the subfamily Braconinae this coloration results from white sheath hairs, and occurs in numerous species belonging to a range of genera. Several possible functional roles for this coloration character are considered, and the expected relationships between various measures connected with the relative lengths of the black and white sheath regions are described for each of these. The observed and expected relationships are compared in order to determine the most likely role(s) of this coloration.

The observations that white tips occur most frequently in wasps with relatively long ovipositors, and that the relative lengths of both the black basal and the white apical sheath regions are positively related to relative ovipositor length suggest two possible roles for the white sheath tips: (i) as a device to deflect the attacks of birds away from the body region; (ii) as part of a visual feedback system providing information to the wasp about the position of its ovipositor. It has not been possible to distinguish

unambiguously between these possibilities, however, the linear relationship between the length of the black region and body length with a slope of 0.73 suggests that the second hypothesis may be correct with the border between black and white regions being particularly important. This conclusion is also supported by observations of species in other subfamilies in which the ovipositors are shorter and the body more flexible than in the Braconinae; in such wasps, the relative position of the white tip is much closer to the base of the ovipositor.

ACKNOWLEDGEMENTS

I wish to thank the numerous people who have loaned me material which is referred to here, and Dr P. Kirby, Dr K. Harrison and Miss A. Donoghue for helpful discussion and for reading versions of the manuscript.

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BENHS Field Meeting: Hampstead Heath, Middx, 24.ix.1983. Leader: R.A. Softly.—Eight members met at Jack Straws Castle (map reference 263866). The day was clouded but mild.

The morning walk encompassed the former West Heath bog at the junction of Bagshot and Claygate Beds, an area of wet acid grass heath now become largely mixed deciduous woodland dominated by birch and oak.

After lunch the party moved to the south end of the East Heath at the junction of Claygate Beds and London Clay, where a drier grass heath community was bordered by scrub including blackthorn. The expertise of those present was concentrated largely on leaf miners, spiders and beetles.

THE SYSTEMATIC POSITION OF *HAPLOTINEA*, A GENUS DISTINCT FROM *EPISCARDIA* (LEPIDOPTERA: TINEIDAE)

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Haplotinea Diakonoff & Hinton, 1956, contains two Holarctic species, both of which occur in Britain. They are small tineids of less than 20mm wingspan, with forewings speckled light and dark brown. Species of *Episcardia* Ragonot, 1895, have unicolorous glossy forewings: many are large with wingspans up to 35mm and the genus is distributed throughout the Old World tropics.

Petersen (1982) has characterized the genitalia of *Episcardia* as follows: "valves with one or several basal projections, which in many species is divided into a strongly sclerotized costal arm and a more membranous ventral arm. Aedeagus usually fairly simple, i.e., without a complicated jointed connection to the vinculum [as in *Neoepiscardia* Petersen]. In the female the [anterior] end of the ductus bursae has a complicated funnel-shaped sclerotization. This can be modified as far as a ring-structure with two long, hanging pegs.".

The genitalia of the two *Haplotinea* species, *insectella* (F.) and *ditella* (Pierce, Metcalfe & Diakonoff) have been figured by Diakonoff & Hinton (1956), Petersen (1957) and Zagulajev (1964). The valva of *Haplotinea* does not have basal processes of the type found in *Episcardia*: at best, *Haplotinea* has shallow and strongly sclerotized nodular projections. The aedeagus is slender and curved, unlike the short, stumpy aedeagus of *Episcardia*; a saccus is developed in *Haplotinea* but not in *Episcardia*.

Diakonoff (1968) described three new species of *Haplotinea* and transferred a further three species to the genus. Five of the six species are typical *Episcardia: Haplotinea cymopelta* (Meyrick) is not. Gozmány & Vári (1973) were led by Diakonoff's paper into believing that the two genera were the same and they erroneously synonymized *Haplotinea* with *Episcardia*. This synonymy was not accepted by subsequent authors, notably Zagulajev (1975). He considered *Haplotinea* and *Episcardia* to be separate genera and transferred to *Episcardia* five of the six species that Diakonoff had included in *Haplotinea*. However, he unaccountably failed to mention *Haplotinea hemilampra* Diakonoff. Its transfer to *Episcardia* is here formalized: *Episcardia hemilampra* (Diakonoff, 1968) **comb. n.** (from *Haplotinea*). *Episcardia cymopelta* (Meyrick) is the atypical member of the six; the forewing is greenish yellow with a broad purple-brown terminal fascia. It is referable to *Chrysoryctis* Meyrick, 1886 (type-species: *Oecophora irruptella* Walker, 1864) **gen. rev.** (from synonymy with *Tinea*).

Despite its rejection by Zagulajev (1975), Davis (1983) has repeated in the Holarctic context the synonymy of *Episcardia* and *Haplotinea* established by Gozmány & Vári. This results in the transfer of *Haplotinea insectella* (F.) to *Episcardia*. This transfer is erroneous—*Episcardia* and *Haplotinea* are separate genera and *insectella* is here restored to its traditional placement: *Haplotinea insectella* (F.) **comb. rev.** (from *Episcardia*).

The larvae of *Haplotinea* have been described by Diakonoff & Hinton (1956) and Hinton (1956). These authors placed *Haplotinea* in the Nemapogoninae (as did Zagulajev, 1964) but stressed the notable difference between *Haplotinea* and *Nemapogon* in the reduced number of larval ocellar lenses in the former genus. Similarly, while considering *Haplotinea* a "typical member of the Nemapogoninae", Zagulajev (1964) stressed the differences that it exhibits from other genera of Nemapogoninae and suggested an affinity with the tribe Cephimallotini of the Myrmecozelinae.

With the exception of the larval meso-and metathorax SV-group being unisetose, all larval similarities between *Haplotinea* and the Nemapogoninae would appear to be plesiomorphies. By contrast, the adult differences between members of the two groups are substantial, highlighting the similarities between *Haplotinea* and the Cephimallotini. The wing pattern of *Haplotinea* is atypical of Nemapogoninae, resembling more the speckled patterns of the genera of the Cephimallotini. Similarly, the stout and flattened labial palpi resemble much more those of the Cephimallotini than the Nemapogoninae. In the male genitalia the aedeagus is short and curved as in Cephimallotini, not elongate and straight as in the Nemapogoninae. A gnathos is absent and the uncus lobes are strongly sclerotized, specialized, and articulated as in the Cephimallotini. The eighth stenite is strengthened and specialized; the valva lacks the digitate subcostal process present in most Nemapogoninae but is specialized with strongly sclerotized processes at the ventral margin and costa as in many Cephimallotini. The female genitalia of *Haplotinea* lack the sclerotizations that are present in the bursa copulatrix of many Nemapogoninae. They do not exhibit the characteristic lepidote pattern present on the internal surface of the ductus bursae of many Nemapogoninae but instead the ductus bursae is lined with microtrichia as in many Cephimallotini.

Although the similarities between *Haplotinea* and the Cephimallotini may be the result of convergence, it makes most sense at present to consider *Haplotinea* as belonging to that tribe. Unfortunately, Zagulajev (1964) erected a family-group name Haplotineini based on *Haplotinea* and this must therefore become the senior subjective synonym of Cephimallotini Zagulajev, 1965 (**syn. n.**). The tribe Haplotineini is here placed within the subfamily Myrmecozelinae: its constituent genera are *Haplotinea*, *Cephitinea*, *Cephimallota*, *Anemallota*, *Aphimallota*, *Dinica*, *Janseana* and *Phthoropoea*.

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Footnote: Gardike, R., 1984, *Ent. Abh. Mus. Tierk. Dresden* **47**: 141–154, figs 1–16 recognizes the species placed in *Haplotinea* by Diakonoff [1968] as *Episcardia*.

THE CAUSE OF GREEN ISLANDS INDUCED BY THE NEPTICULIDAE

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Col. A.M. Emmet writing in Heath (1976), states that the cause of the "green islands" surrounding the mines of many nepticulid larvae has never been satisfactorily explained. This observation provoked Wild (1976) to suggest that larval respiration and the deposition of frass provides carbon dioxide, water and nitrogenous material to a localised area of the leaf, and that this is sufficient to maintain normal cellular metabolism and tissue integrity in the mined area which would otherwise undergo senescence owing to the formation of the abscission zone in the leaf petiole. This hypothesis implies a very general control over the physiology of the leaf by substances that can reasonably be expected to be produced by most leaf-mining Lepidoptera, yet not all such larvae induce green islands.

A more specific mechanism explaining green islands has been provided by the experimental evidence of Engelbrecht and Orban (1969), and as apparently few lepidopterists are familiar with this work, Col. Emmet has suggested that it be brought to wider attention.

Leaves of *Betula pendula* mined by *Ectoedemia argentipedella* (Zeller) and *Populus tremula* mined by *E. argyropeza* (Zeller) accumulate significantly high levels of a group of substances known as cytokinins, which Engelbrecht and Orban held to be responsible for the induction of green islands. Cytokinins are one class of a diverse group of chemicals known as plant growth regulators or phyto-hormones which can exert profound control over the growth and development of plants even when present in only vanishingly small amounts. For instance, it has long been known that their application to excised leaves can prevent leaf senescence, maintaining a local area of healthy tissues, whilst the rest of the leaf continues to yellow. The treated area has a striking resemblance to the green islands induced by leaf miners. Although Engelbrecht and Orban could not totally exclude the possibility that cytokinins were synthesized in the leaf or translocated to it from other parts of the tree under the influence of the larvae, they provided strong experimental evidence that cytokinin was produced by the larvae themselves and found high levels in the frass, gastro-intestinal tracts and particularly in the labial glands which are possibly responsible for their synthesis. Cytokinin biosynthesis was not investigated by these workers but there is every likelihood that they are produced as a side effect of normal purine metabolism or as products of nucleic acid catabolism.

Auxins form another class of phyto-hormones which is perhaps worthy of investigation as an alternative causative agent of green islands in other larva/host-plant associations, as the exogenous application of auxin to excised leaves can also induce green islands similar to those caused by the application of cytokinins. In general, auxins have this effect on the leaves of woody plants whilst cytokinins are active on herbaceous plants. It is interesting to note that *Populus* and *Betula* used by Engelbrecht and Orban are woody plants, yet cytokinins rather than auxins were found to mediate in green island formation.

It seems valid to look on the green island habit as an intermediate state between simple leaf mining which does not involve modification of the pabulum and gall formation, which involves a chemical "hijack" of the invaded tissues resulting in their modification to provide food and shelter for the larvae. Although a green island miner does not manifest the same degree of homeostatic control over its environment as does the gall inhabitant, it does achieve an obvious ecological advantage by increasing the longevity of its food supply, thus enabling it to continue development during leaf fall. There might also be advantages in feeding late in the year at a time when fewer parasites may be active.

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BOOK REVIEW

An Annotated Catalogue of the Butterflies (Lepidoptera: Papilionoidea) named by Roger Verity. 105pp. Reprinted from *J. Res. Lepid.* **21**(1). The Lepidoptera Research Foundation, U.S.A. 1983. $8.00. ISBN 0 9611464 0 0.

A short introduction explains the aims and methods of the book and also contains an interesting description of the difficulties resulting from Verity's unorthodox way of classifying species first into exerges, which do not precisely agree with modern concepts of sub-species, and then into races and sub-races which, though they often appear to be geographical, are based on wider considerations than geographical isolation. Many of his race names have been used by later authors for sub-species. Verity himself criticised the practice as being likely to lead to an undue multiplication of sub-specific names, and the author himself considers that the most recent changes in the definition of sub-species in the International Code for Zoological Nomenclature may lead to still wider extension.

The core of the book consists of a list, with references in chronological order, of Verity's 120 publications, and an annotated catalogue of over 1400 of the names which he bestowed on Holarctic butterflies. These are arranged alphabetically within families; but, regrettably, do not cover the Hesperioidea (Skippers). The information in it is largely derived from the author's own close study of Verity's collection, which is is now in the care of the Museo Zoologica de la Specola in Florence; his preliminary survey was assisted by a grant from the Hering Memorial Fund of this Society. For each name are given: the taxonomic rank which Verity intended or implied for it, the combination in which it was described, places and dates of types and syntypes which are in the collection, and a cross-reference to the list of publications. Names intended by Verity for species or sub-species are printed in capitals, and trinominal names for races, which may now be eligible for use as sub-species, are preceded by an asterisk.

This is by no means a book for the specialist only. Most people who are interested in European butterflies have come across Verity's names and have been puzzled as to how and when they may properly be used. Some will already have consulted the splendid masses of colour figures of racial forms in his major book on Italian butterflies, and may be encouraged to see the originals of these and others during a visit to Florence.

R.F.B.

Correction—Annual Exhibition report, vol. **17:5**. Delete *Archanara dissoluta* new to Buckinghamshire.

Monarch resident in Spain *(Danaus plexippus* (L.)).—On a recent visit to the Malaga district of Spain, I found an area in which the Monarch Butterfly, (*Danaus plexippus*) now appears to be resident. On 29th March 1984 I was walking along a valley looking for Spanish Festoons when my wife pointed out what she thought was a *plexippus* and a few moments later I saw a beautiful specimen sitting on some low growing *Geranium* with its wings open in the sunlight. It soared away over the cliffs. Riley and Higgins state that *D. plexippus* is a rare migrant in Spain and I thought it unlikely that I would see one again. However, that evening, in the same spot, I saw it again and caught it with ease, an almost perfect female. The next day was very hot; in a valley about a mile away from the original capture I watched another in all its glory soaring impossibly out of reach up and down among the trees. Two more were flying together over the original site at mid-day. Over the seven days, 29th March until 4th April, we found Monarchs to be quite common in the area. On one occasion four were seen together, on several occasions three.

At this early part of the year the small valleys of Malaga are green and full of plants and flowers all of which dry up in the intense summer heat. It was to these valleys that *plexippus* restricted itself. The steep intervening hillsides were already dry and hot. Only once were two seen following each other at speed across the intervening hills. We spent many hours trying, without success, to establish what, if anything, was being used as a food plant. Two or three settled each evening at about 7.15 p.m. Spanish time in a pine high in the side of the valley. They seemed to be confined to two valleys over an area of 2–3 square miles. I walked extensively outside this area without seeing any.

So it seems that this magnificent butterfly already, established in the Canaries and a known coloniser, has at least established a temporary colony on mainland Europe and with luck will spread and become permanent.—Peter J. Edwards, Park Cottage, Lower Hartwell, Stone, Bucks.

BOOK REVIEWS

The Butterflies and Larger Moths of Lincolnshire and South Humberside, by J. Duddington and R. Johnson. 299pp., including four maps and black silhouettes of imagines and larvae of 25 families. Lincolnshire Naturalists' Union, Lincoln, 1983. Obtainable from Mrs. E.V. Pennel, 47 Ridge Road, Bracebridge Heath, Lincoln LN4 2LH. Price £7.95 (post free).

Lincolnshire is much less well known to lepidopterists, especially to those outside its boundaries, than its fauna deserves, and this attractive book is fully worthy of their attention. The core of it provides a check list and details of a careful and critical up-dating of the only previous county list by G.W. Mason, which was published by the Lincolnshire Naturalists' Union in parts from 1905 to 1912. This new list includes 57 species of butterflies and 599 moths, of which, however, the text mentions no records of 16 butterflies and about 90 moths since 1960. It is preceded by excellent chapters by several authors on the county's geology, flora, weather, wild life and conservation, and the ecology of certain butterflies. Sketch maps illustrate the general topography, soil regions, and the location of nature reserves, which are listed.

The front cover shows a good colour photograph of the Peacock butterfly feeding at *Sedum* blossom, and the whole text is immaculately produced and free of misprints. It must, however, be regretted that the numbering, order and nomenclature of species follow, for both English and scientific names, Heslop's now outdated revised check list of 1964. This may be convenient for the elder generation, but will not bring up their grandchildren in the way they should go.

R.F.B.

The Moths and Butterflies of Great Britain and Ireland, Vol. 10 (Part II) Noctuidae and Agaristidae. Editors: J. Heath, A.M. Emmet. Harley Books, 1983. 459pp. 13 colour plates. Price £40.

When the review of Vol. 9 of this outstanding series appeared in our Proceedings in March, 1980 it was noted therein that "the plates of imagines and larvae tempt one to look for the text of Vol. 10". This is now before us and brings to completion an authoritative account of the Noctuidae under the proven authorship of R.F. Bretherton, B. Goater and R.I. Lorimer. Before delving into that family we have Chapter 1 comprising R.F. Bretherton's 'The Incidence of Migrant Lepidoptera in the British Isles'. This is an all-embracing account embodying a wealth of information given under some 16 sub-headings from 'Introduction' and 'Recognition' to 'Conservation' and 'The impact of immigration on the British lepidopterous fauna'. On p. 35 The systematic section reminds us of families already dealt with in earlier volumes and of those which will relate to subsequent volumes.

The authorship of the subfamilies of the Noctuidae is shared between:

R.F. Bretherton — overseas distribution for all species; migrant, adventive and extinct species in all subfamilies; Heliothinae, Acontiinae and Hypeniinae.

B. Goater — Amphipyrinae; and keys to species for all subfamilies.

R.I. Lorimer — Cuculliinae, Acronictinae, Chloephorinae, Sarrothripinae, Pantheinae, Plusiinae, Catocalinae and Ophiderinae.

The information on the various species follows the excellent pattern of the previous volume and distribution maps have again been provided by the Biological Records Centre. Clear line drawings of genitalia will assist identification of 'problem' species within the genera *Cucullia*, *Acronicta*, *Amphipyra*, *Oligia*, *Luperina*, *Amphipoea*, *Hoplodrina*, *Plusia* and *Schrankia*, though those of *Oligia* females (p.208) are unavoidably placed in reverse order to their underlying legend. Figures of female genitalia of *Luperina* and *Amphipoea* are omitted, though in the case of *Amphipoea* their form is indicated in the text but without reference to the classic Tams paper of 1941.

A corrigenda slip, enclosed with the volume, corrects the very few typographical errors, though this reviewer has also noted a partially incorrect attribution to the paper on *Parascotia fuliginaria*. The 13 colour plates by Brian Hargreaves are much better than those prepared for vol. 9 and where some difficulty in identification is experienced it invariably proves to be a rarity for which one has no mental picture!

A comprehensive index and index of host plants complete this splendid work and the editors who, in their preface welcome Harley Books as their new sponsor and publisher, deserve our congratulations.

B.R.B.

Handbooks for the Identification of British Insects Vol VI, Part 2 (a) Symphyta (except Tenthredinidae) Hymenoptera, by J. Quinlan and I.D. Gauld. Royal Entomological Society, London 1981. pp.67. £5.50.

This key is a revised version of the one written by R.B. Benson for the R.E.S. in 1951. The format of the key is basically the same as in the original but some changes have been made which make it more informative. In line with other recent R.E.S. keys, there are now introductory sections on biology, collecting and preserving. Other additions are a key to the families of mature larvae, a check list of the 83 species covered by this booklet and a list of their larval food plants. The illustrations associated with the key have been extensively redrawn and in most cases are larger than in the earlier version. The authors have taken the opportunity to update the records of foodplants and distribution in the British Isles but information concerning the overseas distribution has been deleted. Hymenopterists who study sawflies while abroad may regret this change but on the whole this publication is an improvement on Benson's earlier work.

A.J.H.

Biology of Spiders by Rainer F. Foelix. 306pp., 179 photographs and drawings. ISBN 0-674-07431-9. Harvard University Press, Cambridge, Massachusetts and London, England. 1982. £21.

When one considers what an important and interesting group of invertebrate predators the spiders form, it is surprising how little has been written about their biology. Previous books on the biology of spiders by Savory 1928 and Neilson are out of date. The more recent 'The World of Spiders' by W.S. Bristowe 1958 is confined to the behaviour of British spiders and the excellent books on New Zealand, American and Australian spiders are also limited in scope as their titles make clear.

Recent research has revealed many fascinating facts which Dr Foelix has gathered together. This is a book to be owned (if possible) and read slowly. It has something of the effect of Christmas pudding—plums on every page—and too rapid a consumption would bring indigestion. The subjects considered are anatomy, metabolism, neurobiology, webs, locomotion and prey capture, reproduction, development, ecology and systematics. All these are treated thoroughly in clear and concise English. The numerous drawings and photographs help to clarify many points.

The book is well printed and stoutly bound and as, no doubt, in many hands it will get a lot of use, it certainly needs to be. It is well worth £21 and is enthusiastically recommended to all naturalists.

F.M.M.

FIELD MEETINGS

BENHS Field Meeting: Wychwood Forest, Oxon. 4.vi.1983. Leader: G. Prior.—This meeting was held in Wychwood Forest National Nature Reserve by permission of the Nature Conservancy. The weather was in every way excellent and fifteen persons, members and friends, attended. The purpose was to look for and record insects other than the macro-lepidoptera which have already been fairly thoroughly recorded. Wychwood is an ancient forest with a variety of old broad-leaved trees, open rides, stream, ponds and marshy places and it is ideal for the study of the other orders. Several interesting insects were noted although the beetle *Gynandropthalma affinis* Illiger, a prize for which Mr C. Mackechnie-Jarvis travelled from Salisbury, eluded us. Another field meeting is scheduled for 1984 and so we hope for better luck. The following is a list of the insects that members attending have notified me has having been seen.

LEPIDOPTERA: *Xanthorhoe montanata* D. & S., *X. spadicearia* D. & S., *Epirrhoe alternata* Mull., *Petrophora chlorosata* Scop., *Thecla quercus* L. larvae, *Crambus nemorellus* Hbn., *Glyphipterix simpliciella* Steph., *Anthophila fabriciana* L., *Spuleria flavicaput* Haw., *Pammene rhediella* Clerck, *Incurvaria masculella* D. & S., *Stephensia brunnichella* L., *Pieris brassicae* L., *P. napi* Steph., *Gonepterix rhamni* L., *Anthocharis cardamines* L.

COLEOPTERA: *Adalia 10-punctata* L., *Calvia 14-guttata* L., *Coccinella 7-punctata* L., *Propylea 14-punctata* L., *Chilocorus renipustulatus* Scriba, *Cantharis nigricans* Müll., *Rhagonycha femoralis* Brullé, *Podabrus alpinus* West., *Tachyporus hypnorum* F., *Anaspis maculata* Fourc., *Polydrusus pterygomalis* Boheman, *Phyllobius oblongus* L., *P. pyri* L., *Cionus scrophulariae* L., *Eubrychius velutus* Beck, *Lochmaea crataegi* Forst., *Chrysolina polita* L., *Chalcoides aurata* Marsh., *Demetrias atricapillus* L., *Donacia vulgaris* Zschach, *Anaglyptus mysticus* L., *Sinodendron cylindricum* L.

ODONATA: *Agrion splendens* Harris, *Ischnura elegans* Van der Linden, *Enallagma cyathigerum* Charpentier, *Coenagrion puella* L.

HEMIPTERA: *Rhopalus subrufus* Gmel., *Harpocera thoracica* Curt.

HOMOPTERA: *Craspedolepta nebulosa* Zett.

HYMENOPTERA: *Athalia cordata* Lepel., *Strongylogaster xanthocera* Steph. *Pachyprotasis rapae* L., *Eutomostethus ephippium* Panz.

DIPTERA: *Bombylius major* L., *Lunatipula vernalis* Meig., *Acutipula maxima* Poda, *Ctenophora flaveolata* F.

BEHNS Field Meeting: Burley Street, New Forest, 30/31.vii.1983. Leader: Steve Pittis.—Twelve members and friends attended for all or part of this meeting on a warm sunny day followed by a clear but warm night. This was one of a series of meetings organised for the N.C.C. survey of river valleys in the Forest threatened by drainage schemes. The river valley at Burley Street is bordered by heathland and mixed woodland giving a varied habitat.

In the afternoon 14 species of butterflies were encountered with *Plebejus argus argus* and *Hipparchia semele semele* quite common on the heathland. A number of *Quercusia quercus* were seen flitting around oak trees and a Purple Hairstreak later came to m.v. light! In what turned out to be a "Clouded Yellow Year" it was thrilling to see 4 specimens of *Colias croceus* careering across the heath.

Of the moths, several male *Lasiocampa quercus* were observed flying wildly in the sunshine and *Autographa gamma* were abundant. Larvae of *Macrothylacia rubi, Tyria jacobaeae* and *Ceramica pisi* were found along with mines of *Phyllonorycter corylifoliella* and *P. oxyacanthae* on hawthorn and a pupa of *Tischeria marginea* on bramble.

At night 6 lights were set up yielding a total of 133 species of moths. Among the more noteworthy were *Microthrix similella, Buckleria paludum, Hyloicus pinastri, Clostera pigra, Parastichtis suspecta, Cosmia affinis, Eustrotia uncula, Bena prasinana* and *Hypenodes turfosalis*.

A small number of species of Coleoptera, Diptera and Odonata were also identified and a full list of insects recorded has been forwarded to the N.C.C.

BENHS Field Meeting: Dungeness, Kent, 2.vi.1984. Leader: Paul Sokoloff.—At various times during the day some sixteen members and friends attended this meeting despite warnings of flood and tempest from the national weather forecasters. The afternoon was warm and sunny, and time was equally divided between avoiding larvae of the ghastly *Euproctis chrysorrhoea* (L.) (which was present in depressingly large numbers) and searching for more interesting species. *Oncocera genistella* (Dup.) was common on gorse, but *Capperia britanniodactyla* (Greg.) was local and difficult to find. Despite this, diligent searching turned up some 40 larvae of this species. *Coleophora otitae* Zell. seemed rather scarce, with only a few clumps of *Silene nutans* having an appreciable number of cases. A few examples of *Lasiocampa* *trifolii flava* Chalmers-Hunt were noted during the day, but searching after dark with a lantern was more productive when this species, together with *L. quercus* (L.) were to be found feeding on broom.

After some liquid refreshment, nine MV lights were set up on the shingle and amongst the sallows. This was a signal for the temperature to drop, and the wind to increase. Very few moths were seen although singletons of all the expected species were noted, including *Hadena albimacula* (Bork.), *Calophasia lunula* (Hufn.), *Macrothylacia rubi* (L.) *Ethmia bipunctella* (F.) and *Agrotis cinerea* (D. & S.) The highlight of the evening was the capture of a single male *Clostera anachoreta* (D. & S.), believed to be the first recorded Kentish first-brood specimen of this problematic species.

BEHNS Field Meeting: Wanstead Park, East London, 9/10.vi.1984. Leader: Colin W. Plant.—Members were rewarded by the warmest weather of the year to date. The daytime was spent searching for Lepidoptera and Diptera. The 24 species of hoverflies recorded included five new records for the area.

In the early evening the sky remained clear and the temperature plummeted, resulting in a rather poor moth-trapping session. Notwithstanding this, a total of 47 moths were recorded during the day, of which two were new records.

Diptera: Syrphidae. *Syrphus ribesii* (L.), *S. vitripennis* Mg., *Epistrophe eligans* (Harris), *E. grossulariae* (Mg.), *Metasyrphus luniger* (Mg.), *Melangyna labiatarum* (Verrall), *Xanthogramma pedisequum* (Harris), *Sphaerophoria scripta* (L.), *Baccha obscuripennis* Mg., *Baccha* species females, *Melanostoma mellinum* (L.), *M.scalare* (F.), *Platycheirus albimanus* (F.), *P.manicatus* (Mg.), *P. scutatus* (Mg.) *Cheilosia albitarsis* Mg., *Ferdinandea cuprea* (Scop.), *Chrysogaster hirtella* Loew, *Neoascia podagrica* (F.), *Anasimyia lineata* (F.), *Helophilus pendulus* (L.), *Eristalis sepulchralis* (L.), *Merodon equestris* (F.), *Pipiza austriaca* Mg.

Arachnida. *Dictyna arundinacea, Xysticus cristatus, Pardosa amentata, Meta mengei.*

Heteroptera. *Eysarcoris fabricii* (Kirkaldy).

Lepidoptera (including larvae and leaf mines). *Ectoedemia argentipedella* (Zell.), *Trifurcula immundella* (Zell.), *Stigmella hybnerella* (Hbn.), *Psyche casta* (Pallas), *Bucculatrix crataegi* Zell., *Tinea semifulvella* Haw., *Glyphipterix simpliciella* (Steph.), *Anthophila fabriciana* (L.) *Elachista argentella* (Clerck), *Esperia sulphurella* (F.), *Alabonia geoffrella* (L.), *Mompha subbistrigella* (Haw.), *Clepsis spectrana* (Treits.), *Tortrix viridana* (L.), *Olethreutes lacunana* (D. & S.), *Cydia succedana* (D. & S.), C. *rusticella* (Clerck) (*nigricana* (F.)), *Crambus nemorella* (Hbn.), *Scoparia ambigualis* (Treits.), *Pyrausta aurata* (Scop.), *Pieris brassicae* (L.), *P. rapae* (L.), *P. napi* (L.), *Anthocharis cardamines* (L.), *Lycaena phlaeas* (L.), *Polyommatus icarus* (Rott.), *Aglais urticae* (L.), *Inachis io* (L.), *Pararge aegeria* (L.), *Coenonypha pamphilus* (L.), *Drepana binaria* (Hufn.), *Timandra griseata* (Petersen), *Xanthorhoe ferrugata* (Clerck), *X.montanata* (D. & S.), *Ecliptopera silaceata* (D. & S.), *Perizoma flavofasciata* (Thunb.), *Chloroclistis v-ata* (Haw.), *Gymnoscelis rufofasciata* (Haw.), *Lomaspilis marginata* (L.), *Aethalura punctulata* (D. & S.) (new record), *Cabera pusaria* (L.), *Pterotoma palpina* (Clerck) (new record), *Orgyia antiqua* (L.), *Agrotis exclamationis* (L.), *A.puta* (Hbn.), *Ochropleura plecta* (L.), *Diarsia rubi* (Vieweg), *Orthosia gothica* (L.), *Phlogophora meticulosa* (L.).

The mixed nature of the woodlands in the Park provides varied habitats ranging from secondary planting of beech to primary woodland containing native, unpollarded hornbeam, and is in sharp contrast to the more popular areas of Epping Forest. Large areas dominated by grasses, kept cropped by rabbits, separate the woodlands in what was in the seventeenth century part of the huge estate of Wanstead House. In the aftermath of dutch elm disease, scrub including birch, sallow and bramble has grown up in the areas that were clear-felled to allow for replanting of oak, beech, hornbeam, hazel and other species.

The River Roding forms the eastern boundary of the Park and four semi-natural lakes, formed from a diversion of the river, create a chain which provides a barrier retaining most visitors in the areas nearest the gate. The lakes have a good variety of vegetation, both submerged and emergent.

BENHS Field Meeting: Durlston Country Park, Swanage, Dorset, 1/2.xi.1984. Leader: P.J. Baker.—Once again this field meeting date coincided with the departure of summer and the onset of winter. It was fortunate that one member attended the venue on the preceding Friday night. His records, as shown below, indicate that the local Lepidoptera population had been reinforced by a recent migration. On the Saturday wind and showers accompanied a fall in temperature. This resulted in a poor night with the only record of note being *Agrius convolvuli* (L.)

Lepidoptera recorded on the 30th September were: *Cyclophora pupillaria* (Hbn.), *Xanthorhoe fluctuata* (L.), *Chloroclysta siterata* (Hufn.), *C. truncata* (Hufn.), *Thera obeliscata* (Hbn.), *Peribatodes rhomboidaria* (D.& S.), *Campaea margaritata* (L.), *Agrius convolvuli* (L.), *Acherontia atropos* (L.), *Agrotis segetum* (D. & S.), *A. ipsilon* (Hufn.), *Noctua pronuba* (L.), *N. comes* (Hbn.), *Peridroma saucia* (Hbn.), *Xestia c-nigrum* (L.), *X. xanthographa* (D. & S.), *Mythimna l-album* (L.), *Leucochlaena oditis* (Hbn.), *Aporophyla australis* (H. & W.), *A. nigra* (Haw.), *Allophyes oxyacanthae* (L.), *Eumichtis lichenea* (Hbn.), *Agrochola lychnidis* (D. & S.), *Omphaloscelis lunosa* (Haw.), *Amphipyra tragopogonis* (Clerck), *Phlogophora meticulosa* (L.), *Gortyna flavago* (D. & S.), *Helicoverpa armigera* (Hbn.), *Autographa gamma* (L.) and *Hypena proboscidalis* (L.).

INDOOR MEETINGS

BENHS meeting 12.i.1984.—*Exhibits*. Col. A.M. Emmet: A specimen believed to be of *Euzophera bigella* (Zell.) If so, it is the second British specimen, the first having been reared by E.C. Pelham-Clinton at Edinburgh in 1955 from a larva feeding in a peach imported from Italy. This example was taken indoors on the 2.xii.1983 at Saffron Walden. Most probably the larva had been brought into the house in fruit of foreign origin. The range abroad extends from Belgium to Turkestan.

Mr P.A. Sokoloff: Two early colour-tinted postcards, circa 1900–1910, of Wicken Fen, from the collection of the late G.R. Sutton.

Mr K. Webb: A specimen of *Sesia bembeciformis* recently found in an emerging cage. The larva had been collected from a small colony on sallow in South Bedfordshire, its first recorded appearance here since Victorian times.

Mr R. Jones: A beetle, *Anommatus duodecemlineatus* (Muller) from a heap of grass cuttings in a small suburban garden in Bromley, Kent. 21.xi.83. A rare beetle associated with rotting vegetable refuse, grass cuttings, seed potatoes and the like. It is thought to be subterranean and people have found it in their gardens in buried wood and rotting bulbs. Its scarcity might be due to its retiring habits although even in a large pile of grass cuttings, only one specimen was found. It is interesting that this beetle is one of about six species of British beetles to be blind, completely lacking the eyes.

Membership: Mr P.R. Harvey and Lt. Col. Hall-Smith were elected as members.

Communications: The President announced the award of a Knighthood to Prof (now Sir Richard) Southwood, a distinguished member of the Society. He also congratulated those concerned with the production of Volume 10 of MBGBI. Col. EMMETT appealed for records of Microlepidoptera, particularly the Psychidae for inclusion in Volume 2. A supplement to Volume 1 was also in preparation, and additional records would be welcome.

R.F. BRETHERTON announced that the hardback edition of *British Hoverflies* was now sold out, but more were being rebound in this format.

Lecture: Mr N.A. CALLOW gave a talk entitled "Larger than life-size" in which he described the techniques he used, including many personalised modifications for obtaining close up photographs of natural history objects. The talk was copiously illustrated with slides of insects and plants that amply demonstrated the photographer's skill. Mr Callow dealt with numerous technical questions at the end of his talk.

BENHS meeting 26.i.1984.—*Exhibits*. Mr RICHARD JONES. *Pycnomerus fuliginosus* (Erichson) (Col.: Colydiidae), from under bark of an oak stump, Chidingly, East Sussex, on 27.xii.83. This beetle is a recent colonist from Australia and Tasmania, first taken in Britain in June 1962, from under bark of a small log washed up on the shore at Slapton Devon. It was found in Epping Forest in 1964. There are a few published records of its spread through this country, but he had taken it previously in two other places in Sussex many miles apart. These Sussex specimens occured several miles from the nearest habitation, were well established in several stumps and were quite active despite the cold wet weather.

Dr M.G. MORRIS. (1) A case of insects (butterflies and weevils) from Papua New Guinea (with *Troides oblongomaculatus oblongomaculatus* substituting for the PNG ssp.) to illustrate his talk. (2) Two NAS publications on butterfly farming and crocodile farming, for the Society's library. (3) Pictorial guide to male *Ornithoptera* spp. of PNG made for customs (UK).

Membership. The following were elected. Messrs E. Mclean, E.G. Hancock, J.P. Young and A.D. Sclater; Mrs. K. Emmet; Drs M.A. Salmon, P.A. Bond and A.R. Plant.

Dr M.G. MORRIS then gave his talk entitled *Butterflies: farming, commerce and conservation*, which was almost entirely concerned with Papua New Guinea, and was accompanied by a series of fine coloured slides.

A Microlepidoptera Dissection Workshop.—At the 1983 annual exhibition of the Society the staff of the microlepidoptera section of the British Museum (Natural History) extended an invitation for members to attend a workshop session on dissection techniques as applied to the microlepidoptera. This session was duly held on Saturday 25th February 1984. Ten members attended, arriving from destinations as far away as Devon and Glasgow. We were each provided with a binocular microscope, appropriate reagents, and specimens of *Depressaria*, whose ample genitalia were ideal for beginners to work with. A number of members also brought their own specimens for dissection and examination.

The BM staff provided constant expert advice and assistance. All those who participated, whether novice or experienced dissector, found the day both enjoyable and very useful. Our thanks go to Dr Sattler and his staff: Dr G.S. Robinson, Mr M. Shaffer, Mrs L. Pitkin, Mr K.R.C. Tuck and Miss M.A. Tobin for arranging and supervising this novel and rewarding "indoor field meeting".—Paul Sokoloff.

BENHS meeting 9.ii.1984.—The death was announced of Mr F.S. Reeves, who died at his home at Telford, Lincolnshire on 21.i.1984.

Exhibits. The President, Mr B.R. Baker: A male *Eresus niger* (Petagna), a spider which could not well be mistaken for any other British species, taken in Switzerland, 1969. This species was thought to be extinct in Britain but has in recent years been rediscovered here.

Mr J.M. Chalmers-Hunt: Two male tarantulas taken by him in September and October 1983, while entomologising on a 6000 mile motor drive in California and Nevada. A total of some 20 examples were seen during the journey, all apparently referable to *Avicularia californica* Bankes (det. P.D. Hillyard), a species until now not represented in the British Museum (Natural History).

Col. A.M. Emmet: Distribution maps for *Phyllonorycter* and *Stigmella* species, showing the excellent response made by members to a request for records to be shown in *The Moths and Butterflies of Great Britain and Ireland* Volume 2 and the Supplement to Volume 1.

Communications. Mr P.A. Sokoloff saw two *Gonepteryx rhamni* (L.) (The Brimstone) in Bromley, Kent, on 9.ii.1984.

Lecture. Mr R. Jones (a visitor) spoke on the subject of *Feeding behaviour in Spiders*, his talk being accompanied by a series of coloured slides.

BENHS Ordinary Meeting 23.ii.1984—The Ordinary Meeting business, with the President, Mr B.R. Baker in the chair, preceded the Annual General Meeting.

Exhibits. Rev. D.J.L. Agassiz and Mr B. Goater: Series of two recently segregated species, *Mesapamea secalis* (Linnaeus, 1758) and *M.secalella* Remm, 1983. They are separable on structural differences in the male genitalia, but unfortunately can only be separated externally when long series are compared. *M.secalella* is slightly smaller and in this species the plain form is the most frequent one. Described from Estonia, U.S.S.R., it has been discovered in Denmark (Fibiger), Sweden (Moberg) and Finland (Mikkola)*. Both species appear widespread in Great Britain and Ireland. Both occur in Herts., Middx., Hants., Kent, Essex, Surrey; both have been found as far north as Edinburgh and in western Ireland (Co. Galway). Photographs and drawings of the genitalia were exhibited and copies of the drawings were made available to Members.

Mr R.A. Jones: Three specimens of *Dorytomus validirostris* (Gyll.) (Col.: Curculionidae), from under bark of Black Poplar, Hampstead Heath, 16.ii.84. This pretty little weevil is associated with the Black Poplars *Populus nigra* (L.) and *P.* × *canadensis* (Moench) var. *serotina* (Hartig). Despite the widespread occurance of these trees, the beetle is very local. These specimens were found hibernating with several other beetle species under the bark of a large poplar—most likely the more common *P.* × *canadensis*; numerous dead specimens were also found. Recent records have usually been of single specimens swept or taken at mercury vapour lights. The larvae attack the catkins and terminal buds and may normally occur out of

* We are grateful to Dr K. Mikkola of Helsinki for information on these two species.

reach of collectors. There are records of large numbers being taken from the lower branches of poplars and in the surrounding herbage after storms.

Mr C.W. Plant: A longitudinal section of a banana, (country of origin unknown), containing a mine; exhibited for identification/general interst.

The mine begins in the basal portion of the banana, and travels towards the distal end in a straight line in the centre of the seed-zone. It was only discovered after the exhibitor had eaten the distal portion of the fruit. A close examination of the discarded skin failed to reveal any exit hole, and the exhibitor assumes that he has eaten the larva! No oviposition site was observed: possibly the mine began in the stalk of the banana which was not available for examination, or else the ovum may have been laid in the undeveloped fruit which then expanded to hide the entry site. This exhibit, which has been freeze-dried, was purchased at the Asda Superstore at Beckton in east London, on 16th February 1984.

Mr P.R. Harvey: A microslide by our late member Mr Fred Enoch (loaned by his great niece Joan Enoch), probably dating from the 1880's, and consisting of a deep cell containing a complete male of *Pellenes tripunctatus* (Arachnida: Salticidae), but with no date or locality, though labelled 'new to Britain'. Locket and Millidge state that both sexes were taken at Folkestone in 1888; Locket, Millidge and Merrett record a sub-adult male from Dungeness as a recent record. Dick Jones found one specimen in 1981 at Dungeness.

Membership. Mr R.F. Newton and the Royal Albert Memorial Museum, Exeter, were elected members.

BENHS Annual General Meeting 23.ii.1984, at the Alpine Club, 74 South Audley Street, London W.1. The President, Mr. B.R. Baker in the Chair and 43 members present.

Minutes of the last Annual General Meeting were read and approved.

Reports were read by the Secretary (for Council), the Treasurer, the Curator and the Librarian and are published herewith. The Hering Memorial Research Fund report, read by that Fund's committee chairman, Lt.Col. Emmet, is also appended.

The President proposed the adoption of the reports, Rev. Agassiz seconded the proposal, which was adopted unopposed.

No questions were asked by members under bye-law 25b.

1984–5 Officers and Council. The President declared the following elected unopposed:

President: P.A. Sokoloff, *Vice-presidents:* B.R. Baker, P.J. Baker.

Treasurer: Col. D.H. Sterling, *Secretary*: Mrs F. M. Murphy, *Editor*: R.W.J. Uffen.

Curator: E.S. Bradford, *Librarian* S.R. Miles, *Lanternist* R.A. Jones.

Ordinary members of Council: M.R. Brown, N.A. Callow, J.M. Chalmers-Hunt, A.J. Halstead, J. Heath, P.J. Johnson, R.K. Merrifield, C.W. Plant, R.A. Softly, A.E. Stubbs.

The President also announced that Col. Emmet was retiring from secretaryship of the Hering Memorial Research Fund, to which Dr M.J. Scoble was appointed.

The President read his report and gave his address, following which he installed the new President, Mr P.A. Sokoloff.

Mr Sokoloff proposed a vote of thanks to the retiring President and sought and was granted permission to publish the Presidential Address.

Mr. S.N.A. Jacobs proposed a vote of thanks to the retiring Officers and Council.

The Auditors, Messrs A.J. Pickles and R.A. Bell, were re-appointed.

British Entomological and Natural History Society

PUBLICATIONS ACCOUNT FOR 1983
(Publications free to members)

1982	Expenditure	1983	*1982*	Income	1983
£		£	*£*		£
2307	Production of Proceedings	2655	*397*	Sales (and plate contributions 1982)	467
384	Distribution Costs	383	*244*	Hammond Bequest grant for plates	
			2050	Net cost to Income & Expenditure	2571
2691		3038	*2691*		3038

SPECIAL PUBLICATIONS ACCOUNT FOR 1983
(Publications for sale)

£		£	*£*		£
3028	Opening stock saleable publications	2390	*2476*	Sales of publications	6080
	Pug correction slips	82		Royal Society grant	1000
	Production of new publication	8002	*2390*	Closing stock saleable publications	6324
124	Distribution & other costs	299			
1714	Surplus to Special Publication Fund	2631			
4866		13404	*4866*		13404

OFFICERS' REPORTS

HONORARY TREASURER'S REPORT FOR 1983

The modest surplus of income over expenditure of £481 is considered satisfactory, especially as this is after charging the net cost of £716 for Hill cabinet units. Subscription income rose by £360 over 1982, mainly because a number of members who paid at the pre-1982 rates in 1982 put this matter right in 1983. There are still some members who continue to pay at the old rates and it will now be necessary to suspend distribution to these until the arrears are paid. The cost of running the general activities of the Society in 1983 was approximately £1800 more than the receipts from Members' subscriptions, this balance being met from investment income.

Special publications continue to sell well, especially the new Hoverfly book, and the Special Publications Fund now stands at over £9600, but it must be realised that most of the assets of this fund are stocks of publications and not cash.

Half of the capital of the Hammond Bequest Fund has now been placed in long-term investments, but the remaining capital is still held in the National Savings Investment Account, to be ready for eventualities which may arise concerning the Society's rooms, which, on termination of the lease, are now occupied only on a monthly licence. It is intended that the accrued income of the Fund will be used on such items as a projector and coloured plates for the Proceedings.

The rather large current account balance at the end of the year arose on account of

BALANCE SHEET AS AT 31st DECEMBER 1983

FUNDS

1982			1983	
£	*£*		£	£
	10288	*General Fund*—Opening balance	11870	
	150	Gain on investment redemption		
11870	*1492*	Excess of Income over Expenditure	481	12351
	450	*Library Fund*—Opening balance	579	
	626	Income	381	
	1076		960	
579	*497*	Expenditure	169	791
2308		*Housing Fund*		2308
	5281	*Special Publications Fund*—Opening balance	6955	
6995	*1714*	Surplus from sales	2631	9626
	10678	*Hammond Bequest Fund*—Opening balance	23882	
	13448	Interest (and second payment 1982)	2349	
	24126		26231	
23882	*244*	Expenditure	25	26206
	2690	*Hering Memorial Fund*—Opening balance	2664	
	8	Gain on investment redemption		
	294	Income	302	
	2992		2966	
2664	*328*	Expenditure	253	2713
48298		TOTAL FUNDS		53995

cash held to meet pending bills of over £2000 and the estimated cost of a projector, to which was added at the end of December some £4000 special publications sales for that month. Since then, the unexpended balance has been put where it will earn interest.

Mrs S.B. Walker, wife of our Assistant Treasurer for Subscriptions, continued to look after this work during 1983 and our thanks are due to her and also to our Honorary Auditors.

BALANCE SHEET AS AT 31st DECEMBER 1983 contd.—

THESE FUNDS ARE REPRESENTED BY

1982			1983	
£	*£*		£	£
		Investments at cost (details appended)		
	8062	General Investments	20722	
10240	*2178*	Hering Memorial Fund Investments	2343	23065
		Stock		
	2390	Special Publications at cost	6324	
2636	*246*	Christmas cards	187	6511
		(The value of the library, collection, ties and Proceedings back numbers is not included in the accounts)		
		Liquid Assets		
	24260	N.S. Investment Account	15813	
	742	Debtors and advance payments	1218	
	10000	Cash on deposit	3221	
		Cash in transit	111	
	514	Cash on current account	7701	
	35516		28064	
		Less:—		
		Royal Society Loan	1500	
35422	*94*	Subs. in advance, amounts owed & provisions	2145	24419
48298		TOTAL ASSETS		53995

AUDITORS' REPORT

In our opinion the annexed Balance Sheet gives a true and fair view of the Society's affairs as at 31st December 1983 and the Income and Expenditure accounts give a true and fair view of the Society's results for the year.

A.J. Pickles F.C.A.
R.A. Bell

COUNCIL'S REPORT FOR 1983

1983 was a curious year from the entomologist's point of view, but for the Society all went well. 39 new members were elected, five members died, seven members resigned, 21 were struck off for not paying their dues and by the end of the year the society had 754 members.

We were very pleased to hear that Professor Southwood had been given a knighthood and offer him our congratulations also on his vice-presidency of the Royal Society.

The Society's new publication *British Hoverflies* by Alan E. Stubbs with colour plates by Steven J. Falk, surmounted a variety of problems and was published in

INCOME AND EXPENDITURE ACCOUNT FOR 1983

£					£
2050	Publications Account	2571	*3934*	Subscriptions	4297
1575	Rent and Insurance	1706	*1921*	Interest and Dividends	1882
756	Stationery and General Expenses	451	*201*	Donations and bequests	132
253	Indoor Meetings and Exhibition	488	*336*	Surplus on sales (Ties, spare equipment and Christmas cards)	216
	Cabinets and collections	716			
107	Subs/donations to other societies	125	*16*	Surplus on Annual Dinner	11
175	Display board (Sarnis Trust)				
1492	Excess of Income over Expenditure	481			
6408		6538	*6408*		6538

SCHEDULE OF INVESTMENTS AT COST AS AT 31st DECEMBER 1983

		General £	Hering Memorial Fund £
£1600	Agricultural Mortgage Corp. $9\frac{3}{4}\%$ Stock 1985–8	646.49	646.48
1010	Drayton Premier Investment Trust 25p Ordinary Shares	1398.21	
410	Shell Transport & Trading 25p Ordinary Shares	477.79	771.83
236	Midland Bank £1 Ordinary Shares		624.16
150	Unilever 25p Ordinary Shares	248.45	
£4098.06	Treasury $13\frac{3}{4}\%$ Loan 1993	4041.44	
£6836.92	Treasury $8\frac{1}{4}\%$ Loan 1990	5910.00	300.00
£2138.90	Funding $5\frac{3}{4}\%$ Stock 1991	1670.00	
3170	Charifund Units	6330.00	
		20722.38	2342.47

October in memory of Cyril Oswald Hammond (whose bequest made this project feasible). It has proved very popular and, indeed, a single glance at the beautiful plates is enough to sell the book to any naturalist! The council wish both to thank and to congratulate the Publications Committee.

The Hammond Bequest has also been used to buy a Leitz projector (recently we have been borrowing one from the Alpine Club). This has a very good lens and is fully automatic. The Council is grateful to David Wilson, Andy Callow and Richard Jones, the experts who advised on and who arranged this purchase.

For some time it has been felt that our bye-laws, last revised in 1960, were in need of revision to suit the gradually changing circumstances as the Society became more national (and, indeed, international) and less local. Col. Sterling, our Treasurer, undertook this task also and the new bye-laws will be circulated in March and a Special Meeting will be called in June to propose their adoption. We are very grateful to Col. Sterling.

The Editor will be taking advantage of some changes at our Printers to introduce a new format for the Proceedings.

The Council—who are ever optimistic—are hoping that members borrowing books will read and follow the Librarian's instructions when taking books out of the Library. It would be very helpful if books were returned on time but the Librarian welcomes back books however overdue. Recently a book was gratefully received on being returned to the fold after 40 years. Is this a record?

The indoor meetings programme went very well and attendance has risen again this year. Mr Muggleton is retiring as Indoor Meetings Secretary and Mr Richard Jones is taking over.

Mr Prior, who has also been President, Secretary and Librarian in his time has retired as Field Meetings Secretary and has been succeeded by Mr Andrew Halstead. The Council wishes to thank Mr Prior for all his many years of service to the Society.

The attendance at the Annual Dinner, a very cheerful meal arranged by Dr McNulty, rose encouragingly in 1983.

Mr Ken Evans our indefatigable Exhibition Manager was pleased with this year's Exhibition and so, we believe, was everybody else.

CURATOR'S REPORT FOR 1983

1983 was a quieter year from the curator's point of view, apart from one incident in October. Fears were expressed when it came to the Society's notice that holes had to be drilled into the floor of the basement where the collections are housed. We were informed that it was necessary for engineers to inspect the foundations and structure of the buildings. There was some concern that the drill's vibrations would shake and dislodge specimens and do irreparable damage to the collections. Fortunately our fears were unfounded; the drill used caused no discernible damage. A fine layer of dust was all we had to contend with.

The *Anthrenus* problem is still with us, but the infestation is being contained. To date a number of cabinets have been inspected and treated. It is hoped this pest can be eradicated in the near future.

Three cabinets were sold during the year. This still leaves four members who would like to purchase cabinets when they become available. As mentioned last year, the emptying of cabinets before offering them for sale is the obstacle. It will be more difficult in the coming year, as there is little room in other cabinets in which to transfer specimens. A slight thinning of the Society's main collection of Lepidoptera is to be undertaken. This will ease the situation and provide duplicate specimens for members.

Work on the collections progresses satisfactorily. All specimens in the Hammond cabinets have been staged and the Syrphidae checked. Some specimens of Lepidoptera from the surplus cabinet are in the meantime transferred to spare drawers until re-arrangements can be worked out. Several specimens from the collections have been loaned for research.

Donations of specimens were made to the collections during the year. The thanks of the Society go to Col. A.M. Emmet, J.M. Chalmers-Hunt and E.S. Bradford for their contributions.

Finally I would like to thank Mr. W. Parker, Mr. P.J. Chandler, Mr. R.D. Weal and other members for their help and advice during the year.

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

Report for 1983

Grants of £125 each were made to two out of a short list of four applicants:

(1) Mrs Radoslava Spasic of the Entomology Department of the Agricultural Faculty, University of Belgrade, for the study in the field of the Agromyzidae of Yugoslavia, with particular reference to species of economic importance.

(2) Mr F.H. Donner of the Free University, Amsterdam for a visit to New Zealand to study the Nepticulidae of that country. Little financial aid is available from his university and he will have to bear most of the expense personally. His work is in continuation of that begun in 1983 by Professor Chris Wilkinson (a member of the British Entomological & Natural History Society), who received a Hering Memorial Fund grant last year. Their research forms part of the world-wide study of the Nepticulidae which is being undertaken at the Free University.

PRESIDENTIAL ADDRESS

by B.R. BAKER

1. REPORT

From the reports that you have heard this evening it is very evident that the health of our Society gives no cause for concern, but we have not always been in such a fortunate situation. When you have a spare moment look again at your copy of Dr M.J. James's excellent Centenary History of 1972 and you will read therein that after only 11 years of existence the death of the Society seemed imminent. Annual addresses lingered on our declining fortunes and as a last resort a few senior members faithfully promised to attend meetings regularly unless prevented by illness—how different thankfully from the situation today.

Much is owed to those who have laboured quietly and often unheralded behind the scenes and it has been my privilege over the past two years to learn firsthand of the immense amount of work undertaken by our Officers, Council and other officials.

I therefore welcome the opportunity this evening of being able to thank them all for their industry on our behalf and also for making my term of office a very pleasant one.

Our Secretary, Mrs Frances Murphy has already in her report drawn your attention to certain noteworthy happenings during the past year and I make no excuse for repeating some of these. We are indebted to Col. D.H. Sterling who, as well as guiding our financial affairs, has tackled the daunting task of a revision of the

Bye-laws, to Alan Stubbs for his industry in writing the hoverfly book, and to our Editor Raymond Uffen and to all concerned with the Publications Committee for ensuring that we have no shortage of important reading material.

Our Curator Eric Bradford and Librarian Steven Miles continue to provide a splendid service under ever increasing space restrictions in the rooms downstairs, and for the organisation of the many lectures we have enjoyed in this room we must thank our retiring Indoor Meetings Secretary, Mr John Muggleton. Finally, on the subject of indoor meetings, I would remind you of the happy occasion last April when Prof. N.W. Moore delivered the first Cyril Hammond Memorial Lecture.

The deaths of the following five members were reported to us during the year:

Mr A. Bliss who was a Special Life Member and who joined the Society in 1924, died on the 30th November aged 94. He specialised in Lepidoptera and began collecting as a boy of 10 in 1899, many of his specimens coming from Streatham Common.

Mr T.D. Fearnehough, who joined the Society in 1977 was also interested in Lepidoptera. One of his most remarkable achievements was the successful rearing of the Queen of Spain Fritillary *Argynnis lathonia* (L.) from eggs laid by a female taken in 1949 at Stoke Point near Plymouth.

Mr J.H.C. Phillips became a member in 1953. He died tragically as the result of a car accident on 10th June last. We had heard from him shortly beforehand when he wrote enquiring if any members had knowledge of South American butterflies as he hoped to visit Brazil later in the year.

Mr F.S. Reeves died on January 22nd at his home in Tetford, Horncastle, Lincs. at the age of 81. He was elected to membership in 1963, being interested in Lepidoptera. He always took a keen interest in our activities but was unable to come to meetings other than the Annual Exhibition.

Prof G.C. Varley, Hope Professor Emeritus of Entomology at Oxford joined our Society in 1951. He was one of the foremost ecologists of this century, his most famous work being that of the population dynamics of *Operophtera brumata* at Wytham. He remained active right up to the time of his death, one of his latest interests being in acorn cup galls.

BENHS meeting 22.iii.1984—*Exhibits.* The PRESIDENT: (1) A specimen of the fungus *Daldinia concentrica* collected from a dead birch stem at Keston, Kent, 21.iii.84. The fungus was inhabited by larvae of the pyralid moth *Apomyelois bistriatella neophanes* Durrant. The larval feeding is apparent only when the fungus is broken away from its substrate, when black frass mixed with dirty white silk can be seen. At the time of collection, the larva had spun up in a silken cocoon in the centre of the fungus. Other larvae seen had spun up beneath bark that was covered by the fungus. The moth is not often seen, and there are very few records for Kent.

(2) Some incurvariid cases collected from litter in a birch wood at Bromley, Kent, March 1984, and probably made by the larvae of *Incurvaria pectinea* Haw.

Mr R.A. JONES: Ants found in a box of 'ants' eggs' fish food, identified as *Formica rufa* or a close ally. From the small packet of about 250 cocoons, there were 28 nearly complete ants and dismembered bits from about as many again. Had the ants been alive when they were packed, it is likely that they would have chewed their way out of the soft cardboard packet. The fish devoured both 'eggs' and ants with equal relish.

Mr K.R. WEBB: A specimen of *Carabus granulatus* L. found under the bark of alder at Clop Hill, Beds., 18.iii.84.

Colour slides with comments were shown by Messrs. R. Jones, K.F. Webb, R. Softly, P.A. Sokoloff and N.A. Callow, in place of the advertised lecture.

BENHS meeting 8.iii.1984—*Exhibits*. Mr S. Painter: five weevils (*Otiorhynchus sulcatus* F., the Vine Weevil) of some 150 found in a Northolt, Middlesex, house on 6/7.iii.1984.

Communications. Mr Chalmers-Hunt stated that on the night of 6.iii.84, Mr B.K. West had had some 50 moths of *Apocheima hispidaria* to his mercury vapour light in a locality in Surrey.

Lectures. Mr P.J. Johnson and Dr H.C.J. Godfrey gave talks, illustrated by coloured slides, upon *The British species of Momphidae and Epermeniidae* respectively.

BENHS meeting 12.iv.1984—*Exhibits*. Mr R.F. Bretherton: The following Lepidoptera collected in Madeira in November 1983 by Mr D.W. Baldock: two *Danaus plexippus* L., *Pararge aegeria aegeria* L., *P. xiphia* F., *Artogea rapae* L. and the pyralid *Uresiphita limbalis* D. & S.; and in South Spain on 13.x.83 by S. Swanson: *Danaus chrysippus* L.

Mr M. Hadley: A specimen of *Typhoeus typhoeus* L. (Col.) taken at mercury vapour light at Friday Street, Surrey, 11.iv.84.

Communications. Mr Bretherton said that it was intended that, on midsummer's day, thousands of butterflies would be released on Hampstead Heath, a gift from the Guernsey Government to the Greater London Council. The livestock, all bred in redundant crop glasshouses in Guernsey, was a preliminary to more widespread releases. Fears were expressed that such action could render butterfly recording worthless, as well as having a detrimental effect on the status of native butterflies in this country.

[The councils of this and other entomological and conservation bodies subsequently appraised the promoters and recipients of this offer of its naivity and it was dropped.—Ed.]

Mr R. Tubbs reported that the Red Admiral, *Vanessa atalanta* had been seen in Dorset this year during the first week of April.

A discussion, What part should the Proceedings play in the Society's activities, led by the Editor, Mr. R.W.J. Uffen, was the main subject of the night's meeting. A summary will be published in the Proceedings.

BENHS meeting 26.iv.1984—*Exhibits*. Lt.Col. A.M. Emmet: A twig of birch showing the gall made by *Lampronia fuscatella* (Tengst.), the hole prepared for the emergence of the adult being capped by silk mixed with frass. It was collected at Upper Bucklebury, Berkshire on 17.iv.1984 and is a new record for the county.

Mr A.J. Halstead: Some live *Oeciacus hirundinis* (Jenyns) (Hemiptera: Cimicidae), collected 26.iv.84 from a 1983 house martin's nest taken from the eaves of the laboratory, RHS Garden, Wisley, Surrey.

Hon. Secretary, Mrs. F.M. Murphy: (1) A culture of the booklouse *Liposcelis bostrychophilus* Badonnel, useful for feeding small spiderlings. (2) A living, immature *Brachypelma smithi*, a popular pet tarantula, of Mexican origin. (3) A living amblypigid or 'whip scorpion', from near Canas, Costa Rica, taken by the exhibitor.

Membership. Ms P.C. Daniel, Messrs R.A. Austin, K.L. Halfpenny, A.J.E. Harman, P. Granger, Dr. J.A. Daniels and the University of Queensland were elected members.

Communications. The President stated that the Rev. Pittis had seen a male Clouded Yellow, *Colias croceus*, in the Isle of Wight on 14th April this year.

Lecture. Mrs FRANCESMURPHY spoke on *Spiders as pets*, illustrating her subject by excellent colour transparencies.

BENHS meeting 10.v.1984, held jointly with the Ecology and Entomology Section of the London Natural History Society in the Linnean Society's rooms Burlington House. LNHS vice-president K.H. HYATT in the chair.

Exhibits. Mr P. HOLLAND: Some myxomycetes housed in matchboxes.

Communications. Lt.Col. A.M. EMMET stated that from the gall of *Lampronia fuscatella* (Tengst.) from upper Bucklebury, Berks., exhibited at the last meeting, he had since bred the host-specific hymenopterous parasite *Panteles schuetzeana* (Roman) and had presented the specimen to the BMNH together with the gall containing the exuviae. It is not yet known to which subfamily this species of parasite should be assigned, and it is hoped that study of the exuviae will provide the answer.

Several members reported having seen the Red Admiral, *Vanessa atalanta,* of late, notably at Cheam, Surrey 28th April, Dorset 17th April and at Keston, Kent.

Lecture. In the unavoidable absence of the scheduled speaker, Mr P.A. SOKOLOFF had volunteered at very short notice to give a talk. The audience was treated to a fascinating account of *Recent changes in the butterfly fauna of London and the south-east*, accompanied by slides.

BENHS meeting 24.v.1984.—*Exhibits.* The President, Mr P.A. SOKOLOFF: (1) Freshly emerged *Melitaea cinxia* (L.) from an introduced colony in his garden at Orpington, Kent. (2) Larvae of *Setina irrorella* (L.) (Dew Moth), recently collected at Hurst Castle, Hants.

Mr R.F. BRETHERTON: A chart showing numbers of macrolepidoptera and Pyralidae trapped at Bramley, Surrey on nights in March, April and May 1983 and 1984, with corresponding dusk to dawn maximum and minimum temperatures. The trap was operated only when dusk temperatures exceeded 5°C.

Contrasts between 1983 and 1984 are remarkable, especially until the end of April. In 1983, after a mild winter, large catches, mainly *Orthosia* noctuids, began early, from 11th to 19th March, with a peak of 356. These continued, after a cold spell, on 9th and 13th to 17th April. After a further cold spell, moderate numbers, not exceeding 70, continued from 22nd April to 7th May. Thereafter, with declining emergences of the *Orthosia* group and generally low temperatures, numbers fell sharply, only reaching 22 on two nights to 23rd May.

In 1984, because of low temperatures, the trap was operated only twice in March, attracting about 20 moths. Large catches began only on 9th April (217) and again on 18th April, with a peak of 235 on 21st, then declining until 5th May. Thereafter, with warm days, but generally cold nights, catches consistently exceeded those of 1983, reaching 62 on 16th May and 45 on 23rd.

First records of 23 species were noted by 31st March 1983, but of only 15 in 1984. They had equalised at 41 by 30th April and in 1984 reached 80 on 23rd May, against 62 in 1983.

Mr R.A. JONES: *Attagenus smirnovi* (Zhantiev) (Col.: Dermestidae). This beetle was first described in 1973 in the USSR and has since been discovered in various places throughout the world. It was first found in Britain in 1978, in a flat in South Kensington. The exhibited specimen was taken by Andrew Foster from the second British locality—the offices of the Nature Conservancy Council in Belgrave Square, where it was recently discovered in some numbers. *Attagenus* species are mainly found indoors and are associated with dry dust, furs, skins, etc. The males have greatly enlarged last antennal joints and the only really indigenous species, the common *A.pellio* (L.) was shown for comparison.

Lecture.—Dr K.S. Sattler, Assistant Keeper of the Department of Entomology, BMNH, spoke on *The entomological collections of the Natural History Museum—organisation and function.*

BENHS Special Meeting 14.vi.1984, at the Alpine Club, 74 South Audley Street, London W.1.

The President, Mr. P.A. Sokoloff, read the motion placed before the meeting:

That the proposed revised bye-laws of the British Entomological and Natural History Society be adopted forthwith.

It was decided that voting should be by show of hands. 24 members voted for the proposal, none against and there were no absentions.

The Secretary reported receiving 66 postal votes in favour of the motion and none against.

The President declared the motion carried.

BENHS meeting 14.vi.1984.—*Exhibits.* Mr J.M. Chalmers-Hunt: Two living spiders taken by him in Sardinia and determined by Mr Hillyard (BMNH): *Synaema globosum* (F.) (Thomisidae) female, Gairo, 3.vi.84 and *Micrommata ligurinum* C.L. Koch (Sparassidae) immature female, Mamoiada, 5.vi.84.

Mr A.J. Halstead: a living female wood wasp, *Xiphydria camelus* (L.) (Hym.: Xiphydriidae) found in a walk-in polythene tunnel at RHS garden, Wisley, Surrey on 13.vi.84. This insect occurs throughout Britain, but is local and not often seen. Its larvae tunnel in the stems of alder and birch.

Mr R.A. Jones: An adult beetle reared 18.v.84 and the pupal skin of *Ctesias serra* (F.) (Col.: Dermestidae), resulting from a larva taken from beneath black poplar bark on Hampstead Heath on 16.ii.84. The larva (some slides of which were shown later) is most peculiar, having numerous tufts of bristles over its tail half, some of which it can vibrate rapidly. It is very active under bark of various trees, is quite widespread and easy to breed, but the live adult is rarely found.

The President: A pair of *Rhamphomyia marginata* (Dipt.: Empididae) taken mating on a sheet beneath a mercury vapour lamp at Ham Street, Kent on 19.v.84. The species had been noted earlier in the evening, when the females began swarming. (2). A specimen of *Apomyelois bistriatella* ssp. *neophanes* Durrant bred from the fungus *Daldinia concentrica* exhibited at the meeting on 22nd March. The fungus had been collected from Keston in Kent.

Dr K. Sattler: A handlens used by Edward Meyrick and two medals of his, recently presented to the British Museum (Nat.Hist.) by members of the Meyrick family.

Edward Meyrick (1854–1938) was probably the most prolific lepidopterist ever. Between 1875 and 1939 he published over 420 books and papers and described between 15,000 and 20,000 species of Lepidoptera. J.F.G. Clarke in his catalogue of the Meyrick types of Microlepidoptera in the British Museum (Nat. Hist.) listed 14,199 names of Microlepidoptera (excluding Pyraloidea). It is remarkable that Meyrick did all his studies with the aid of a handlens (here exhibited) and never appears to have used a microscope.

Meyrick received many honours, amongst them a medal from King Leopold III of Belgium and the Captain Scott Memorial Medal of the South African Biological Society (both here exhibited).

Membership. Messrs R.D. Hawkins and M. Colvin were elected.

Lantern slides were shown by Messrs M. Newcombe, R.A. Jones, P.A. Sokoloff, P. Harvey, Mrs F.M. Murphy, Dr K.S. Sattler and others.

PRESIDENTIAL ADDRESS PART II

THE BRITISH CLEARWING MOTHS (SESIIDAE)

by B.R. BAKER

When you accorded me the honour of becoming your President, the voice of Alan Stubbs (who sounded me out on the telephone) was still clear in my ear saying "the first year as Vice-President is easy, the busy time is the second year". He was absolutely right, and for some time the subject for tonight's Part II has exercised my thoughts because there is so much expertise in field entomology possessed by members of this Society that it becomes difficult to choose a group within the Lepidoptera which has not already been the subject of past presidential addresses or other lectures throughout the years. Indeed the group that I have chosen this evening was that taken by our late member and past president, Capt. R.A. Jackson, but since that paper was given over forty years ago I know that I am on sure ground when I say that some of you were not present on that evening of 19th June, 1943.

Synanthedon culiciformis (L.)

Clearwings are a fascinating group to study, for not only are they elegant creatures when adult and a joy for the man with a single lens reflex camera, but their lengthy life cycles invite one to make expeditions in search of immature stages in mid-winter, a time when other fieldwork can be at a low ebb. Some of my earliest recollections in entomology are of winter rides as a schoolboy to the heathlands of south Berkshire where we would spend the day sawing at likely-looking birch or alder stumps in search of clearwing larvae. There were no field guides available to say which species were best sought in mid-winter and Tutt's works were unknown to us, but enthusiasm was high and we worked in hope. Other recollections, as clear as those far off excursions, are that no moths whatsoever resulted from any of them, and we deemed all clearwings to be great rarities. Not that these field trips were totally unproductive, for they were the means of a steady supply of firewood which lasted well into spring. Much time could have been saved had that excellent A.E.S. publication of 1946 been available, for leaflet No. 18 on *Collecting Clearwings* is essential reading for anyone contemplating field trips with sesiids in mind today. We now also have Fibiger and Kristensen's 1974 *Sesiidae of Fennoscandia and Denmark* available in an English edition which, however, does contain a few inaccuracies.

Clearwings are almost worldwide in distribution and Naumann, 1971, estimates that there are about 1000 species so far described. There are about 100 known from the Palaearctic Region but so far only 15 recorded from the British Isles.

They are exclusively day-flying insects. Though living in colonies they are not frequently seen as adults, unless one knows of a good host tree and can visit it in the early mornings during the whole of the emergence period.

The best way therefore to acquire specimens is to breed them through from cut stumps, twigs or roots which themselves have to be given careful housing in aquaria tanks, or similar containers, with a bedding of about six inches of damp sand and a topping of sphagnum moss. It has proved very convenient to have the perforated zinc tops of the tanks provided with two lift-up doors. This allows one to reach into either end of a tank and still have half of the top closed off when boxing a newly emerged specimen. Clearwings can be remarkably skittish and have the disconcerting habit of jumping backwards when disturbed—hence it pays to afford them all care and respect. They really do give one the impression of being rather special insects and no matter how many times one may have bred even the commonest species it still makes the day to see the steely blue wings of a newly hatched specimen in the breeding cage.

Most of you will be all too familiar with the tools necessary for undertaking entomological carpentry, but as well as a variety of saws, secateurs, chisels and mallet we have to thank the Scandinavians for thinking of the wire brush, an invaluable aid for revealing most capped emergence holes. It is also worth adding a rasp or Surform to your toolkit. This will remove the caps from the tunnels of *Sesia apiformis* (Cl.) which are otherwise too tough to be broken by the wire brush.

In recent years in our own Society there seems to have been an added interest in clearwings and they have figured fairly regularly in our annual exhibitions. Nevertheless the legend of scarcity dies hard and the prototype Lepidoptera record card first proposed by the Biological Records Centre in the 1960's was devoid of any clearwing names. Happily this was rectified following an open meeting when comments were invited on the composition of the cards before the finalised version went out on general release.

The species which most readily comes to mind when one mentions clearwings to other lepidopterists is *Synanthedon tipuliformis* (Cl.). Referred to as 'common' in earlier works (though not found so commonly today) this moth is widely distributed from English southern coasts northwards to Dumfries. Compare that distribution with that for *S. anthraciniformis* (Esper) which is also widespread on the downland of southern England extending up to Worcester and across to Huntingdon. Yet this was regarded as a very rare species until its association with the wayfaring tree was discovered. This state of rarity is inferred by Eustace R. Bankes in a paper to the Entomological Society of London in 1906 wherein he writes 'On July 26th last I received through the generosity of the Hon. N. Charles Rothschild a portion of the stem of *Viburnum lantana* that he knew by deduction must contain a feeding larva of the extremely rare *Trochilium andrenaeformis*'. When mistaken assessments of rarity like that are made is it not likely that other species, which we still regard as very localised, are awaiting discovery in unworked localities? Possibly more inviting is the opportunity to turn up a species new to the British list such as *Pennisetia hylaeformis* (Lasp.) which is common in all Scandinavian countries ranging northwards beyond the arctic circle. This species feeds on raspberry and pupation takes place in the dead stems.

There are several other foodplants such as *Ulex*, *Epilobium* and *Euphorbia* with which clearwings are associated abroad and, perhaps, also in Britain, therefore when examining these often worked plants it might pay to look at stems and roots after attending to other micros on the leaves.

Some of the clearwings, and particularly so the larger species, bear a fair resemblance to certain Hymenoptera, and this resemblance is best seen when form is combined with movement. The sight of *Sesia apiformis* flying around a poplar trunk or *S. bembeciformis* intent on its inspection of the sallows strengthens one's belief in mimicry!

The very characteristic appearance of clearwings arises from the combination of a number of unusual features such as:

1. A very reduced anal region of the forewing which produces an elongated, narrow wing.
2. Clear areas devoid of scales in both wings, best seen when the insects have taken their first flight, and
3. A brightly coloured abdominal pattern.

The eggs are all of a uniform pattern—a flat ovoid disc with one end of the disc somewhat straight. Their reticulate sculpturing can only be seen under high magnification. Such eggs as I have been able to examine vary in colour from pale green through reddish and varying shades of brown to completely black. The eggs are laid on bark, in stump crevices, on leaves or twigs or on exposed roots.

The larvae are internal feeders in the wood of oak, birch, poplar, sallow, alder and other trees, a few mine the roots of birds-foot trefoil, dock, sorrel and thrift. Their colour varies from white to yellowish, sometimes opaque, sometimes semi-transparent, when the dorsal vessel and gut contents become visible. The larvae are beautifully adapted for their specialised mode of life, having powerful jaws within a sclerotised head capsule and a prothoracic segment also with varying degrees of sclerotisation. This combination of features thus produces an efficient means for chewing and tunnelling through wood, for the head, as and when required, can be withdrawn into the prothoracic segment thus creating a greater length for forward thrust.

The pupae also exhibit several specialisations. The head is furnished with ridges which act as cutting plates for rupturing both cocoon (when present) and tunnel cap. The shape of this frontal process can also be used for identifying empty sesiid pupae. The movable abdominal segments with their rows of spines give the entire pupa mobility, essential for extruding from its tunnel. Pupae may be sexed by examining the spines on segment seven, which bears a double row in males and a single row in females. This is a useful character enabling one to monitor the hatch of a given species after the daily collection of empty pupae from one location over the complete emergence period.

Clearwing colonies can be detected by:

1. looking for old emergence holes in host trees.
2. by the appearance of frass issuing from trunks or stumps, and
3. by looking for extruded pupae.

Old emergence holes can be sought at any time of year, frass is best observed in early spring and the presence of extruded pupae will coincide with the particular hatching period. These extruded pupae are not as ephemeral as one might think and though many will drop and be blown away, others, if well protected within bark crevices, have been known to remain there for as long as a year.

Clearwings hatch in early morning from about 9 a.m. until 11 a.m., the time varying with the species—sometimes pupae may extrude from a trunk and then dry prematurely and fail to split. In 1968 a colony of *Sesia apiformis* (Cl.) was kept under observation for a period of three weeks from early June until early July during which time a total of 11 imagines were recorded. On one of the mornings a pupal head was visible at 08.40 and it remained motionless and partially extruded for 40 minutes. Fearing that the pupa would dry it was finally stroked with damp grass and emergence proper then began and lasted for a further 30 minutes ending with the wings being lowered flush with the trunk surface. This lengthy hatching time may be compared with *S. culiciformis* (L.) which has been timed as 40 minutes but one cannot be dogmatic about exact times and these are doubtless affected by prevailing weather conditions.

S. apiformis occurs predominantly in central, southern and south-eastern England though it was formerly recorded from Durham, north and south Wales and Ireland. There are few records of clearwings being so common as to cause the death of their host tree but R. Neil Chrystal in his Insects of the British Woodlands writes thus of *S. apiformis*. "The moth is sometimes responsible for causing the death of large poplars. One instance of this can be recorded concerning two poplar trees which early one season suddenly produced quantities of flowers and a few weeks later drooped and shed all their leaves. On examination of the lower part of the stem and roots, it was found that the caterpillars of the hornet clearwing had been working in the tree for at least three years and had completely destroyed the cambial region of the whole lower stem and root system. In other cases, however, the attack seems to persist for a much longer time without any fatal effects".

S. bembeciformis (Hbn.) our other large species, is a particularly good Hymenoptera mimic as recalled by a friend of mine when holidaying at a Devonshire caravan site. A hatch of *bembeciformis* took place from a group of sallows growing close to the camp shop, but despite assurances to the proprietor that the insects were but harmless moths, the public health men were called in to clear the breeding site!

Synanthedon myopaeformis (Borkh.) might well be termed a town species for its larvae may be found within infected apple and pear trunks growing in urban gardens in many localities of southern England. This clearwing can easily be overlooked for the moths often favour one particular tree to the total exclusion of similar ones in a garden. Extruded pupae are a helpful sign in discovering the breeding tree and one such tree that was kept under annual inspection for more than a decade would produce 30 to 40 imagines each season. The owner of the garden finally decided to fell the tree and one winter the trunk was transported to my own garden. The following summer at least 30 *myopaeformis* flew off into neighbouring gardens! A careful excavation of the total trunk surface gave no sign of any larvae therein and provided good evidence of a one year life cycle.

Synanthedon spheciformis (D. & S.) is a local species, generally thought to be most prevalent in alder stems, where its presence is betrayed by copious frass and, later on, by extruded pupae. Sometimes this species is heavily preyed on by birds, the ripped-open tunnels plainly visible on alder stems, but I have never been able to spot the culprit at work even when seated within easy ear-shot of the tell-tale tapping. On the heathlands of Berkshire and north Hampshire *S. spheciformis* can be quite common at times in the birches, its presence in such places being best revealed when the besom-makers have been at work.

S. culiciformis (L.) is also a common inhabitant of heathlands but has a much wider distribution than has *S. spheciformis*. I was pleasantly surprised to find it in the Lake District a few years ago and other workers have taken it in Scotland. It is always worth making a note of any birch cutting you come across in your own district with an added reminder to visit the spot again in mid-May. Female *S. culiciformis*, though quick of flight, are not difficult to see when they are intent on ovipositing around fresh birch stumps. Should you find them at work, leave them in peace, but return the following spring to work for the pupae!

Synanthedon flaviventris (Stdgr) is our most recently discovered species, though Fassnidge's discovery was made almost 60 years ago when he was working for *Cydia* *servillana* (Dup.). Many of you will be familiar with the pear-shaped gall to be found on sallow stems every other year, this indeed being a favourable winter in which to search, but it puzzled Fassnidge not to find galls the year following his initial discovery, despite a careful search. I have yet to read a convincing explanation of the seemingly rigid adherance of all *flaviventris* populations to the odd-even years. *S. flaviventris* has so far been recorded only from a few vice counties in southern and central England but systematic search could well extend its present known limited range.

Synanthedon formicaeformis (Esp.) is another gall-former upon sallows, though the larvae seem to be obtained with greater regularity by examining osier stumps or by cutting branches which show frass exuding from broken twig bases or from scars made by storm damage. If one knows of a good *formicaeformis* locality it is an interesting exercise to try and find the eggs upon osier stumps for you will discover that a tiny erophyiid mite, clamped tight against the bark, is a fair egg mimic. This clearwing has a long emergence period from late May until early April but I had not appreciated that it was a May insect until a happening in 1971. On 17th April of that year an osier stump was found to be well tenanted by *formicaeformis* larvae and rather than disturb them it was decided to cut the stump at some later date. This proved an unwise decision for, when I revisited the locality on 31st May, the stump top was found to be decorated with a halo of extruded pupae.

S. vespiformis (L.) provides a good example of the rapid colonisation of an area by clearwings when provided with man-made egg-laying sites. No entomologist regards the felling of oak woodland with anything but alarm, but when, sadly, some of the trees have to be harvested it can reveal the unsuspected presence of this clearwing. In one oakwood in north Hampshire I had searched unsuccessfully for *vespiformis* by examining the various bumps and excrescences with which the trunks are sometimes disfigured. Then some large oaks were felled on the edge of the wood and the following year 75 extruded pupae were visible around the circumference of one giant stump. The moth must surely have been present in that locality all the time but this example does illustrate how easily one can overlook the presence of clearwings even in a well-worked locality. *S. vespiformis* is not only a common inhabitant of oak woods but has also been recorded from sweet chestnut, beech, walnut, wych elm and birch.

Bembecia scopigera (Scop.) Most clearwings are best obtained by working for the immature stages but *scopigera* is easier to detect as an adult. The use of a sweep-net over patches of birds-foot trefoil on July evenings has revealed several new colonies on the chalk in my district. It is equally true that not all specimens obtained by this means are always in mint condition, but, having detected a colony, the perfectionist can then resort to a careful search of the grasses and find specimens at rest. The larvae mine the roots of birds-foot trefoil but to find them can be a tedious business, for no helpful signs appear visible above ground level. However, if one selects plants on the edges of the patches, or those which have been isolated by disturbance of the ground, patient digging will eventually reveal them. Eggs, appearing as tiny black, ovoid discs on the leaves or stems of the foodplant, are much easier to find.

All of the clearwings that we have looked at so far this evening have fairly wide distributions and we now conclude by considering those species with either maritime or very limited distributions.

Bembecia chrysidiformis (Esp.). The extreme south-eastern corner of England is the most noted locality for this beautiful species, but it could well exist undetected in other parts of our southern seabord. There is for instance a documented account of its occurrence at Southsea, though admittedly the account is an ancient one, and in the

Entomologist's Record Vol. 95 Nos 3–4 there is an intriguing reference to a possible sighting on the Isle of Portland.

Care should be exercised in view of the present very limited distribution of *chrysidiformis*, but if one has taken an infected root and failed to breed the moth the same year remember that the larva lives through a second winter.

B. muscaeformis (Esp.). This is a truly maritime clearwing to be found commonly around the coasts of western England and west and north Wales. It is also known from the Isle of Man, southern Ireland, north-eastern Scotland and a single record from the Scottish west coast. The adults are not difficult to detect along sheltered cliff faces and patches of thyme are favoured feeding places. A good sign of the activities of the larvae in the thrift stems and roots is the browning and dead appearance of parts of the thrift cushions. Little, if any frass is obvious in my experience until one has lifted up and broken a dead looking clump of thrift when the workings become visible. Mid-May is a good time to search for larvae. The adults, which are on the wing throughout July, hatch around 10 a.m. and sit quietly for a while on the thrift stems. It is in this pre-first flight period, before any of the superficial wing scales have been lost, that the protective resemblance of *muscaeformis* to its surroundings can best be appreciated.

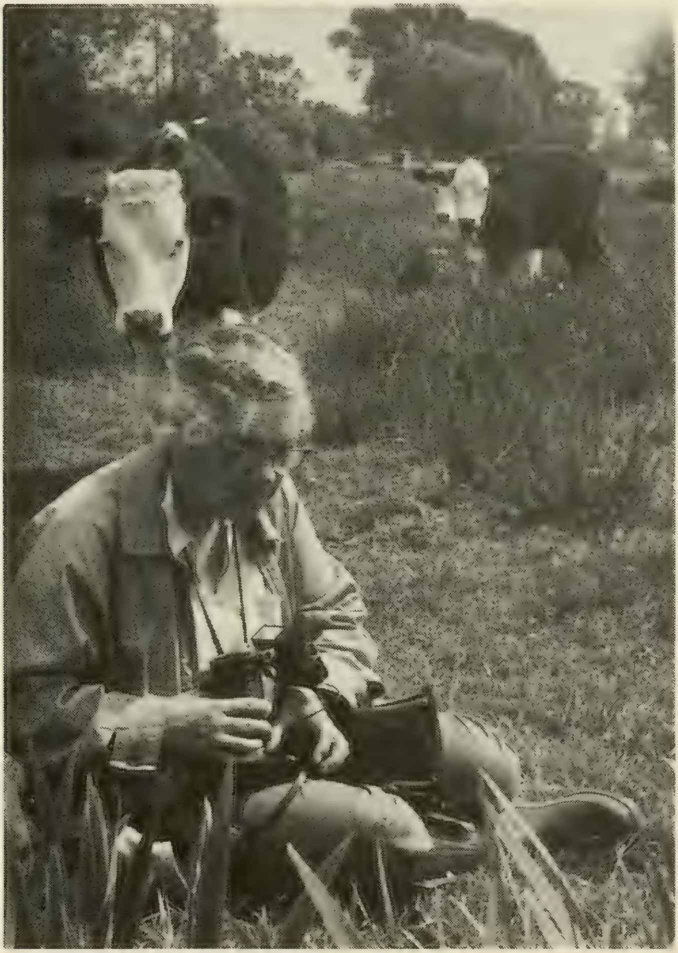
Synanthedon scoliaeformis (Borkh.) The discontinuous distribution as at present known makes one think that *scoliaeformis* must be awaiting discovery in some of the intervening regions. Persistent searches in recent years around Llangollen, where Ashworth discovered the species in the early 1860's, have finally convinced me that the insect no longer occurs in its original wood. There have been some disastrous fires there and much suitable habitat destroyed, though in some of the remaining well grown birches a wood-boring Coleopteran has on more than one occasion raised false hopes. Yet there must be many unexplored valleys in this mountainous region where well grown birches flourish and where *scoliaeformis* is awaiting discovery—how otherwise can you have a 'Welsh' clearwing. In Scotland the known localities are well separated and lepidopterists working the intervening districts would do well to devote some of their stay to an inspection of well grown birch trunks. In southern Ireland the moth is well established in Kerry but favoured trees require some finding. One such tree showed signs of immature larval borings and also nine newly formed cocoons—it was the only tree found during several hours of searching.

Paranthrene tabaniformis (Rott.) This clearwing has been described as our least known resident and that would seem to be a fair assessment. The few records of its occurrence surely cannot all relate to accidental introduction with trees such as black poplar and aspen. In Scandinavia *tabaniformis* seems to occur with regularity, most easily found by searching for pear-shaped galls on aspen. In France it has been recorded, most recently by Barry Goater, from a very different foodplant namely *Hippophae rhamnoides*, Sea Buckthorn. The late W. Parkinson Curtis also relates finding *tabaniformis* from the same foodplant at Uvernet when in the company of William Fassnidge. Curtis suggested that it might well be worth seeing if the moth could be found on the same foodplant in this country and suggested Burnham-on-Sea, Somerset where *Hippophae* grows in quantity by the golf links. Others have made investigations on the east coast so perhaps we may hear more of *tabaniformis*, which was last recorded in Britain from Berkshire in 1924.

For some of you we may not have travelled much fresh country this evening, but for others, for whom perhaps sesiids are new territory, the foregoing remarks are offered as an invitation to discover what may exist in their own districts. Keep a weather eye for frass exuding from almost any kind of tree and then make the effort to breed out the cause of that frass. Should the insect prove to be other than a clearwing there are many other attractive micros which will repay your efforts.

The illustrations this evening would have been incomplete without help from several members. My thanks are therefore due to John Heath and Col. A. Maitland Emmet for allowing me to make slides from distribution maps prepared for Vol. 2 of M.B.G.B.I. for which they Editors; to David Wilson for the slide of eggs of *Sesia bembeciformis* (Hbn.) and to David Carter for the slide of *Paranthrene tabaniformis* (Rott.) kindly prepared from the Berkshire specimen in the collections of the British Museum (Natural History).

[The President's address was abundantly illustrated by colour transparencies of the species taken by him in the field and in captivity—Ed]



The Hon. Secretary, Frances Murphy attracting the unanticipated interest of the residents of Magor Marsh in her spider photography. Monmouthshire field meeting, May 1982.

BENHS meeting 28.vi.1984.—*Exhibits*. Mr Colin W. Plant: (1) *Hadena albimacula* (Borkh.), *Clostera anachoreta* (D. & S.) and *Capperia britanniodactyla* (Gregson), all from the field meeting at Dungeness 2.vi.84. The first two moths were taken at mercury vapour light, the last bred from one of four larvae collected on Wood Sage, *Teucrium scorodonia*, the other three larvae producing ichneumonid parasites. (2) A live *Eidophasia messingiella* (F.v R.), taken at Barking, Essex, a local and seldom common species in Essex according to Emmet, and recorded from only eight of the 57 10 km squares in the county.

Dr Adrian R. Plant: *Sisyra terminalis* Curtis (Neuroptera: Sisyridae), taken at light in the Wyre Forest, Shropshire, 20.vi.84. *S. terminalis* is very local in Britain, but has no doubt been overlooked in many suitable localities.

Although the biology of this species is poorly understood, it is known that the larvae of other *Sisyra* species live as parasites within the osteoles of, or at the surface of, fresh water sponges. The aquatic and parasitic habit of *Sisyra* is unusual amongst the Neuroptera, which are mostly predators of terrestrial insects.

Mr R.A. Jones: The very local chafer *Amphimallon ochraceus* (Knoch), taken from many on the wing in bright sunshine above very short sheep-cropped turf in the ruins of the castle at Newcastle Emlyn, Dyfed in mid-afternoon on 8.vi.84. The much commoner *A. solstitialis* (L.) (also exhibited) flies at dusk. *A. ochraceus* is recorded from scattered localities in England, from Holyhead and Tenby and from Carnarvonshire and Glamorgan (Allen, *Ent. Rec. J. Var.*, **90**:17, 278). Mr J.M. Chalmers-Hunt had also taken this species flying in numbers above Llandudno Junction, Carnarvonshire.

Mr R.F. McCormick: (1) Larva of *Papestra (Lacanobia) biren* (Goeze), the Glaucous Shears, from a female moth captured at Thackthwaite, near Penrith, 2.vi.84. (2) Larvae found feeding abundantly on *Salix phylicifolia* L. (Tea-leaved Willow), near Penrith in mid-June. This *Salix*, wherever found in this district, was similarly infested. [Some moths from these larvae have since hatched and are referable to *Yponomeuta evonymella* (L.), which was recorded only from *Prunus padus*— J.M.C.-H.].

Lantern slides. In place of the advertised lecture, Mr. A. Callow showed a fine selection from his collection of coloured slides under the title *Larger than life*. The transparencies and running commentary were much appreciated.

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1984 ANNUAL EXHIBITION

Chelsea Old Town Hall—27th October 1984

131 exhibits were recorded and these are reviewed below from the notes supplied by exhibitors, supplemented by reviewers' observations and enquiries. Exhibitors' records must include a statement of the point of interest of a specimen as well as a bald record to ensure that it does not get overlooked. The Editor also wishes to have the attention of himself or the reviewers drawn on the day to photogenic specimens of interest and novelty for inclusion in the colour plates. As the specimens have to be assembled into whole plates for photography at the exhibition, it is not possible to photograph overlooked material later and to substitute it for less interesting specimens already recorded. It is not generally policy to photograph known aberrations or species already illustrated elsewhere, but this is happening because there is apparently space available, which is not disputed until too late. We do not yet have an economic method of recording in colour very small species at greater than life size.

The 1984 exhibition plates will be published later when other colour plate work is to hand, for economy.

The exhibition location was photographed by R.W.J. Uffen and individual members by Mrs McCormick.

Reviewers were: C.J. Luckens (British butterflies), B.F. Skinner (British macrolepidoptera), J.M. Chalmers-Hunt (microlepidoptera), R.F. Bretherton (foreign macrolepidoptera), P.J. Chandler (Diptera), I. McClenaghan (Coleoptera), A. Halstead (other insects) and E.S. Bradford (illustrations).

DIPTERA

APPLETON, D.M.—A male of *Melangyna quadrimaculata* (Verrall) (Syrphidae) taken at *Corylus* catkins, Botley Wood, Hants., 1.iii.84.

HODGE, P.J.—*Leopoldius signatus* (Wiedemann) (Conopidae), two taken at *Hedera* flowers, Malling Down, near Lewes, E. Sussex, 22.ix.84; five species of Syrphidae from Sussex, including *Myolepta luteola* (Gmelin), a male from *Heracleum* flowers, near Framfield, 14.viii.84; also *Volucella zonaria* (Poda) and *V. inanis* (Linnaeus), from near Lewes, 7.viii.84.

HUDSON, I.R.—A selection of uncommon larger Brachycera, Conopidae, Syrphidae and Tachinidae from S. Hants and W. Sussex, 1983–4. These included among the Syrphidae: *Caliprobola speciosa* (Rossi), a female flying slowly around a damaged but living beech trunk at Mark Ash, New Forest, 8.vi.84 and a male sunning itself in a hollow in an old beech stump at Denny Wood, New Forest, 15.vi.84; *Pocota personata* (Harris), a female investigating a damaged area of a beech trunk 8 feet from the ground, at Mark Ash Wood; *Myolepta luteola* (Gmelin), feeding at *Mentha aquatica* flowers in a damp meadow at Roydon Woods, 21.viii.84; *Brachypalpus laphriformis* (Fallén), on beech trunk, Mark Ash, 2.vi.84. Other notable species were: *Leopoldius signatus* (Wiedemann) (Conopidae), sunning itself low amongst undergrowth in small copse, Hilsea, Portsmouth, 28.ix.82; *Alophora hemiptera* (F.) (Tachinidae), a male from *Mentha aquatica* flowers at Botley Wood, 18.viii.84 and a female also at *M. aquatica* flowers, at Roydon Wood, 21.viii.84.

KNILL-JONES, S.A.—A collection of Diptera, mainly Syrphidae, from Freshwater, Isle of Wight, including *Volucella inflata* (F.), *V. zonaria* (Poda) (Syrphidae) and *Bombylius discolor* Mikan (Bombyliidae).

MILES, S.R.—*Pelecocera tricincta* Meigen (Syrphidae), female from Ash Ranges, Surrey, 26.viii.84, first record from Surrey and first outside Dorset and S. Hants; *Mallota cimbiciformis* (Fallén) (Syrphidae), male at rest adjacent to a large rot hole in a living beech at Micheldever Spoil Heaps, Hants, a county naturalist's trust reserve, 11.vii.83.

PLANT, C.W.—A collection of Syrphidae taken during 1984, including *Meligramma triangulifera* (Zetterstedt), Burnt Oak Wood, Kent, 19.v.34, female; *Neoascia interrupta* (Meigen), Aveley, Essex, 13.v.84.

SOKOLOFF, P.A.—A pair of *Rhamphomyia marginata* (F.) (Empididae), taken from a mating swarm at Ham Street Woods, Kent, 19.v.84; further examples were also seen at mercury vapour light at about 11 p.m. on the same night.

STUBBS, A.E.—A selection of scarce or interesting Diptera from many parts of Britain. The following more notable records were among them: *Tipula cheethami* Edwards (Tipulidae), associated with seepages on basalt cliffs at Calgary, Mull, 7.vi.83, first record from west of Scotland; *Arctoconopa melampodia* (Loew) (Tipulidae), at shaded oxbow lake, Mauld, Ross & Cromarty, 20.vi.83, third British record; *Limonia frontalis* (Staeger) (Tipulidae), from Downton Gorge N.N.R., Herefordshire, 10.vii.82, second British record; *Argyra grata* Loew (Dolichopodidae), same data as last, fifth British record; *A. atriceps* Loew, another scarce species taken at the same time as the last; *Syntormon tarsatus* (Fallén) (Dolichopodidae), Turner's Puddle, Dorset, 4.vii.84, northern and western species scarce and local in the south; *Syneches muscarius* (F.) (Empididae), one male and two females from same locality as last, the second British locality for this Dorset speciality; *Melangyna guttata* (Fallén) (Syrphidae) from Langford Meadow, Dorset, 4.vii.84, one female; *Campiglossa argyrocephala* (Loew) (Tephritidae), Strath Rory, Ross & Cromarty, 13.vi.84, a new county record; *Clusiodes geomyzina* (Fallén) (Clusiidae), swept from pine stump in Abernethy Forest, Inverness, 9.vi.84.

COLEOPTERA

APPLETON, D.—*Cafius cicatricosus* (Erichson), Warsash, Hants, 30.vi.84, one of several taken on and about this date below seaweed; *Sphinginus lobatus* (Olivier), two exhibited from Netley, near Southampton, 24.vi.84 and 30.vi.84, where about a dozen were found by sweeping below oaks (now evidently established following discovery at Titchfield Common, Hants in 1982); *Agrilus viridis* (L.), one beaten from sallow, New Forest, 15.vii.84; *Triplax lacordairii* Crotch, four off fungus on elder, Brading Down, Isle of Wight, 11.vi.84; *Baris analis* (Olivier), (known in Britain only from Isle of Wight, last seen in 1887) one of three found in moss 31.iii.84 was exhibited, together with one swept 26.iv.84, all from a very restricted area of low cliffs on East Wight.

FOSTER, A.P.—(1) individual species records: *Amara strenua* Zimm., one from Pawlett Level, Somerset, 12.vii.1983, second record in the county; two examples of the rare buprestid *Agrilus biguttatus* (F.), which was found to be breeding in some old oak trees on Hampstead Heath, Middlesex in June 1984 (recorded from this locality by Stephens in the 1800's, but not recorded since); *Korynetes caeruleus* (Deg.), one from a pavement in the town centre of Ludlow, Salop; *Attagenus smirnovi* Zhantiev found commonly in an office in Belgrave Square, London during the winter months of 1983/84 (probably the second British record, the first being from a flat in Kensington in April 1978); two *Potamonectes griseostriatus* (Deg.) from Birkdale Tarn, North Yorks., probably the first record for England of this Welsh and Scottish upland species.

(2) A selection of dead wood Coleoptera taken on the BENHS meeting to Whitley Wood, New Forest on 3.vi.1984—*Tomoxia biguttata* (Gyll.), on oak log, the following by beating hawthorn blossom; *Ampedus pomonae* (Steph.), *A.cinnabarinus* (Esch.), *Selatosomus nigricornis* (Panz.), *Anaglyptus mysticus* (L.) and *Pogonocherus hispidus* (L.).

HODGE, P.J.—Twenty-five species taken during 1984 were exhibited, of which the following were the most interesting. *Elaphrus uliginosus* in marshy meadow on bank of small stream near Dorchester, Dorset, 4.vii; *Perileptus areolatus* and *Medon ripicola* on bank of Afon Vyrnwy near Oswestry; *Bembidion quadripustulatum* on mud beside boggy pond, Arundel Park, W. Sussex, 5.v; *Badister peltatus* Rye Harbour, E. Sussex, 23.v; *Philonthus pullus* on roots of *Juncus* and under stones, Oxwich Dunes, S. Wales, 30.v (a very rare species away from the Gower Peninsula); *Mycetoporus punctatus, Dermestes maculatus, Axinotarsus marginalis* all new to Sussex; *Ptinus dubius* new to Kent, Lydd on pine 11.vi, otherwise only known from Suffolk; *Arena tabida,* one under dry horse dung, Cromlyn Burrows, Swansea, 18.v; *Atheta* (*Dilacra*) *difficilis* Arundel Park, 5.v on mud by boggy pond (a rare species with a few records for London district and S.E. England); *Aphodius putridus,* in rabbit burrows on the downs at Hollingbourne, Kent, 17.vi; *Cryptocephalus biguttatus,* Lavingham Common, W. Sussex on *Erica tetralix,* 18.vi, a scarce species. *Bagous lutulosus,* two swept off *Juncus,* Stedham Common, W. Sussex, 16.vi, probably new to W. Sussex; *Ceutorhynchus verrucatus,* Lydd Ranges Kent, at roots of Yellow-horned Poppy, 11.vii. Also a species of beetle not recorded from Britain, discovered in the collection (now in the Booth museum, Brighton) made by the late G.B. Alexander—*Uloma culinaris,* Bushy Hall, in rotten wood, 20.vii.50. This tenebrionid breeds in rotten wood in Scandinavia but further evidence is required before it can be admitted onto the British list.

HEAL, N.F.—*Clytra quadripunctata* (L.), Church Wood, Blean, Kent, 4.viii.84, *Ampedus sanguinolentus* (Schrank), Horsell Common, Surrey, 20.iv.84, *Dascillus cervinus* (L.), Darland Bank, Gillingham, Kent, 27.vi.84, *Chlaenius vestitus* (Paykull), Longrope Wood, Orlestone, Kent, at light 5.vii.83, *Thanatophilus sinuatus* (F.), Nagden, Kent, 8.vi.83, *Stenagostus villosus* (Fourcroy), Hoads Wood, Bethersden, Kent, at light 11.vii.83, *Liparus germanus* (L.), Canterbury Golf Course, Kent, 6.viii.84, *Arhopalus rusticus* (L.), Blackheath, Surrey, at light 29.vii.84, *Scaphidium quadrimaculatum* Olivier, Reigate, Surrey, 9.vi.84, *Lebia cruxminor* (L.), Ditchling, Sussex, 19.v.84, *Peranus bimaculatus* (L.), Bagham, Kent, 23.vi.84.

The following all from Murston, Kent: *Korynetes caeruleus* (Deg.), 14.v.84, *Crioceris asparagi* (L.), 9.vi.84, *Nitidula rufipes* (L.), 14.v.84, *Grypus equisiti* (F.), 2.vi.84, *Gronops inaequalis* Boheman, 26.viii.84, *G. lunatus* (F.), 26.viii.84, *Sibinia arenariae* Steph., 26.viii.84, *Demetrias imperialis* (Germar), 10.iii.84.

Deleaster dichrous (Graven.), Stodmarsh, Kent, at light 17.viii.84, Hankley Common, Surrey at light 29.viii.84, *Anthicus instabilis* Schmidt, Funton, Kent, 16.ix.84, *Brachygluta helferi* (Schmidt-Goebl), Funton, Kent, 16.ix.84, *Dolichosoma lineare* (Rossi), Nagden, Kent, 8.vi.83.

Hyman, S.P., Kirby, P., Plant, C.W. and Lambert, S.J.—Rare and interesting beetles collected mainly in S. Essex. *Demetrias imperialis* (Germ.) Cuckolds Haven, S. Essex, 22.vi.84; *Dytiscus circumflexus* F., Thames Side Park, S. Essex, iii.84; and at Running Water Wood, Belhus Park, S. Essex, 29.ix.84; *Opilo mollis* (L.), Ingrebourne Marsh, S. Essex, 25.x.84; *Axinotarsus marginalis* (Lap. de Cast.), Dagnam Park, S. Essex, 3.viii.84; *Coccidula scutellata* (Herbst), Eastbrookend, Dagenham, S. Essex, 6.vii.84; and at Murston Marshes, Kent, 2.ix.84; *Stethorus punctillum* (Weise), St. Mary's Museum Nature Reserve, S. Essex, 8.viii.84 and 9.viii.84; *Adonia variegata* (Goeze), Cuckolds Haven, S. Essex, 22.vi.84 and Hornchurch Airfield, S. Essex, 20.vii.84; *Harmonia quadripunctata* (Pontoppidan), Dunwich Woods, Suffolk, 14.x.84; *Pycnomerus fuliginosus* Er., Black Down, E. Sussex, 12.vii.83; *Lissodema cursor* (Gyll.), Dagnam Park, S. Essex, 3.viii.84; *Anthicus tobias* (Mars.), East Tilbury, S. Essex, 24.viii.84; *Bruchella rufipes* Ol., Galleons Hotel, S. Essex, 1.x.84 and 4.x.84; *Apion limonii*, Kirby, Murston Marshes, Kent, 2.ix.84; *Apion foveatoscutellum* Wagner, Burton Court, Kent, 2.ix.84; *Apion semivitellatum* Gyll., Bully Fen, Stratford, S. Essex, 29.viii.84; *Apion intermedium* Eppelsheimer, Friston Forest, Sussex, 23.vi.84; *Baris picicornis* Marsh., Friston Forest, 23.vi.84; and Limmo Peninsula, S. Essex, 25.ix.84; *Baris scolopacea* Germ., Canvey Island salt marsh, S. Essex, 16.viii.84; *Mecinus collaris* Germ., East Aberthow, S. Wales, 25.ix.83; *Mecinus janthinus* Germ., Limmo Peninsula, S. Essex, 16.viii.84; and Murston Marshes, Kent, 2.ix.84; *Gymnetron collinum* (Gyll.), Limmo Peninsula, S. Essex, 25.ix.84; *Scolytus laevus* Chapuis, Castle Eden Dene, Co. Durham, 82.

Jones, R.A.—A section of bark and three rare beetles taken from the same felled oak stump, Hampstead Heath, London, 18.vii.84; *Phloiotrya vaudoueri* Mulsant, under the thick oak bark; *Platypus cylindrus* (F.), crawling across the log; *Agrilus panonicus* (Piller & Mitterpacher), removed dead from the characteristic semi-circular exit hole. The bark was punctured by many hundreds of these exit holes and for several weeks previously the beetle had been active and frequent about the log (A. Foster, NCC, personal communication).

Anommatus duodecimstriatus (Müller), Bromley, 21.xi.83, from a heap of grass cuttings in a small suburban garden. Normally thought of as subterranean, it completely lacks eyes; *Dryophilus pusillus* (Gyll.), Cringoed, Oakford, Mid-Wales, 6.vi.84 flying across an open meadow at dusk.

Moles' nest insects out of their normal habitat at the height of the host's breeding season: *Grammostethus marginatus* (Erichson), Maidcross Hill, Cambridgeshire, under stone in small gulley at edge of sandy track, 16.v.81, *Hystrichopsylla talpae* (Curtis) (Siphonaptera), in heaps of cut reeds, Wicken Fen, Cambridgeshire, 16.v.81.

Amphimallon ochraceus (Knoch), from the ruins of the old castle, Newcastle Emlyn, Mid-Wales, 8.vi.84. In some numbers flying in bright afternoon sunshine across short sheep-cropped turf; *Cicindela sylvatica* L., running and flying over bare sand in hot sunshine, Ambersham Common, W. Sussex, 28.vii.84; *Elaphrus uliginosus* F., Arundel Park, W. Sussex, 22.iv.84. Running under herbage at edge of small pond—new to Sussex; *Saprosites mendax* Blackburn, Arundel Park, W. Sussex, 22.iv.84, under bark of fallen beech. Arundel is still the headquarters of this insect in Britain; *Ampedus cinnabarinus* (Esch.), Arundel Park, W. Sussex, 22.iv.84, under bark of a fallen beech; *Ctenicera cuprea* (F.), Trichrug, Llanarth, Mid-Wales, 7.vi.84, on the wing through a clearing in a conifer plantation; *Melasis buprestoides*

(L.), Hampton, Middlesex, bred by Mrs F. M. Murphy from a log brought indoors. The adults started to emerge from 8.iii.84 and continued to appear in numbers until the end of the month; *Pycnomerus fuliginosus* (Erichson), Muddles Green, Chiddingly, E. Sussex, 27.xii.84, under bark of oak stump and quite active despite the cold weather. This Australian insect, first discovered in Britain in 1964, is now spreading.

MACKECKNIE-JARVIS, C.—*Carabus clathratus* L., Kenmare, Co. Kerry; *Dyschirius obscurus* (Gyll.), Shanes Castle, Antrim; *Bembidon virens* Gyll., Loch Maree, Ross & Crom.; *Lebia cruxminor* (L.), Lough Dearg, Co. Clare; *Lathrobium fennicum* Renk., Tresco, Scillonia; *Philonthus varius* (Gyll.), var. *shetlandicus*, Spiggie, Shetland; *Actocharis readingi* Sharp, St Mary, Scillonia; *Atomaria scutellaris* Motsch., Scillonia; *Cetonia aurata* (L.), ab. *nigra*, St Mary, Scillonia; *Athous subfuscus* (Müll.), Lerwick, Shetland; *Anaglyptus mysticus* (L.), ab. *hieroglyphicus* Wychwood, Oxon; *Oberea oculata* (L.), Wicken Fen, Cambs.; *Stenostola ferrea* (Schrank), Brampton Bryan, Hereford; *Psylliodes luridipennis* Kutschera, Lundy, Devon; *P. sophiae* Heikertinger, typical form, ab. *tricolor* and ab. *nigrifrons*, all from Icklingham, Suffolk; *Ceuthorhynchus insularis* Dieck, Lundy, Devon.

OWEN, PROF. J.A.—Photographs of beetles and of stages in their life histories and also a number of beetles from Scotland including: *Proteinus crenulatus* Pand., Loch Garten, ix.83; *Phyllodrepa puberula* Bernhauer, Loch Garten, x.81; *Quedius fulvicollis* Steph., Loch Garten, vii.83; *Microdota boreella* Brundin, Lochinver, vii.83; *M. excelsa* Bernhauer, Loch Garten, v.84; *M. soedermani* Bernhauer, Loch Garten, v.84; *Cyphon kongsbergensis* Munster, Dornie, vii.84; *Corticaria longicollis* (Zett.), Nethy Bridge, v.81; *Cis lineatocribratus* Mellié, Loch Garten, vii.83 and *Tetropium castaneum* (L.), Inveraray, v.71.

PEET, N. and AUSTIN, R.A.—*Dytiscus marginalis*, L., and *Hydrophilus piceus* (L.), taken at mercury vapour light, Hickling, Norfolk, 1984; *Agapanthia villosoviridescens* (Deg.), noted frequently on herbage in July and August 1984 at Hickling; *Clytus arietis* (L.), Guernsey, vii.84; *Cetonia aurata* (L.), a memorable sight, numerous on bramble flowers, Sark, 1983; *Dorcus parallelipipedus* (L.), one of three noted in woodland at Slapton, Devon, viii.84; *Staphylinus olens* (Müll.), from bare rocks on a beach, Sark, Channel Is., ix.82.

PORTER, D.A.—*Ampedus elongantulus* (F.), Priddy, 9.vi.84, new to Somerset?; *A. sanguinolentus* (Schrank), new Sussex record, Lavington Common, 16.vi.84; *Ischnodes sanguinicollis* (Panz.), Windsor, 14.iv.84; *Curculio rubidus* (Gyll.), Wiggonholt Common, 9.ix.84, new to Sussex; *Euophryum confine* Broun, new to Dorset?, 4.iv.80; *Aepus marinus* (Ström), Eastbourne 29.vi.79, new to Sussex, a considerable extension to range on south coast; *Pselaphaulax dresdensis* (Herbst), Brockenhurst, New Forest, 28.v.84; *Dyschirius angustatus* (Ahrens), Camber, Sussex, 18.v.83, (a rare carabid); *Halyzia 16-guttata* (L.), Arundel, Sussex, 2.vi.83, (an uncommon ladybird); *Aphodius niger*? (Panz.), questionably this species from classical locality in the New Forest, Brockenhurst, 8.vii.84; *Platycis cosnardi* (Chev.), Duncton 16.vi.84, the 4th British specimen and the second record from Sussex; *Sitona gemellatus* Gyll., Eype, 29.viii.77, new to Dorset, previously recorded only from Devon; *Grammoptera variegata* (Germar), Wapping Thorn Wood, 16.vi.84, perhaps the second Sussex record (recorded previously by Bedwell from Eridge Park); *Apion vicinum* Kirby, Wool, 6.viii.84, (uncommon species, previously from Dorset by Ford who gives no locality); *Nanophyes gracilis* Redten., Stedham Common, 10.vi.84; *Scydmaenus rufus* Müll. & Kunze, Old Windsor, 2.vi.82, a rare species even in this classical locality; *Syagrius intrudens* Waterhouse, taken on bracken, Leonards Lee, 28.v.81; *Pterostichus lepidus* (Leske), 3.vi.79, new Sussex record, Midhurst.

SOKOLOFF, P.A.—Beetles bred from the fungus *Daldinia concentrica*: (1) the common *Biphilus lunatus* (F.); (2) *Malachius bipustulatus* (L.), a common beetle, but an unusual habitat for the larva which is normally predatory, living under bark or in rotten wood (possibly the larva was feeding on the early stages of the Pyralid moth *Apomyelois bistriatella neophanes* which was also present in the fungus); (3) *Synchita humeralis* (F.), a rather scarce beetle usually found under bark or occasionally under tree fungi and known from *Daldinia*. Locality: Keston, Kent on dead and dying birch.

BRITISH BUTTERFLIES

BARRINGTON, R.D.G.—(1) A drawer of butterfly aberrations taken in Dorset and S. Wiltshire. Many of the fine varieties of *Maniola jurtina* (L.), shown such as *postmultifidus* Lipscomb, *subtusalbida* Silb., *fracta* Zweight, *antiaurolancia* Leeds and *hueni* Kruhl were all taken in the same Dorset field; *M. jurtina* from elsewhere included ab. *commaculo* and another female ab. *fracta*. Also shown *Hipparachia semele* (L.), ab. *monocellata* Lempke, *holonops* Brouwer and *suffusa* Tutt, *L. coridon* (Poda), ab. *marginata* Tutt, *P. argus* ab. *discreta+juncta* Tutt, *A. urticae* ab. *ichnusa* (and a homoeotic example), A. *hyperantus* ab. *brunnocellata*.

(2) Butterflies taken in Eire (counties Clare, Galway and Wexford) in June/July 1984. These included the distinctive Irish ssp. *juvernica* Williams, of *Leptidea sinapis* (L.), with their greenish, strongly-marked undersides, (English examples were shown for comparison), and a series of *P. icarus* (Rott.), from county Clare. These latter showed some of the characteristics of ssp. *mariscolore* but produced a partial second brood when reared in captivity. Also shown were Irish forms of *H. semele* and *A. hyperantus* and *Maniola jurtina* ssp. *iernes* Graves.

BROTHERIDGE, D.J.—Butterfly varieties including an extreme aberration of *Aglais urticae* (L.), (taken in the wild by A. Sloan).

CRIBB, P.W.—A specimen of Weaver's Fritillary, *Clossiana dia* (L.), captured by Dr Phillip Cribb on the Surrey Downs in viii.84. (Subsequent inquiry has revealed that bred specimens of continental *Clossiana dia* have been recently released in that area by another collector).

DYKE, R.A.—A specimen of *Nymphalis antiopa* (L.), taken on 25.ix.84 at Grange Park, London N21.

FENSOME, B.—A selection of butterflies collected or bred in 1984 including a fine aberration of *P. tithonus* and a bred gynandromorph of *P. icarus*.

HARMER, A.S.—A well presented exhibit of aberrations of various species such as *T. lineola* ab. *suffusa+marginata, C. rubi* ab. *caecus*, two homoeotic *L. phlaeas, L. coridon* ab. *inaequalis* Tutt, and ab. *tithonus* Meig., and some bred *syngrapha inframarginata* forms, a homoeotic *L. bellargus, A. iris* with extra rufous markings at costa and apex of forewings, *B. selene* ab. *extenuata* Cabeau, *A. aglaia* spp. *scotica* ab. *fusca* Tutt, a fine *A. paphia subtusaurea* Reuss+*caroffana* Cabeau, *M. jurtina* abs. *anticrassipuncta* Leeds, and *postmultifidus* Lipscomb, *C. pamphilus* ab. *obselitissima* Leeds, and ab. *obliquajuncta* Leeds, and *A. hyperantus* ab. *arete* Müll.

JONES, A.M.—The highlight of an interesting selection of aberrations was a fine female ab. *iolata* of *A. iris* captured in Surrey on 13.vii.82. An impressive series of 14

L. camilla was mainly *obliterae/nigrina* forms. Other bred and captured varieties were shown of *P. icarus, H. lucina, B. selene, B. euphrosyne, L. phlaeas* and there were several good aberrations of *M. jurtina* such as two female ab. *alba* Blackie and abs. *cinerea* Cosmovici and *atrescens* Leeds.

Knill-Jones, S.A.—Butterflies collected within walking distance of his home at Roundstone, Freshwater, Isle of Wight, including *obsoleta* forms of *P. icarus and L. coridon,* and *T. sylvestris* ab. *pallida.* The normally single-brooded *P. malvae* had been captured on dates from 24.iv to 3.vii. Series showed seasonal variation of *C. pamphilus* and the British *Pieris* species.

Lear, N.W.—A selection of butterflies from the City of Bristol Museum Collections. Many of these were from the I.R.P. Heslop collection which is rich in varieties of *A. iris.* These included abs. *iole, maximinus, sari* and *sorbioduni.* The histories of several of these famous insects are described in graphic detail in *Notes and Views of the Purple Emperor.* Various aberrations of *N. io, L. camilla* and *A. urticae;* gynandromorphs of *T. sylvestris, P. rapae* and *G. rhamni* and some rare migrants were shown, as well as *L. coridon* ab. *dextra semi-syngrapha* taken in Somerset in 1983 by the exhibitor.

Middleton, A.P.—Amongst various aberrations were *A. artaxerxes* ab. *quadripuncta* Tutt, Dumfries, 4.vii.84. *P. argus* ab. *albopunctata* with pale brown colour. *L. coridon* abs. *puntatamargino* and *inaequalis, M. jurtina* abs. *atrescens, grisea-argentacea* and *pupillonulla* and *C. pamphilus* ab. *partimtransformis* (Leeds). A series of *C. tullia* from Shropshire showing a tendency towards ab. *cockaynei* Hopkins, were also exhibited.

Phelps, H.G.—*M. jurtina* ab. *alba* and another variety.

Plant, C.W.—Amongst other varieties a magnificent *A. aglaia* with confluent markings captured in South Hertfordshire.

Russwurm, A.D.A. and Middleton, H.G.M.—An exhibit of varieties taken in 1984 with a fine *H. semele* ab. *grisescens* from Portland taking pride of place. There were further varieties of *H. semele* showing variety in spotting, and, also from Portland, *M. jurtina* ab. *commaculo, C. pamphilus* ab. *pallidula* and *L. coridon* ab. *crassicherra+discreta+compuncta. E. aurinia* ab. *melanoleuca* was shown along with *T. sylvestris* ab. *intermedia,* a homoeotic *P. brassicae, P. rapae* ab. *atomaria* and varieties of *C. argiolus* and *P. argus.*

Reid, I.G.M.—Some interesting varieties of *A. urticae* with blotching of the dark markings. These blotched forms are surely modifications of a single variety. Names such as ab. *dannenbergi* and *semi-ichnusoides* have been applied to each variant. The latter name has always puzzled me as it presumably dervies from *A. urticae ichnusa* the form endemic to Corsica and Sardinia, characterised by paucity not extension of dark markings. Also present were a dwarf *L. bellargus,* an undersized variety of *C. tullia* from Shropshire, and two *L. coridon* ab. *obsoleta.* The latter were taken between innings during a cricket match at Blandford. Congratulations to the collector on good use of time!

Salmon, Dr M.—An interesting exhibit of butterflies from collections of historic interest. Specimens from the collections of F. W. Frohawk, J. W. Tutt, P. Siviter-Smith, L. A. Sabine, H. A. Leeds, E. A. Cockayne, and H. J. Turner were shown—also a specimen of *P. argus* ssp. *masseyi* from the original series collected by H. Massey.

Scanes, J.T.—An example of *P. icarus* ab. *discreta+crassipuncta* captured at Banstead, vi.84.

SIMNER, J.B.A. and D.R.—(exhibited by R.D.G. Barrington on behalf of the above). Two varieties of *A. urticae* with blotched markings, one a somatic mosaic, a pair of *H. semele* ab. *monocellata, C. rubi* ab. *partimtransformis, N. io* ab. *semiocellata, C. croceus* ab. *pseudomas, M. jurtina* ab. *postexcessa* and *P. tithonus* ab. *partimtransformis* and *antiexcessa+postexcessa.*

SIMPSON, M.—Aberrations of Nymphalidae: *A. urticae, V. atalanta* and *L. camilla.*

SIMSON, BRIG. E.C.L.—Underside varieties of *L. coridon* including ab. *nigrescens* and a possibly unique *anticaeca+neurata+postfulvescens.*

TREMEWAN, W.G.—A female *T. sylvestris* ab. *obscura* Tutt, captured at Gwithian, Cornwall 3.vii.84, with the normal fulvous coloration mostly replaced with dark brown shading.

TREW, D.—Two very fine pale *B. euphrosyne* ab. *albinia.* Also *C. croceus* ab. *alba, P. tithonus* ab. *crassiexcessa* and *C. pamphilus* ab. *anticastanea.*

TUBBS, R.S.—A further showing of the superb male *A. paphia* ab. *cifkai* Silb., taken in 1981 and two further examples taken in the same locality near Winchester in 1984. Two pale forms of *C. euphrosyne* ab. *xanthos* taken in 1948 were shown for comparison. Only males of the white form of *A. paphia* have ever been recorded (7 examples known from 1980 to date). The genetics of this form are unknown.

YOUNG, L.D.—Aberrations bred in 1984–3 of *P. icarus* and three of *L. phlaeas.*

BRITISH MACROLEPIDOPTERA

AGASSIZ, REV. D.J.L.—A series of *Luperina nickerlii* (Freyer), from Essex, with series of *L. nickerlii gueneei* Doubl., *L. nickerlii leechi* Goater, *L. nickerlii knilli* Bours., and *L. testacea* (D. & S.), for comparison.

BAKER, B.R.—some recent records for Berkshire were *Aleucis distinctata* (H.-S.), recorded in the V.C.H. 1906 and rediscovered in the same area in 1984; the first county record of *Xanthorhoe biriviata* (Borkh.), bred from larvae found in viii.84; and on behalf of Lt. Col. G. G. Eastwick-Field a melanic example of *Paradarisa (Ectropis) extersaria* (Hbn.).

BROTHERIDGE, D.J.—A selection of uncommon species from N. Wiltshire including *Euphyia biangulata* (Haw.), and *Serraca punctinalis* (Scop.), from Savernake Forest.

CHALMERS-HUNT, J.M.—Single examples of *Phragmatobia fuliginosa* (L.), ab. *flavescens* Schultz, from East Malling, Kent on 16.viii.65, and *Ourapteryx sambucaria* (L.), ab. *olivacea* Standfuss, taken at Sheppy, Kent by F. Clouter on 8.vii.76.

CLASSEY, E.W.—A specimen of the rare *Arctia caja* (L.), ab. *decolor* Cockayne, from Uffington, Oxfordshire on 28.vii.84.

DERBYSHIRE ENTOMOLOGICAL SOCIETY—The first county record of *Lampropteryx otregiata* (Metc.), taken at Ashbourne, Derbyshire on 5.ix.84.

DOBSON, A.H.—The first VC 12 recorded *Hadena compta* (D. & S.), from Oakley, Hants on 23.vi.83 (see also Sterling, D.H.); and a specimen of *Lithophane leautieri hesperica* Bours., found at rest 1.2 metres up from the ground on foliage of *Juniperus communis* in an area well away from any introduced conifers at Danebury Hill, Hampshire on 30.x.78. Also from Oakley an *Ochropleura plecta* (L.), ab. *rubricosta* Fuchs.

ELLIOTT, B.—Local and aberrant Lepidoptera taken or bred during 1984 included a varied series of *Zygaena filipendulae stephensi* Dupont, from Holy Island, Northumberland; a bred series of *Furcula bifida* (Brahm), from Warwickshire and a bred series of *Alcis repandata* (L.), from North Nottinghamshire, ranging from typical to ab. *nigra* Tutt.

Elliott, B. and Skinner, B.—Specimens of *Eupithecia abietaria* (Goeze), from Northumberland in vii.84, together with photographs of the locality, full grown larvae and tenanted spruce cones.

Emmett, Lt Col A.M.—The third Essex record this century of *Eupithecia insigniata* (Hbn.), from Elmdon on 12.v.84; an *Oligia versicolor* (Borkh.), from Bindbrook, Essex on 12.viii.84; and one *Heliothis peltigera* (D. & S.), from Little Leighs, Essex on 19.vii.84.

Fairclough, A.J. and R.—A short series of *Herminia tarsicrinalis* (Knoch), taken at Thorpeness, Suffolk on 14.vii.84.

Fenn, J.L.—A halved gynandromorph *Peribatodes secundaria* (Esp.) bred from a female from Hamstreet, Kent. A female *Semiothisa signaria* Hbn., taken at Hamstreet, Kent on 31.vii.84 being the second record for the British Isles; together with four preserved larval skins. A female *Alcis repandata* (L.), with bipectinate antennae bred from a female from Gussetts Wood, Buckinghamshire.

Gibson, Dr C.W.D.—Aberrant and immigrant species taken during 1984 included a male *Lithosia quadra* from Wychwood, Oxfordshire. Notable captures from Sherbourne, Dorset in 1969 were examples of *Archanara sparganii* (Esp.) and *Egira conspicillaris* (L.).

Hall, N.M.—A series of the hybrid *hybridus* Steph., including two gynandromorphs, resulting from a pairing between a female *Laothoe populi* (L.), and a male *Smerinthus ocellata* (L.), in 1984.

Halsey, J.C. and M.—A selection of aberrant specimens of which the most extreme were two *Pseudoips prasinana britannica* Warr., ab. *leucozona* Cockayne, from Downham Market, Norfolk on 8.vii.84; *Selenia dentaria* (F.), ab. *brunnearia* Mansbridge, from Warwick on 25.iv.82; a melanistic *Archanara sparganii* (Esp.), from Shell Bay, Dorset on 5.viii.83 and a bred specimen of *Diloba caeruleocephala* (L.), from Warwick in vi.82 having the forewing stigmata extremely confluent.

Harmer, A.S.—A specimen of *Heliothis armigera* (Hbn.), bred from a larva found in capsicum imported either from France or Spain. Emerged 19.i.84.

Harper, Dr M.W.—An albinistic aberration of *Orthosia gothica* (L.), from Ledbury, Herefordshire on 12.iv.84.

Hart, C.—A male and female *Pelosia obtusa* (H.-S.), bred from a female from the Norfolk Broads, together with photographs of the fully grown larva figured in vi.84 feeding on the green alga *Desmococcus*.

Jordan, M.J.R.—A selection of species taken in the Scottish Highlands in April and July 1984 including examples of *Brachionycha nubeculosa* (Esp.), *Hyppa rectilinea* (Esp.), and *Plusia festucae* (L.).

Knill-Jones, Dr R.P.—specimens of *Hadena perplexa* (D. & S.), conforming to ssp. *capsophila* (Dup.), bred in 1984 from Ailsa Craig, Ayrshire; an isolated and most northerly colony.

Lambert, S.J.J.—A specimen of *Synanthedon formicaeformis* (Esp.), from Eastbrookend, Essex being one of the few records of this species from Essex this century.

Langmaid, Dr J.R.—A specimen of *Catocala sponsa* (L.), from Southsea, Hampshire on 2.viii.84.

LEAR, N.W.—A selection of historical specimens from the City of Bristol Museum; these were a *Catocala elocata* (Esp.), taken on the wall of a house at St Saviour's, Jersey on 20.x.03 by G. B. Coney; a short series of *Fagivorina arenaria* (Hufn.), from the New Forest in the 1830's; six specimens of *Sabra harpagula* (Esp.), bred from a female from Leigh Woods, Bristol in 1939; a drawer of aberrant *Abraxas grossulariata* (L.), most of which were bred by the Rev. G. H. Raynor; specimens of *Conistra erythrocephala* (D. & S.), taken in Pine Wood, near Canterbury, Kent; and single specimens of the following: *Hyles lineata livornica* (Esp.), from Clifton, Bristol on 2.vi.13 by Dr C. Walker; *H. gallii* (Rott.), labelled Deal, 1900, Tutt and *Hippotion celerio* (L.), from Arundel, Sussex on 24.ix.13 by Miss A. Middleditch.

MACNULTY, Dr B.J.—Recent captures from the Gower Peninsular, Glamorgan included *Agrotis trux* (Hbn.), *Xestia agathina* (Dup.), and *Agrius convolvuli* (L.).

PARSONS, M.—*Bembecia scopigera* (Scop.), with root sections that had contained larvae.

PEET, Dr T.N.D. and AUSTIN, R.A.—Interesting captures from Guernsey in 1984 included *Tristateles emortualis* (D. & S.), on 23 July; two male *Lymantria dispar* (L.), on 24.viii and 13.ix; *Agrotis crassa* (Hbn.), in August; *Trachea atriplicis* (L.), on 28.vii, new to the Island and *Mythimna litoralis* (Curt.), also new to the Island and probably resident.

PENNEY, C.C. and MCCORMICK, R.F.—Interesting species captured during 1983 and 1984 included *Setina irrorella* (L.), from Hampshire, *Noctua orbona* (Hufn.), from Suffolk and *Luperina nickerlii* (Freyer), from Essex.

PICKLES, A.J. and C.T.—A case of aberrant and local species taken or bred in 1984, of special interest were specimens of confluent *Zygaena filipendulae* (L.), from Mull; an example of *Hoplodrina ambigua* (D. & S.), ab. *confluens* Vorbrodt, and specimens of *Standfussiana lucernea* (L.), *Cleorodes lichenaria* (Hufn.), and *Alcis jubata* (Thunb.), from the Gower Peninsular, Glamorgan.

PLANT, C.—A specimen of the rarely recorded first brood of *Clostera anachoreta* (D. & S.), from Dungeness, Kent on 2.vi.84. A series of *Luperina nickerlii* (Freyer), from Shoeburyness, Essex in 1984. Aberrations taken in 1984 included a melanic male *Stauropus fagi* (L.), from S.W. Essex; *Nola confusalis* (H.-S.) ab. *columbina* Image from Epping Forest, Essex and *Menophra abruptaria* (Thunb.) ab. *fuscata* Tutt from East Ham, Essex.

PRATT, C.R.—Local macrolepidoptera taken in Sussex in 1984 were *Lasiocampa trifolii trifolii* (D. & S.), and *L. trifolii flava* Chalmers-Hunt; *Eilema pygmaeola* (Doubl.); *Dicallomera fascelina* (L.); *Rhyacia simulans* (Hufn.); *Hydrelia sylvata* (D. & S.), f. *goodwini* Bankes, and *Scopula nigropunctata* (Hufn.), from the newly discovered resident population in Sussex.

REID, J.—A case of *Rhodometra sacraria* (L.), bred from two females taken on Guernsey in September 1983 showing much variation as the result of temperature experiments.

REVELL, R.J.—Single specimens of *Mythimna loreyi* (Dup.), from Charmouth, Dorset on 29.viii.84 and *Apamea furva* (D. & S.), from Clearbrook, near Yelverton, Devon in June 1964.

RUSSWURM, A.D.A. and MIDDLETON, H.G.M.—A small selection of aberrations taken at mercury vapour light in the New Forest during 1984. These included *Orthosia gracilis* (D. & S.), ab. *rufescens* (Cockerell), from Boldre on 28.iv and a melanistic *Ceramica pisi* (L.), also from Boldre on 7.vi.

SIMSON, Brig. E.C.L.—Short series of both *Scotopteryx mucronata* (Scop.), and the Scottish and English races of *Eupithecia intricata* (Zett.).

SKINNER, B.—A variable series of *Luperina nickerlii* (Freyer), collected from the coastal marshes of Essex and Kent in September 1984. Aberrant species taken during 1984 included extreme melanic examples of *Lymantria monacha* (L.), from Hertfordshire; a halved gynandromorph *Agrotis exclamationis* (L.), from Addington, Surrey on 1.vi; a melanic male *Agrotis puta* (Hbn.), from Addington on 14.vi; several extreme forms of *Agrotis clavis* (Hufn.), from Addington in June and July; and a variable series of *Agrotis cinerea* (D. & S.), from Dovedale, Derbyshire/ Staffordshire in early June.

SOKOLOFF, P.A.—A specimen of *Acherontia atropos* (L.), bred from a larva found feeding on potato growing in an allotment in Farnborough, Kent in viii.84 and a short series of *Luperina nickerlii* (Freyer), from Benfleet, Essex on 3.ix.84.

STERLING, Col. D.H.—Taken at mercury vapour light in Winchester, Hampshire in 1984 were single specimens of *Eurois occulta* (L.), on 1/2 August and *Hadena compta* (D. & S.), on 23/24 July, the latter being the first record for VC 11.

STERLING, M.J.—Local and aberrant species taken during 1984 included a melanic *Odontopera bidentata* (Clerck) bred from a larva found feeding on *Chamaecyparis lawsoniana* at Long Eaton, Derbyshire and *Perizoma taeniatum* (Steph.) from Dovedale, Staffordshire.

TREMEWAN, W.G.—Three examples of the orange form, f. *aurantia* (Tutt) of *Zygaena filipendulae* (L.), from Ranmore Common, Surrey in July 1984 and the first authentic six-spotted form of *Z. lonicerae* (Scheven) from near Basingstoke, Hants on 1.vii.84.

TWEEDIE, M.W.F.—An extreme dark grey aberration of *Timandra griseata* (Peters) from Playden, Sussex. A specimen of *Euplagia quadripunctaria* (Poda) from Playden on 7.viii.84. Other interesting captures at Playden in 1984 included specimens of *Craniophora ligustri* (D. & S.) and *Aporophyla australis* (Boisd.).

TYLER, D.B.—A variable series of bred *Mimas tiliae* (L.).

WARING, P.—A specimen of *Hyles gallii* (Rott.) taken at light in Bentley Wood, Wiltshire on 14.vii.83, probably being the first record for the county. A specimen of *Catocala nupta* (L.), taken at light, marked and released on 25.ix.83 at Kidlington, Oxfordshire and recaptured 6.5km away on 28.ix.83 at Wytham Wood, near Oxford.

WEST, B.K.—Aberrations from N.W. Kent were *Biston betularia* (L.), a form of ab. *carbonaria* Jord. from Dartford on 18.vii.79, resembling early forms of this aberration which occurred in the 19th century; an example of *Semiothisa liturata* (Cl.) in which the post discal brown band of the forewing is replaced by blackish brown, bred from Dartford in 1982; *Eupithecia centaureata* (D. & S.) ab. *centralisata* Stdgr. bred from Greenhithe in 1977; and *Lomaspilis marginata* (L.), ab. *diluta* Cockayne from Dartford on 20.vi.75.

WILD, E.H.—A specimen of *Mesoligia furuncula* (D. & S.) ab. *vinctuncula* (Hbn.) taken at mercury vapour light at Highcliffe, Dorset on 1.viii.84.

WILSON, D.E.—A series of *Lymantria monacha* (L.), from Hertfordshire in August 1984 showing a range of melanism. A female *Lasiocampa quercus* (L.), referable in some respects to ab. *rufescens-virgata* Tutt, taken at light at Much Hadham, Hertfordshire on 14.vii.83. A specimen of *Eurois occulta* (L.), from Much Hadham on 11.viii.84. Three pale aberrations of *Apamea anceps* (D. & S.) from Much Hadham in June 1983 and 1984. Examples of *Hylaea fasciaria* (L.), ab. *prasinaria* (D. & S.) and another form from Hamstreet, Kent in 1984 and other bred green and grey forms of the same species also from Hamstreet.

WINTER, P.Q.—A selection of interesting species from eastern Yorkshire taken in 1984 which included *Lacanobia suasa* (D. & S.) from Muston on 24 May, the first record from this site in 20 years continuous trapping; *Rhodometra sacraria* (L.), from Muston on 7 September; *Acherontia atropos* (L.), found on a beach chalet at Scarborough on 15 August and a specimen of *Earias clorana* (L.), from Howden, probably the first record for VC 61.

FOREIGN MACROLEPIDOPTERA

BALDOCK, D.W.—Examples of 35 species of butterflies caught 2nd to 4th September 1984 between 2,000 m and 2,500 m above St Anton, Austrian Tyrol; to illustrate size and condition of high level fauna at this late date for collecting in the Alps. Species shown: *Parnassius phoebus sacerdos* F., *Artogeia bryoniae* Hbn., *Pontia daplidice* Hbn., *Colias phicomene* Esp., *Hypodryas cynthia* D. & S. *Boloria napaea* Hffsg., *B. pales* D. & S., *Clossiana selene* D. & S., *C. titania* Hbn., *Mesoacidalia aglaia* L., *Erebia ligea* L., *E. euryale* Esp., *E. aethiops* Esp., *Erebia pluto* de Pr., (on scree at 2,500 m), *E. manto* D. & S., *E. epiphron* Knoch, *E. melampus* Fuessly, *E. gorge* Hbn., *E. tyndarus* Esp., *E. montana* de Pr., *E. meolans* de Pr., *Coenonympha gardetta* de Pr., *Heodes virgaureae* L., *H. tityrus subalpina* Spr., *Cupido minimus* Fuessly, *Maculinea arion* L., *Vacciniina optilete* Knoch, *Eumedonia eumedon* Esp., *Aricia allous* Geyer, *Albulina orbitulus* de Pr., *Agriades glandon* de Pr., *Cyaniris semiargus* Rott., *Lysandra coridon* L., *Hesperia comma* L. Also seen were *Aglais urticae* L., *Inachis io* L., *Vanessa atalanta* L.

BRETHERTON, R.F.—Examples of 26 species of butterflies caught 16th/25th July 1984, in a very late season, in S. Switzerland and N. Italy: c.100 species were seen in all. The more notable were *Colias palaeno* L., 2,000 m, Pontresina, Engadine; and *Neptis rivularis* Scop., and *Heteropterus morpheus* Pall., 600 m, near Lake Orta, Piedmont.

CRIBB, P.W.—(1) A case of butterflies caught in mid-July in the Swiss Engadine, N. Italy, and Valais, including *Neptis rivularis* Scop., *Hypodryas intermedia wolfensbergeri* Frr., *H. cynthia* D. & S., *Plebejus pylaon trappi* Verity. (2) A case of butterflies and moths reared during 1984, including *Zerynthia cerisyi ferdinandi* Stichel, (Falakron Mt., N. Greece), *Coenonympha leander katarae* Coutsis (Katara Pass, Pindos Mts., Greece), *Acherontia atropos* L., (F_2 generation from Canary Islands).

DERRY, A.C. and J.A.—37 species of butterflies collected on Crete, 8th to 21st June 1981. Of particular interest are: a *Colias erate* Esp., on the Nida Plateau, 9th June, probably first brood, may be the first record for the island; *Gegenes nostrodamus* F., the first confirmed record; a few colonies of *G. pumilio* Hffsg. were also found in S. Crete; *Charaxes jasius* L., not rare near Lakki; *Artogeia ergane* Geyer, three males in the Lasithi area, probably only the second record; also *Kretania psylorita* Frr., *Coenonympha thyrsis* Frr., and *Allancastria cerisyi cretica*, which are endemic in Crete.

DOBSON, A.H.—Sample of 26 moths from the east coast of Mallorca, Spain, taken at a Heath actinic light trap on limestone scrub and hotel balcony and lights at Cala Ratjada, 16th to 23rd August 1984.

EDWARDS, Dr P.J.—*Danaus plexippus* L., two specimens caught in S. Spain, April 1984; also two photographs of its habitat and a distribution map, to illustrate his note in the Proceedings (*Proc. Trans. Br. ent. nat. Hist. Soc.* **17**:84).

GOATER, B.—Heterocera taken in France or bred from French stock: (1) two species recorded only twice previously in France: *Apotomis inundana* D. & S. (Torticidae), Bois de Merles, Meuse, 24.vii.84; the larva feeds on aspen, which is common there; *Lycia florentina* Harrison *italica* Harrison (Geometridae), Col de Braus, Alpes maritimes, male at light, 12.iv.84. (2) Species of *Conistra* (Noctuidae) bred from eggs from hibernated females in April; *C. vaccinii* L., much larger than British specimens and very variable; all from one brood, la Garde Freinet, Var 1983; *C. rubiginosa* Scop., (*vau-punctatum* Esp.), typical form, with several ab. *immaculata* Stdgr., from one brood, Entraumes, Alpes maritimes 1984; *C. erythrocephala* D. & S., one brood, mainly typical, Ardèche; another brood, mainly ab. *glabra* Hbn., 1983; *C. ?veronicae* Hbn., a variable brood from la Garde Freinet, the genitalia appearing to agree with *veronicae; C. rubiginea* D. & S., Vence, Alpes maritimes, one brood very variable, another with little variation; *C. staudingeri* de Graslin, two broods, both very variable, Pyrenées orientales, 1982, Var 1983; *C. torrida* Lederer, Alpes maritimes, 1984, five invariant females at light on 1 m snow at 1,800 m. Said to be rare in France. (3) Interesting species complexes: *Standfussiana lucernea cataleuca* Bdv., and *S. nictymera* (Bdv.); *Chersotis larixia* Guenée, *Ch. elegans* Eversman, and *Ch. grammiptera* (Rambur); *Chersotis ocellina* D. & S., *Ch. alpestris* Bdv., and *Ch. oreina* Dufay, 1984; *Hoplodrina blanda* D. & S., *H. respersa* D. & S., *H. hesperica* Dufay & Boursin, and *H. superstes* Ochs.; *Abrostola triplasia* L., and *A. trigemina* Werneb., British, compared with *A. agnorista* Dufay, and *A asclepiadis* D. & S. from France. (4) Local or uncommon species in France: *Arctia flava* Fuessly, Col du Galibier, Savoie July 1984, ten seen; *Proserpinus proserpina* Pall., Bois de Merles, Meuse 1984, seven seen; *Pachypasa lineosa* Serres, bred from *Juniperus oxycedrus,* Ardèche 1983, and males at light, Alpes maritimes 1984; *Euxoa culminicola* Stdgr, Alps, common at high altitudes; *Ochropleura candelisequa* (D. & S.), Valdeblore, Alpes maritimes, not uncommon 1983, 1984; *Standfussiana wiskotti* (Standfuss), Alps, high altitudes; *Perigrapha i-cinctum* D. & S., S.E. France, April; *Dasypolia ferdinandi* Rühl, southern Alps, hibernated females at m.v. lights on snow above 1,800 m; *Apamea rubrirena* Treits. Jura and Alps; *Autographa aemula* D. & S., Alps and Pyrenees, three in two localities 1984; in appearance resembles British *A. bractea* D. & S.; *Clytie illunaris* Hbn., le Canet, Pyrenées orientales, bred from small larvae beaten from *Tamarisk* in August 1984.

HALL, N.M.—*Arctia caja* L., with yellow hindwings; *Proserpinus proserpina* Pall.; *Aplasta ononaria* Fuessly, from Ile D'Oloron, S.W. France.

JAMES, R.J.—*Pontia daplidice* L., two aberrations in which the ochreous-green, black tesselations in the underside are partially or completely replaced by ochre. Both appeared during breeding, stock from S. France.

PHELPS, H.G.—Selection of butterflies taken in north and central Spain in July 1984, including a fine male albino *Maniola jurtina* L.

REVELL, R.J.—From Argeles-Gazoste, Hautes Pyrenées, France, 1st to 7th April 1984, netted or captured in a Heath trap: *Clossiana dia* L., *Erebia triaria* de Pr., *Anticlea badiata* D. & S., *Menophra abruptaria* Thunb., *Lycia hirtaria* Clerck, *Orthosia munda* D. & S., *Orthosia cruda* D. & S., *O. stabilis* D. & S., *O. incerta* Hufn., *O. gothica* L., *Valeria jaspidea* de Vill., *Conistra erythrocephala* D. & S., *C. rubiginea* D. & S., *C. vaccinii* L., *Xylocampa areola* Esp.

TREBILCOCK, G.D.—From the Pyrenees, 7th July to 1st September 1984: interesting *Mellicta athalia* Rott., *Lysandra coridon* L., ab. *fowleri* South, *L. bellargus* Rott., ab. *krodeli* Gillmer, *Aglais urticae* L., ab. ?.

TREMEWAN, W.G.—From Morocco, bred series of *Zygaena trifolii mideltica* Reiss & Reiss, and *Z. trifolii tizeragis* Wiegel, and a series of hybrids obtained by crossing these two subspecies. The hybrids show variable intermediate characters.

WINTER, P.Q.—A tropical butterfly imported to Britain: *Opsiphanes* sp. ?, male found among bananas in warehouse at Bridlington, 5.v.84. Cargo arrived 3rd May, supposedly from Windward Islands, and had been ripened at 57°/70°F. and fumigated with ethylene gas. Trinidad and Tobago is considered to be a more likely source.

MICROLEPIDOPTERA

AGASSIZ, Rev. D.J.L.—(1) The often confused species *Neofriseria peliella* (Treits.), from Kent; and *N. singula* (Staud.), from Middx., and S. Essex. (2) *Parapoynx obscuralis* (Grote), from nurseries at Enfield, Middlx. (3) From S. Essex: *Cataplectica profugella* (Stt.), *Bryotropha basaltinella* (Zell.), *Syncopacma cinctella* (Clerck), *Telephila schmidtiellus* (Heyd.), *Brachmia inornatella* (Doug.), *Sorhagenia rhamniella* (Zell.), (genitala not yet checked) and a *Monochroa* sp.

AUSTIN, R. and PEET, T.N.D.—From Guernsey: *Dioryctria abietella* (D. & S.), at mercury vapour light, 28.vii.84, new to island list; *Bankesia conspurcatella* (Zell.), Forest, by day, new to island list.

BAKER, B.R.—(1) *Cydia illutana* (H.-S.), a specimen from Berkshire, tentatively identified by Dr J. D. Bradley. If confirmed this will constitute a species new to Britain. *C. illutana* is widely distributed in Europe, occurring in Denmark, Germany, Finland to USSR and in central Europe. The larva is recorded on *Picea abies* and *Abies*. (2) *Pediasia contaminella* (Hbn.), a specimen from Berkshire being a new vice county record. [The identity of *C. illutana* was subsequently confirmed—Ed.]

BLAND, Dr K.P.—(1) *Anacampsis temerella* (Lien. & Zell.), reared from pupae in spun shoots of *Salix repens* from near Cornaigbeg, Isle of Coll (VC 103), collected 25.vii.84, emerged 27–31.vii.84, apparently new to Scotland. (2) *Biselachista trapeziella* (Stt.) (i) Arniston Mains, Midlothian (VC 83), reared ex *Luzula sylvatica*, collected 9.iv.84, emerged 22.v.84; (ii) Maggie Bowie's Glen, Midlothian (VC 83), reared ex *Luzula pilosa*, collected 31.v.84, emerged post-10.vi.84, apparently new to Scotland. (3) *Lampronia capitella* (Clerck), Ballater, Aberdeenshire (VC 92), taken by M. R. Young, 24.vi.84; Ballater is the only recorded Scottish locality for this blackcurrant 'pest', last recorded there in 1955. (4) *Coleophora genistae* Stt., Muir of Dinnet, Aberdeenshire (VC 92), taken by K. P. Bland and R. Knill-Jones, 24.vi.84; Dinnet is only the third Scottish locality. (5) *C. orbitella* Zell., two specimens reared from birch: Creinch Island, Loch Lomond (VC 99) and Camghouran, Rannoch (VC 88) (Note: Emmet, *Field Guide* description of case is erroneous; *two* pieces of leaf used in making case).

BRADFORD, E.S.—(1) some species taken at actininc blue fluorescent lamps at Pean Hill, Whitstable E. Kent: *Agriphila latistria* 27.viii.84, *Platytes alpinella* (Hbn.), 13.viii.84 (and one from East Blean, 29.vii.84); *Lozotaeniodes formosanus* (Geyer), 16.vii.84, *Adoxophyes orana* (F.vR.), 8.ix.84; *Coleophora clypeiferella* Hofmann, 28.vii.84, *Eutromula pariana* (Clerck), 30.vii.84, *Ypsolopha horridella* (Treits.), 20.viii.84. (2) other species from E. Kent: several *Nemapogon ruricolella* (Stt.), bred out of dead oak wood collected, E. Blean, 29.vii.84; *Triaxomera fulvimitrella* (Sodoffsky), *T. caprimulgella* (Stt.), swept by day, E. Blean, 19.vii.81; *Nemapogon wolffiella* Karsh. & Niel., (*albipunctella* auct.) at actinic lamp, E. Blean, 8.vii.84;

several *Infurcitinea argentimaculella* (Stt.), bred from the lichen *Lepraria incana* growing on an old wall in a car park near Dane John, Canterbury, vii.84; *Bedellia somnulentella* (Zell.), bred from larvae mining leaves of *Calystegia soldanella*, Chestfield, 4.xi.83 and from *C. sepium*, Whitstable 31.x; *Caloptilia azaleella* (Brants), larvae found mining azalea in Canterbury; *Syncopacma larseniella* (Gozm.), several swept from *Lotus* in Church Wood, Blean, during the BENHS field meeting on 4.viii.84; *Coleophora solitariella* Zell., bred from larvae on *Stellaria holostea*, Pean Hill, Whitstable, 11–21.vii.84; *Reuttia subocellea* (Steph.), bred from larvae on *Origanum vulgare*, Detling, 10–16.vii.84; one *Esperia oliviella* (F.), netted by day in Church Wood, Blean, during the BENHS field meeting on 4.viii.84; two *Scoparia truncicolella* (Stt.), taken at actinic fluorescent lamp, East Blean, 26.viii.84.

British Museum (nat. Hist) Microlepidoptera Section—(1) An aberration of *Scythropia* of unusual colour, probably representing a partial second generation. (2) *Cnephasia tyrrhaenica* (Amsel): a species which could occur in Britain. Until now this species has been considered rare and to have only a southern European distribution. However, recent work on pheromones by W. Nässig (Zoological Institute, University of Frankfurt) has revealed its presence in the Rhine valley (unpubl.). Superficially it looks very like *Neosphaleroptera nubilana* (Hbn.), but can be distinguished by its narrower hindwings with slightly shorter fringes. The labial palpi of *nubilana* are about 1.25× the horizontal diameter of the eye, whereas those of *tyrrhaenica* are about 2× the horizontal diameter of the eye. Razowski (*Acta zool.cracov.*, **4**:378–9, 408–9; 382–3, 410–11, 1959) illustrates the genitalia of both species.

Britton, M.—*Phyllonorycter* spp. from Norfolk, London and Yorks.

Brotheridge, D.J.—A number of unusual species from N. Wiltshire including *Morophaga boleti* (F.), *Sitochroa palealis* (D. & S.), *Palpita unionalis* (Hbn.), *Ancylis myrtillana* (Treits.), and *Pyralis lienigialis* (Zell.), (two specimens, the first of which had remained misidentified as *P. farinalis* (L.), for seven years).

Chalmers-Hunt, J.M.—*Monochroa niphognatha* (Gozmany), (Gelechiidae), a species new to Britain. One of two males taken by the exhibitor at light at Stodmarsh, E. Kent, 26.vi.84. Determined by Dr. K. Sattler (British Museum, Natural History).

Cronin, A.—An unidentified micro bred from a larva found on *Cotoneaster* at Portslade.

Derbyshire Entomological Society.—(1) *Archips argyrospila* (Walker), Matlock, Derbyshire, 29.iv.84. Species new to Britain. Full account to appear in *Entomologist's Record*. (2) *Parapoynx diminutalis* (Snell.), Holloway, Derbyshire, 12.iv.74.

Emmet, Lt Col. A.M.—(1) Species which have come to mercury vapour light in the period 1982–1984 at Labrey Cottage, Saffron Walden, which is not close to their characteristic habitats.

(a) Coniferous woodland: *Cedestis gysseleniella* (Zell.), *Exoteleia dodecella* (L.), *Batrachedra pinicolella* (Zell.), *Ptycholomoides aeriferanus* (H.-S.), *Lozotaeniodes formosanus* (Geyer), *Olethreutes bifasciana* (Haw.), *Epinotia nanana* (Treits.), *Zeiraphera diniana* (Guen.), *Z. ratzeburgiana* (Ratz.), *Clavigesta purdeyi* (Durr.), *Dioryctria mutatella* Fuchs.

(b) Fenland: *Orthotaelia sparganella* (Thunb.), *Elachista cerusella* (Hbn.), *Agonopterix angelicella* (Hbn.), *Acentria nivea* (Clerck), *Eurrhypara perlucidalis* (Hbn.), *Nascia cilialis* (Hbn.).

(2) A larval case and leaf of *Potentilla sterilis* showing feeding of a coleophorid

species. This could either be *Coleophora albicostella* (Duponchel), new to Britain, or *C. gryphipennella* (Hbn.), on a hitherto unrecorded foodplant.

(3) Other species: *Epermenia insecurella* (Stt.), Therfield Common, Herts., two 23.vii.84; *Coleophora hydrolapathella* E. M. Hering, Catfield, Norfolk, eight reared 9–14.vii.84 from cases found on old stems of *Rumex hydrolapathum* (case shown); *Batia lambdella* (Donovan), Southsea, Hants., one reared from *Ulex*, 15.vi.84; *Oecophora bractella* (L.), Harewood Forest, Hants., two reared 26.v.84 from larvae under dead bark of *Quercus; Depressaria pulcherrimella* Stt., Saffron Walden, two 7 & 13.viii.84 (new to Essex); *Agonopterix kuznetsovi* Lvovsky, Kynance Cove, Cornwall, eight 18.ix.84; *Metzneria aprilella* (H.-S.), Saffron Walden, one 16.vii.84 (new to Essex); *Euzophera bigella* (Zell.), Saffron Walden, one 2.xii.83 (second British record); *Ephestia parasitella unicolorella* Staud., Saffron Walden, eight 12.vii.83 and 7–18.vii.84.

(4) Distribution maps for 20 species of microlepidoptera recorded for the first time in Essex since the publication of *The smaller moths of Essex* in 1981, together with notes.

(5) Leaves of oak from Barton Mills, Suffolk showing the "green islands" surrounding the mines in leaves which had fallen and otherwise withered. One fresh leaf containing mines as follows: 30 *Ectoedemia quinqella* (Bed.), 7 *E. subbimaculella* (Haw.), 2 *E. albifasciella* (Hein.), 1 *Phyllonorycter* sp.

FAIRCLOUGH, A.J. and R.—Short series of species caught or bred in 1984: *Bankesia conspurcatella* (Zell.), March, Sittingbourne, Kent; *Nitidinea piercella* (Bentinck), Fingringhoe, Essex, bred June, and Wicken Fen, Cambs., caught 25.vi; *Lampronia rubiella* (Bjerk.), Winchester, Hants., 4.vi; *L. capitella* (Clerck), Leigh, Surrey, 2.vi; *Phyllonorycter emberizaepenella* (Bouché), Reigate, Surrey, bred, Feb. from *Symphoricarpos; Coleophora salicorniae* (Wocke), Peldon, Essex, bred July–August; two *Agonopterix astrantiae* (Hein.), West Meon, Hants., bred June–July; *Falseuncaria ruficiliana* (Haw.), Winchester, second brood bred July–August; *Pammene albuginana* (Guen.), Whitmorr, Surrey, bred Feb–March; *Eurrhypara perlucidalist* (Hbn.), Wicken Fen, June–July. *Diasemiopsis ramburialis* (Dup.), Matching, Essex, one in M.V. trap, 13–14.vii. *Acleris cristana* (D. & S.), new form related to *webbiana* (Sheldon).

FENN, J.L.—*Euzophera bigella* (Zell.), bred from pupa found in a peach kernel, Hochwold, Norfolk, 15.viii.83.

HALL, N.—(1) *Commophila aeneana* (Hbn.), Knowle Hill, Berkshire, new county record. (2) Variation among: *Phyllonorycter ulmifoliella* (Hbn.), *P. cavella* (Zell.), *P. strigulatella* (Zell.) (only recent Berks. record), *P. lantanella* (Schrank) (only recent Berks. record).

HARPER, Dr. M.—*Periclepsis cinctana* (D. & S.). A short series from Tiree, Inner Hebrides, taken by Dr. Mark Young and Dr. M. Harper, 30.vi. to 1.vii.84. The species is new to Scotland, and its occurrence there demonstrates an extraordinary distribution in the British Isles, as the only other records of it are for chalk grassland sites in Kent. These Tiree specimens appear to differ from those from S.E. England in being slightly larger and more irrorated with grey especially on the hindwings.

HEAL, N.F.—*Bankesia conspurcatella* (Zell.), some of dozens flying in light rain at 9 a.m., Sittingbourne, Kent, 6–19.iii.84; *Lampronia fuscatella* (Tengst.), Dartford Heath, Kent, 4.vi.84 and bred 23.iii.84 from galls collected Elstead Common, Surrey 14.ii.84; *L. capitella* (Clerck), Reigate, Surrey, 2–9.vi.84; *Phyllonorycter roboris* (Zell.), bred 4–16.iii.84 from mines collected Friday St., Surrey, 12.xi.83;

Coleophora deviella Zell., (*suaedivora* Meyr.), bred 1–31.vii.84 from larvae on *Suaeda maritima*, Peldon, Essex, 28.ix.83 and Shellness, Kent, 1.x.83; *C. aestuarinella* Bradley, bred 20.vii.–20.viii.83 from larvae on *Suaeda maritima*, Harty, Kent, 6.x.82 and Peldon, Essex 14.x.82 (new to science); *Brachmia inornatella* Douglas, at mercury vapour light, Stodmarsh, Kent, 21.vii.84; *Monochroa niphognatha* (Gozm.), Stodmarsh, Kent, at mercury vapour light, 8.vii.84; *Syncopacma vinella* (Bankes), bred 20.vi.84 from larvae on *Genista tinctoria*, Ditchling, Sussex, 19.v.84 and caught there 18.vi.84; *Cosmopterix lienigella* (Lien. & Zell.), at mercury vapour light, Stodmarsh, Kent, 8.vii.84; *Agonopterix carduella* (Hbn.), bred 18.vii.–2.viii.84 from larvae Stockbury, Kent, on *Centaurea nigra*, 16.vi.84; *Ancylis upupana* (Treits.), Ashdown Forest, Sussex, 9.vi.84; *Eurrhypara perlucidalis* (Hbn.), Murston, Kent, 14.vii.84 and Stodmarsh, Kent, at mercury vapour light 8–12.vii.84.

HECKFORD, R.J.—*Heringocrania chrysolepidella* (Zell.), Parke, nr. Bovey Tracey, Devon, 28.iv.84, new to Devon; *Etainia decentella* (H.-S.), Plympton, Plymouth, 20.vi.84 and 25.viii.84, at mercury vapour light, new to Devon; *Coleophora genistae* Stt., Mount Hermon, nr. Lizard, Cornwall, ex larva *Genista anglica*, 1–10.vii.84; *Elachista biatomella* (Stt.), 26.vii.84, Braunton Burrows, Devon, new to VC 4; *Batia lambdella* (Donovan), Beatland Cross, nr. Shaugh Prior, Devon, ex larva *Ulex*, 6–9.vi.84; *Telechrysis tripuncta* (Haw.), Chudleigh Knighton Heath, Devon, 9.vi.84; *Agonopterix kuznetzovi* Lvovsky, Mullion Cove, Cornwall, ex larva *Serratula tinctoria*, 8.vii.84, third British locality; *A ulicetella* (Stt.), nr. Lizard, Cornwall, ex larvae *Genista pilosa*, 15–24.vii.84, new foodplant; *Monochroa elongella* (Hein.), Braunton Burrows, Devon, 16–17.vii.84; *Syncopacma suecicella* (Wolff), nr Lizard, Cornwall, ex larva *Genista pilosa*, 25.vi–13.vii.84, new to Britain; *Mompha conturbatella* (Hbn.), Bullers Hill, Haldon, Devon, ex larva 2–23.vi.84, *Epilobium angustifolium*, new to Devon; *Adoxophyes* sp. ?*privatana* (Walker), Plymouth, ex larva 28.iv.84, imported cut orchids; possibly not previously recorded in Britain. *Eudonia lineola* (Curtis), Croyde Bay, Devon, 23.vii.84; *Buckleria paludum* (Zell.), Bicton Common, Devon, 28.vii.84, first confirmed Devon record; *Leioptilus carphodactyla* (Hbn.), St. Mary's Bay, Brixham, Devon, ex larva, 23–27.viii.84, new to Devon.

KNILL-JONES Dr. R.P.—Interesting Scottish microlepidoptera, 1984. *Lita solutella* (Zell.), Morrone Wood NNR, Aberdeenshire; *Eucosma obumbratana* (Lien. & Zell.), Glasgow Zoo (VC 77) and Kirkdale, Galloway (VC 73), confirmation of an old Scottish record; *Eurrhypara coronata* (Hufn.), Lochfaula Farm, Glasgow (VC 77), new to Scotland; *Nepticula dryadella* (Hofmann), from *Dryas octopetala*, Ben Lawers NNR (VC 88) at 2,000 ft., mines also found on *Dryas* at similar altitude on Ben Lui (VC 98).

LANGMAID, Dr. J.R.—*Coleophora deviella* Zell., Southsea, two viii.84, new to Hampshire; *Pyrausta aurata* (Scop.), ab. without reddish coloration of forewings, but with strong dusting of yellow scales, Southsea, 18.vi.84; *Assara terebrella* (Zinck.), one bred from spruce cones, Rhinefields, New Forest, 1984; *Ancylosis oblitella* (Zell.), Southsea, 9.viii.84; two *Stenoptilia saxifragae* Fletcher, Threshfield, 1984, new to Yorkshire?

PELHAM-CLINTON, E.C.—*Caloptilia robustella* Jäckh, Ballater, Aberdeenshire, 24.vi.84, furthest north record in Britain; *Epermenia insecurella* (Stt.), Therfield, Herts., two taken on the wing, 23.vii.84; *Chrysoesthia sexguttella* (Thunb.), Axmouth, Devon and Gweek, Cornwall, forms with unusually extended markings, bred v.84; two *Scrobipalpula tussilaginis* (Frey), Axmouth, Devon, new to Britain, bred v.84 from four larvae found mining leaves (one shown) of *Tussilago farfara*, x.83, following collection of an uncertainly determined moth; *Pammene fasciana* (L.), Ballater, Aberdeenshire, 24.vi.84, furthest north record in Britain; taken with *Caloptilia robustella* in old oak woodland.

PENNEY, C.C.—Interesting pyrales taken in the first two years of collecting this group.

PLANT, C.W.—*Agdistis bennetii* (Curtis), Wallasea Island, Essex; *Leioptilus carphodactyla* (Hbn.), Grays Chalk Quarry, Essex, bred from larva; *Capperia britanniodactyla* (Gregson), Dungeness, Kent, bred from larvae on Wood Sage.

ROBINSON, R.S. & G.S.—*Nemapogon ruricolella* (Stt.), new to Essex, plus a host record. 11 were bred 28.vi–11.vii.84 from a piece of wild cherry stick infested by *Chondostereum purpureum* (Silver-leaf fungus) collected by RSR at Warwick Wood, Rainham, Essex, iv.84. The *N. ruricolella* are smaller (9.5–10.3 mm wingspan) than *N. cloacella* (11.0–16.0 mm) from other sticks collected at the same time. The fascia distal to the end of the cell is uniformly bronze in *ruricolella* but streaked with grey in *cloacella*. Identification has been confirmed by examination of the genitalia of a female from the series.

SIDDONS, P.N.—*Spatalistis bifasciana* (Hbn.), Bodmin, 10.vii.84; *Mompha lacteella* (Steph.), Chyverton near Perranporth, 1.vi.84; *M. propinquella* (Stainton), Trencreek near Newquay, 26.vii.84. *Coleophora artemisicolella* Braund, Trencreek near Newquay, bred 20.vii.84. *Teleiopsis diffinis* (Haw.), Perranporth, 26.vii.84; *Caryocolum marmoreum*, (Haw.), Padstow, 8.vii.84; *Elachista megerlella* (Hbn.), Chyverton near Perranporth, 24.v.84. *E. gangabella* Zell., Chyverton near Perranporth, 9.vi.84; *E. luticomella* Zell., Chyverton near Perranporth, 2. vii.84; *Biselachista serricornis* (Stt.), Gossmoor, Cornwall, 11.vi.84. *Pammene albuginana* (Guen.), Chyverton near Perranporth, 30.vi.84.

SIMPSON, Dr. A.N.B.—*Coleophora ochrea* (Haw.), Horton, Gower, S. Wales, bred from cases on *Helianthemum*, v.84; *Lobesia occidentis* (Falk.), Wyre Forest, Worcs., bred from shoots of *Euphorbia amygdaloides*, vii.84; *Glyphipterix haworthana* (Steph.), Sutton Park, Warwks., bred seed heads of *Eriophorum*, iv.84; *Caryocolum vicinella* (Douglas), Llangranog, Cardigan, bred *Silene maritima* v.84; *Depressaria ultimella* (Stt.), Mwnt, Cardigan, on *Apium nodiflorum*, bred viii.84; *Coleophora orbitella* Zell., Monk Wood, Worcs., cases on birch x.83, bred; *Psyche betulina* (Zell.), Monk Wood, Worcs., cases on *Crataegus* and *Lonicera*, iv–v.84, bred; *Phyllonorycter junoniella* (Zell.), Sutton Park, Warks., on *Vaccinium vitis-idaea*, iv.84, bred; *Cosmiotes stabilella* (Stainton), Windmill Hill, nr Evesham, Worcs., larvae mining *Brachypodium sylvaticum*, ii.84, bred; *Ephestia parasitella unicolorella* Staud., Colletts Green, Worcs., at light, 20.vi.84.

SOKOLOFF, P.A.—A selection of microlepidoptera taken or bred in 1984 including *Spatalistis bifasciana* (Hb.), taken at mercury vapour light, Ham Street, Kent; *Alucita hexadactyla* (L.), bred from an ornamental Dutch honeysuckle, Orpington, Kent; *Apomyelois bistriatella neophanes* Durrant, bred from *Daldinia concentrica* growing on dead and dying birch, Keston, Kent.

STERLING, Col. D.H.—*Amphisbatis incongruella* (Stainton), New Forest, flying in sunshine, iv.84; *Sitochroa palealis* (D. & S.), and *Evergestis extimalis* (Scop.), garden mercury vapour light trap, Winchester.

STERLING, M.J.—*Commophila aeneana* (Hb.), Nottinghamshire, new to VC 56; *Eucosma maritima* (H. & W.), Gibraltar Point, Skegness, Lincs.; *Gymnancyla* *canella* (D. & S.), Gibraltar Point, Skegness, Lincs., a normal and a melanic example; *Caryocolum blandella* (Douglas), Iron Tors, Derbyshire, bred from seed-head of *Stellaria;* new to VC 57; *Eudonia vandaliella* (H.-S.) (*resinella* auct.), Tintern, Mon., one taken at mercury vapour light; *Ypsolopha vitella* (L.), Willington, Derbyshire, normal and melanic bred from *Ulmus*.

STERLING, P.H.—(1) An old tramp's blanket found in a disused shed near Chipping Norton, Oxfordshire, and the following species which were bred from it. *Monopis rusticella* (Hbn.), *Niditinea fuscipunctella* (Haw.), *N. piercella* (Bent.), *Tinea pellionella* (L.), and *T. pallescentella* Stt.

(2) *Infurcitinea argentimaculella* (Stt.), Emer Bog (VC 11), bred from silken tubes in the lichen *Leparia* on old trees; *Digitivalva perlepidella* (Stt.), Grays, Essex, bred from larvae in *Inula conyza* leaf; *Coleophora linosyridella* Fuchs, Mucking Marsh, Essex, bred from cases on *Aster tripolium; Pammene albuginana* (Guen.), Ham Street, Kent, at mercury vapour light; *Cydia pactolana* (Zell.), Botley Woods, Hants. (VC 11), a very fresh specimen taken by day. *Melissoblaptes zelleri* (Joann.), Dungeness, at mercury vapour light.

UFFEN, R.W.J.—An unidentified species of *Monochroa* (Gelechiidae), probably new to science, found mining leaves of *Scrirpus maritimus* at Mucking reedbed, Essex. The mines are not represented in the Hering herbarium.

WARREN, R.G.—Staffordshire microlepidoptera. From moorlands: *Schiffermuelleria subaquilea* (Stt.), *Lita virgella* (Thunb.), *Philedone gerningana* (D. & S.), *Philedonides lunana* (Thunb.), *Exapate congelatella* (Clerck), *Acleris caledoniana* (Steph.), *Olethreutes mygindiana* (D. & S.), (bred from *Vaccinium vitis-idea*).

From the limestone of Dovedale and the Manifold Valley: *Euhyponomeuta stannella* (Thunb.), (apparently restricted, in its only known locality in Britain, to a single hillside), *Cataplectica profugella* (Stt.), *Ethmia funerella* (F.), (occurs in woods where there is no *Symphytum* and larvae have been found on *Myosotis sylvatica*), *Aethes hartmanniana* (Clerck), *Aphelia unitana* (Hbn.), *Epiblema turbidana* (Treits.), *Capperia britanniodactyla* (Gregs.).

From Cranberry Bog, Balterley Heath: *Olethreutes schulziana* (F.), *Buckleria paludum* (Zell.), first Staffs. record since 1964 and probably the site referred to as a 'a small bog near Crewe' by Tutt c.1850.

WILD, E.H.—*Crambus pascuella* (L.), melanic specimen taken on the field meeting at Emery Down, New Forest, 29.vi.84. (Note: the example is referable to ab. *obscura* Kuchlein—J.M.C.-H.). *Eudonia pallida* (Curt.), Highcliffe, Hants.

WINTER, P.Q.—*Myelois cribrella* (Hbn.), Burdale, S.W. Yorks, found at rest on a thistle at dusk, 28.vi.84. A species becoming increasingly frequent in VC 61.

DICTYOPTERA

BRADFORD, E.—A specimen of the dusky cockroach, *Ectobius lapponicus* (L.), collected by sweeping at Church Wood, Blean, Kent, 4.viii.84.

ORTHOPTERA

KIRBY, P.—The rare macropterous form of the bush cricket, *Conocephalus dorsalis* (Latr.), taken at the RSPB reserve, Elmley, Kent. Also shown were the normal brachypterous form and the macropterous *C. discolor* (Thunb.), with notes on their separation.

HEMIPTERA

APPLETON, D.—Some rare or local Heteroptera taken in the New Forest, Hants. in 1984. Two specimens of *Eysarcoris aeneus* (Scop.), swept from rushes, 25.viii; *Physatocheila costata* (F.), beaten from a lichen-covered apple tree 27.viii; *Acalypta brunnea* (Germ.), found on a mossy stump, 15.ix; *Cryptostemma alienum* (H.-S.), from the shingle beside a stream, 13.ix.

HEAL, N.F.—Some Hemiptera from Kent, unless otherwise stated. *Chorosoma schillingi* (Sch.), Bishopstone, 11.viii.84; *Miris striatus* (L.), Thornden Wood, Whitstable, 19.vi.83; *Dicranocephalus medius* (M. & R.), Folkestone Warren, 17.vi.83; *Berytinus hirticornis* (Brullé), Murston, 10.iii.83. *Picromerus bidens* (L.), at m.v. light, Hankley Common, Surrey, 29.viii.84; *Cyphostethus tristriatus* (F.), Hackhurst, Surrey, 26.v.83; *Rhacognathus punctatus* L., Hothfield Bog, 5.v.84; *Macrodema micropterum* (Curtis), Elstead Common, Surrey, 14.ii.84. The exhibit also included the two British species of the Membracidae, *Centrotus cornutus* (L.), Hoads Wood, Bethersden, 11.vi.84, and *Gargara genistae* (F.), Canterbury Golf Course, 1.viii.84.

HODGE, P.G.—Some Heteroptera taken in 1984. *Odontoscelis dorsalis* (F.), from Lydd Camp, Kent; *Aeschyntelus maculatus* (Fieb.), at Wool, Dorset; the tingid *Dictyonota fuliginosa* (Costa), on old broom brushes at Dungeness, Kent; *Atractotomus mirificus* taken at m.v. light in the exhibitor's garden at Ringmer, Lewes, Sussex. This last species is associated with Scots pine and is probably new to Sussex.

KIRBY P.—Some local or rare Heteroptera taken in 1984, including *Phytocoris insignis* (Reuter), from Sussex; a wholly melanic specimen of *Piezodorus lituratus* (F.), taken by P. Harvey at Claygate, Surrey; *Deraeocoris scutellaris* (F.), swept from heather on Thursley Common, Surrey, 22.vii; the very local lacebug *Tingis reticulata* (H.-S.), taken 1.ix at Arundel Park, Sussex; *Nysius helveticus* (H.-S.), found on Chobham Common, Surrey, 11.viii; *Anthocoris minki* Dohrn found in *Pemphigus* aphid galls on Lombardy poplars along the towpath at Kew, Surrey, 28.ix; *Taphropeltus hamulatus* (Thomson), White Downs, Surrey; *Drymus latus* Doug. & Scott, from two East London sites, Dogkennel Hill, Redbridge, and Bully Fen, Newham; *Micranthia marginalis* (Fallén), Thursley Common, Surrey, 22.viii; *Microvelia umbricola* (Wrob.). The last species is a local insect which was taken by J. Bratton on 11.viii.84 at Wicken Fen, Cambs.

PORTER, D.A.—Some local Heteroptera taken in southern England 1982–84. *Eysarcoris aeneus* (Scop.), Brockenhurst, Hants., 27.vii.84; *E. fabricii* (Kirk.), Bridport, Dorset, 15.viii.82 (new county record); *Saldula arenicola* (Scholtz), Eype, Dorset, 3.viii.83; *Deraeocoris olivaceus* (F.), Hailsham, Sussex, 10.vii.82, 8.vii.83 (new county record and possibly a distinct immigrant colony as this is well outside its usual range); *Oncochila simplex* (H.-S.) and *Eremocoris podagricus* (F.), Arundel, Sussex, 9.ix.84 (both new county records); *Miridius quadrivirgatus* (Costa), Effingham, Surrey, 22.viii.82 (new county record for this normally coastal species); *Cyphostethus tristriatus* (F.), Friston Forest, Sussex, 18.vi.83. This last species normally feeds on juniper but at Friston Forest it seems to be feeding on Lawson Cypress.

Exhibitor 62—A specimen of the leafhopper *Ledra aurita* (L.), taken in Wytham Woods, Oxon, 29.ix.84.

HYMENOPTERA

ARCHER, M.E.—Both sexes of two local solitary wasps, *Crossocerus leucostoma* (L.), and *Philanthus triangulum* (F.), with maps of their British distribution. The former is a northern species and its capture at Strenshall Common, Yorks., is the first for the county and the most southern record. *P. triangulum* was taken at Nacton Heath, Suffolk. This local species occurs on the Isle of Wight but has not been recorded on mainland Britain this century. The female was taken near a burrow and was carrying its honey-bee prey, which indicates a breeding record. The exhibitor would be pleased to hear of any further records of these species.

HALSTEAD, A.J.—Some uncommon or local sawflies taken in 1984 in Surrey, except where otherwise stated. *Pamphilius balteatus* (Fallén), 19.v, Sheepleas, and *P. hortorum* (Klug), 6.vi, R.H.S. Garden, Wisley, Both of these species are widely distributed but the adults are often elusive. *Arge ciliaris* (L.), male on hawthorn flowers, Therfield Heath, Royston, Herts., 30.v, and female on the larval host plant *Filipendula ulmaria*, Basingstoke Canal, Woking, 2.vi. The very local *Arge rustica* (L.), found on vegetation beneath oak trees near the River Wey, R.H.S. Garden, Wisley, 12.vi, both sexes of *Athalia rosae* (L.), taken 11.viii and 18.viii on flowers of wild angelica at Mayford, Woking. This was a notorious pest of turnips in the 18th and 19th centuries but has been uncommon in recent years. It is a migratory species which is favoured by warm dry summers and was present in some numbers at the above site. Other local or infrequently seen species included *Allantus calceatus* (Klug), Basingstoke Canal, Woking, 19.v; *Claremontia alternipes* (Klug), R.H.S. Garden, Wisley, 21.v; *Halidamia affinis* (Fallén), Mayford, Woking, 16.vi; *Tenthredo olivacea* Klug, Whitedown Woods, 11.vi; *Hoplocampa ariae* (Benson), on *Sorbus aria* flowers, Sheepleas, 3.vi; *Pristiphora subbifida* (C. G. Thomson), Sheepleas, 19.v.

MILES, S.R.—Some local solitary bees taken 1983–84. Female *Osmia pilicornis* Smith taken at bush vetch flowers, Savernake Forest, Wilts., 19.vi.83; female *Andrena florea* (F.), at flowers of white bryony, Ash Common, Surrey, 3.vii.83; male *Nomada pleurosticta* (H.-S.), which is associated with *Andrena humilis* (Imhoff), at Aldershot, Hants., 30.v.84.

NEUROPTERA

BADMIN, J.—A live specimen of the rare lacewing *Drepanepteryx phalaenoides* (L.), beaten from holly at Selling, near Faversham, Kent, in September, 1984. It had been fed with aphids since its capture. At least seven records of this lacewing have been made in S.E. England since 1976 and it may be on the increase.

KIRBY, P.—Specimens of the local lacewing *Psectra diptera* (Burmeister), taken at Aveley Clay Pit, Essex, 30.viii.84, and at Arundel Park, Sussex, 1.ix.84. These are both first records for these counties.

ILLUSTRATIONS

TWEEDIE, M.W.F.—Colour photographs of seven British Pyralidae. 398 monochrome photographs of British Lepidoptera. Among the monochrome photographs was a fascinating series entitled 'The Faces of Moths', a visual aspect one does not always observe when studying these creatures.

OWEN, J.A. and D.J.M.—Photographs of Coleopterous larvae and adults of various species, including several showing *Lampyris noctiluca* (L.), emitting light.

PORTER, J. and CHURCH, S.H.—Photographic illustrations of British macrolepidoptera, figuring 725 larvae and 630 species of adult insects, among which were three representing *Oecophora bractella* (L.), one of the rarer micros discovered recently in Hampshire and bred from dead wood.

NATURE CONSERVANCY COUNCIL. A stand containing maps depicting the progress of the Invertebrate Site Register, also showing habitat destruction and loss through agriculture and development in all its forms, such as forestry, roadways, housing, drainage and industrial development.

HARMER, A.S.—Photographs of British butterflies and moths, including several life histories.

ARCHER, Dr. M.E.—A number of large scale and detailed paintings representing some of the world's vespine hornets and wasps, as well as British bumble bees, painted since 1976 by Mr. John Ruddick, Dr. Archer's father-in-law.

PLANT, C.W.—London Butterfly Atlas. An exhibit organised by the London Natural History Society. Distribution maps were shown covering the period 1980–1984 for *Aglais urticae* (L.), and *Lysandra coridon* (Poda), based on tetrads, (2 × 2 km squares), within 20 miles centred on St. Paul's Cathedral, thus taking in all Middlesex, parts of Essex, Kent, Surrey, Buckinghamshire and Hertfordshire. The display makes an appeal to B.E.N.H.S. members for records of all butterflies in the London area. The project ends in 1986.

HALL-SMITH, D.H.—An exhibit constructed from clear and transluscent flexible plastic sheet, showing three-dimensionally the genitalia of Lepidoptera. This novel and excellent idea is used when teaching genitalia dissection and preparation at Leicestershire Museums Service. The models can be fixed or taken apart to show the arrangement of the various structures.

SOKOLOFF, P.A.—Two colour postcards of Wicken Fen, Cambridgeshire, circa 1900–1910, from the collection of the late G. R. Sutton.

JONES, R.A.—Some (10 in. × 7 in. and 7 in. × 5 in.) prints taken from 35 mm slides, produced cheaply by a commercial processing house. *Rhagonycha fulva* (Scop.), in cop., *Amaurobius similis* (Blackwall), *Araneus quadratus* (Clerck), *Opilio perietinus* (Degeer) and *Porcellio scaber* (Latreille).

MURPHY, F.M.—Colour photographs showing the courting postures adopted by the spider *Saitis barbipes* (Simon) (Salticidae).

REVELS, R.—Colour photographs illustrating the insects and wildlife of Skokholm Island Nature Reserve.

HARVEY, P.R.—Cibachrome prints made from Kodachrome slide originals of: (1) Various spiders and insects of Chobham Common, Surrey. (2) Four *Cionus* spp. on figwort and *Verbascum blattaria* in a Surbiton garden and *Symmorphus gracilis* wasp preying on *Cionus* larvae.

STUBBS, J.—A display with the title 'A wife's-eye view of entomologists'. The display included a number of cartoons, photographs and pictures, giving us a humorous peep at entomology and entomologists in general.

ANNUAL EXHIBITION 1984

Top: Maitland Emmet with Mark Shaw
Behind, left: Ted Archer

Middle: Peter Baker, Bernard Skinner, Ken Evans (Exhibition organiser)

Bottom: Basil MacNulty

ANNUAL EXHIBITION, CHELSEA OLD TOWN HALL, 27TH OCTOBER, 1984

INDOOR MEETINGS

BENHS meeting 12.vii.1984.—The President announced the death of Mr G.H. Mansell, who was elected in 1960.

Exhibits. Mr J.M. Chalmers-Hunt: Two males of a micro-moth newly identified from British material by Dr K. Sattler (Brit. Mus. Nat. Hist.) The two males identified were taken by the exhibitor at Stodmarsh National Nature Reserve, E. Kent. A description of the moth will appear in the *Entomologist's Record*.

Mr A. Godfrey: (1) The buprestid beetle *Agrilus pannonicus* caught flying in bright sunshine in a ride in Windsor Forest, 17.vi.84. A.A. Allen (*Entomologist's mon. Mag.* **85**, 1973) summarised the records of this rare species and surmised that it may breed in old, rotten oak stumps.

(2) *Caliprobola speciosa* (Rossi) from a well known locality in the New Forest, where 10–20 were seen on 9th, 10th and 16th June. The hoverflies showed a preference for basking in sunshine on logs and tree stumps in the beech woodland. The flies appeared to have definite territories, defending them from other hoverflies and, in one instance, from a bumble bee. The exhibitor had also noted a pair mating at the base of a large beech tree in the woodland.

Mr I.R. Hudson: Three species of rare hoverflies collected in the New Forest during early June 1984. All are associated with ancient woodland, especially beech. (1) A male and female *Brachypalpus laphriformis* (Fall.) collected at Mark Ash Wood during the BENHS field meeting on 2nd June. The male was sunning low down on a beech trunk and the female was crawling over a damaged area of another tree, where a branch had fallen off at some time, about 1.5m up. (2) *Pocota personata* (Harris), also from the field meeting. This convincing bumble bee mimic was flying slowly around a damaged area on a beech trunk, about 2.5m up, where a large branch had broken off in the past. (3) A male and female *Caliprobola speciosa* (Rossi), taken on separate occasions in different areas of the Forest. The female was flying slowly around the base of a beech tree that had been damaged to expose the heartwood and the male was sunning on the ground within an old beech stump.

Mr R.A. Jones: *Ctenicera cuprea* (F.) from the Forestry Commission woods at Trichrug, near Cilcennin, Dyfed, where it was on the wing in numbers on 7.vi.84. This rather handsome click beetle is absent from southern England and is widespread but local in Wales.

BENHS meeting 26.vii.1984.—The President announced the death of Mr H. E. Chipperfield, of Walberswick.

Exhibits: Mr P.A. Sokoloff: Living examples of *Bisigna procerella* (D. & S.), (Lep.: Oecophoridae) and *Spatalistis bifasciana* (Hbn.), (Lep.: Tortricidae), two rather scarce moths taken at Long Rope, Orlestone in Kent on 25th July.

Mr R.A. Softly: A *Spilosoma lubricipeda* (L.), having extensively black-marked forewings, from a light trap at Mill Hill, London, 17th July.

Mr R.A. Jones: *Phloiotrya vaudoueri* (Mulsant), (Col.: Melandryidae) from under very thick bark of an old oak stump, Hampstead Heath, 18.vii.84. Little is known of this rare beetle, except that it is found under thick bark of old trees, notably oak. It is recorded mainly from ancient woodlands like Windsor and Sherwood Forests.

Mr K. Merrifield: A specimen of *Synanthedon vespiformis* (L.), netted at the recent field meeting at Baynes Wood, Berks. From Pollards Wood, Bucks, an example of the wood-feeding cranefly *Ctenophora pectinicornis* (L.). This is the most frequently recorded species of *Ctenophora*, which occur in old woodlands.

Membership: Messrs Lear, Siewruk and Marson were elected.

Communications: Mr R. McCormick reported the capture of a specimen of *Tyta luctuosa* (D. & S.) (the Four-Spotted) from his garden in North Cheam, Surrey, on 14/15.vii.84.

Lecture: Dr J. Waage gave a talk on the *Biology of Heliconiid butterflies*, which outlined their life histories and complex inter-relationships with plants of the genus *Passiflora*. The talk was well illustrated, and provoked a lively discussion.

BENHS meeting 13.ix.1984.—*Exhibits*. Mr E.S. Bradford: Specimens of *Caloptilia azaleella* (Brants), (Lep.: Gracillariidae) bred from an azalea bought in a shop in Canterbury, Kent early in 1984.

Mr P.J. Johnson: A specimen of the bee-mimic *Trichius fasciatus* (L.), a beetle found locally in Scotland, northern England and N. Wales. The beetle had been feeding on an umbellifer head at Aigas, near Inverness, Scotland (VC 96) in afternoon sunshine on 26.vii.84.

Mr R.A. Jones: *Asiraca clavicornis* (F.) (Homoptera: Delphacidae), found in great numbers sweeping a dry grassy bank on 'The Muchute' Farm, Isle of Dogs, on 25.viii.84. The greatly enlarged and flattened fore and middle legs (used for burrowing among the roots of grass) and the long, stout antennae, give this local species a peculiar appearance.

Miss S. Lambert: *Synanthedon formicaeformis* (Esp.), (Lep.: Sesiidae), taken at TQ 514858, Dagenham, Essex, 11.vii.84. The insect was taken at rest on bramble blossom at about 11.30 a.m., and is apparently the first record for Essex of this species this century.

Communications: Mr E.S. Bradford: a *Cynthia cardui* (L.), at Stanmore, Middx., on the 13th September. Mr K. Webb: a *Vanessa atalanta* (L.), at Clophill, Beds., on 8th September.

The Rev. Agassiz reported that *Luperina nickerlii* (Freyer) (Lep.: Noctuidae) had lately been found in numbers at several saltmarsh localities on the coast of Essex.

Lecture: Dr C.F. Curtis spoke on *The problem of insecticide resistance in mosquitoes*, and accompanied his talk by a series of slides, mainly diagrammatic.

BENHS meeting 8.xi.1984.— A vice-president, Mr P.J. Baker, in the Chair.

Exhibits: Col A.M. Emmet: Mines of the alder-feeding species of the *Phyllonorycter*, *P. rajella* (L.), *P. froelichiella* (Zell.), and *P. kleemannella* (F.), showing characters useful for species determination. *P. stettinensis*, which alone mines the upperside of the leaf presents no problem and was not shown.

P. rajella pupates in a relatively narrow cocoon flanked by frass visible as dark lines if the mine is held up to the light. The other two pupate in ovoid, inflated chambers devoid of frass. That of *P. kleemannella* is smaller (c. 5 mm long) and dark when viewed against the light. That of *P. froelichiella* is larger (c. 7 mm long) and paler, being almost translucent. The larger size of the mine of *P. froelichiella* is a reliable character, but there is little difference in size between the mines of the other two species.

Prior to pupation, the mines may be distinguished by the colour of the larvae. That of *P. froelichiella* is grey with the anal segment whitish. The larvae of the other two species are whitish, that of *P. rajella* with a greenish tinge and that of *P. kleemanella* with a yellowish tinge.

Mr R.A. Jones: Specimens of a golden brown variety of the leaf beetle *Chrysolina menthastri* (Suffrian), taken on 28.viii.71 and 3.viii.74 from a colony of this so far unrecorded form, at Danehill near Ashdown Forest, E. Sussex.

Mr C. Hart: An adult and empty pupa case of *Ephestia cautella* (Walker), (Lep.: Pyralidae), bred from a larva taken by Mark Colvin in early October in Tesco's supermarket, Lewes, Sussex. The moth emerged 5.xi.84.

Membership: Mr S.J. McWilliam was declared elected.

Communications: Mr R. Tubbs reported two *Vanessa atalanta* (L.), seen at Petersfield, Hants., on 4.xi.84. Mr C. Hart reported capturing a female *Mythimna vitellina* (Hbn.), at mercury vapour light near Reigate on 18.x.84.

Lecture: Dr A.M. Powell spoke on the subject of *Some fish/arthropod interactions*, and accompanied her talk by a number of slides, mainly diagrammatic.

FIELD MEETINGS

BENHS and Kent Field Club Field Meeting: Burnt Oak Wood, Orlestone, Kent, 19.v.1984 and 23.vi.1984. Leader: M.A. Enfield.—Apart from providing general records to help monitor the effects of management on this Kent Trust for Nature Conservation reserve, we hoped to see two local rarities, namely the empidid fly *Rhamphomyia marginata* and the Lesser Belle moth, *Colobochyla salicalis*. We saw a few of the flies on the reserve, and large numbers flying in swarms in the rides just across the road in Longrope Wood. Sadly, we were unlucky with the Lesser Belle and, for the seventh year running, I have not heard of any being seen at Orlestone. There must be doubts about its continuing survival in England.

We did note a few new records for Orlestone, but these were common species that may not have been thought worth recording before. Among the micro moths, *Pseudotelphusa scalella* 19 May, and *Spatalistis bifasciana* 23 June, were the most noteworthy.

BENHS Field Meeting: Odiham Common, Hampshire, 7.vii.1984. Leader: Stephen Miles.—Excellent weather greeted the eight people who attended this meeting. This site includes a variety of habitats within its boundaries; marsh and adjacent neutral meadows, damp oak/hazel coppice on clay soils and birch scrub on sand and gravel.

The meeting was timed to coincide with the normal ovipositing period of the syrphid fly *Volucella inflata* (F.). Unfortunately this event was not observed and only one female of this species was seen. The fourth British example of the fungus gnat *Manota unifurcata* (Lundström), was taken. Previously this species had only been recorded from Monks Wood, Huntingdonshire, Chippenham Fen, Cambs., and Windsor Forest, Berks. It is also considered a scarce mycetophilid in Europe as a whole. *M. unifurcata* has been reared from dead wood which had a myxomycete upon it but the association is not confirmed. Peter Chandler also took: the local mycetophilids *Leptomorphus walkeri* Curtis, *Coelosia flava* (Staeger), and

Brachypeza bisignata (Winnertz), the local dead wood feeding (in the larval state) empidid *Oedalea tibialis* (Macquart) and the platypezids *Agathomyia antennata* (Zett.), and *A. elegantula* (Fallén).

At a small area of bare sand, numbers of the local sphecid wasp *Crabro scutellatus* (Scheven), were seen attending to their nest holes in the soil. One female of the rare and local wasp *Crossocerus styrius* (Kohl), the nesting habits and prey of which are unknown, was taken in flight by the leader.

Of the eight butterfly species seen *Ladoga camilla* (L.), *Aphantopus hyperantus* (L.), and *Melanargia galathea* (L.), were the most notable, the last named, seen by one member, being interesting as this species had only been seen twice before in the locality by the leader. The nearest chalk downland is approximately one mile away.

Some members of the party were pleased to see a small patch of Bog Pimpernel (*Anagallis tenella* (L.)) growing in a very wet area crossed by a track.

In addition to the twenty-five species of spiders listed below four other more local species were taken, these being: *Philodromus collinus* Koch, *P. rufus* Walck., *Ballus depressus* Walck., and *Erigonidium graminicola* (Sund.), the latter being very numerous in both sexes at the locality. During the meeting our secretary, Frances Murphy was fortunate to find a spider of the family Tetragnathidae bearing a hymenopterous parasitic larva on the dorsal surface of its abdomen. The parasite was later reared out and found to be a male *Acrodactyla quadrisculpta* (Grav.), this is interesting in that it represents a 'true' rearing record.

Other insects and arachnids seen or taken were:

ODONATA: *Ischnura elegans* (Van der Linden), *Enallagma cyathigerum* (Charpentier), *Libellula depressa* L.

NEUROPTERA: *Chrysopa perla* (L.), *C. carnea* Stephens, *C. ciliata* Wesmael, *C. albolineata* Killington, *Hemerobius humulinus* L., *H. marginatus* Stephens.

MECOPTERA: *Panorpa germanica* L.

HYMENOPTERA: SYMPHYTA, *Calameuta filiformis* (Evers.), *Strongylogaster lineata* (Christ), *Athalia bicolor* Lep., *A. circularis* (Klug), *A. scutellariae* Cam., *Macrophya ribis* (L.), *Tenthredo mesomelas* L., *Blennocampa pusilla* (Klug), and *Endelomyia aethiops* (F.), larvae of both on wild rose, *Croesus latipes* (Vill.), larvae on birch.

HYMENOPTERA: APOCRITA, *Argogorytes mystaceus* (L.), *Andrena flavipes* Panzer, *Bombus lucorum* (L.), *B. terrestris* (L.), *B. pascuorum* (Scop.), *B. lapidarius* (L.), *Lasius niger* (L.).

COLEOPTERA: *Chilocorus renipustulatus* (Scriba), *Phyllobrotica quadrimaculata* (L.).

DIPTERA: *Oxycera formosa* Mg., *Leptogaster cylindrica* (Deg.), *Laphria marginata* (L.), *Chrysogaster solstitialis* (Fallén), *Eristalis arbustorum* (L.), *E. horticola* (Deg.), *E. nemorum* (L.), *Volucella bombylans* (L.), *V. pellucens* (L.), *Sphegina kimakowiczi* Strobl.

ARACHINDA: *Clubiona lutescens* Westring, *Anyphaena accentuata* (Walck.), *Diaea dorsata* (F.), *Heliophanes cupreus* (Walck.), *Pisaura mirabilis* (Clerck), *Anelosimus vittatus* (C. L. Koch), *Achearanea lunata* (Clerck), *Theridion sisyphium* (Clerck), *T. varians* (Hahn), *T. pallens* (Blackwall), *Enoplognatha ovata* (Clerck), *Araneus diadematus* Clerck, *A. quadratus* Clerck, *A sturmi* (Hahn), *Araniella cucurbitina* (Clerck), *Zilla diodia* (Walck.), *Cyclosa conica* (Pallas), *Gongylidium rufipes* (Sund.), *Diplocephalus picinus* (Blackwall), *Erigone atra* (Blackwall), *Meioneta rurestris* (C. L. Koch), *Lepthyphantes obscurus* (Blackwall), *L. flavipes* (Blackwall), *Linyphia triangularis* (Clerck), *L. montana* (Clerck).

BENHS and Kent Field Club Field Meeting: Gibbins Brook, Kent, 12.viii.1984. Leader: J.S. Badmin.—There are few sites in E. Kent that rival Gibbins Brook for its rich assemblage of wetland plants and interesting invertebrate life. Indeed there was so much to see and record that few of the 22 members who attended this joint meetings with the Kent Field Club managed to walk further than 100 m from the cars before lunch.

Most of the southern area of the SSSI is marsh with willow scrub and extensive alder carr. Plants of interest, otherwise local in Kent, were bogbean, marsh pennywort, bog stitchwort, marsh willowherb and the heath spotted and southern marsh orchids. Those who ventured further afield discovered tussocks of *Carex paniculata* (L.), nearly a metre high, growing beneath the alder trees.

On the higher ground to the north was an area of grass heath and birch scrub dominated locally by bracken.

Insect numbers were exceptionally high. 37 species of leafhoppers were recorded and these appeared to be the most prevalent group in terms of biomass from sweep net catches. Several unusual macropterous forms were noted. The spittle bugs *Neophilaenus lineatus* (L.), *N. campestris* (Fall.), and *Philaenus spumarius* (L.), in a variety of colour forms were so abundant as to cause incipient hopper burn. Appreciable numbers of the large blue-green *Cicadella viridis* (L.), and yellow and black cicadellid *Evacanthus interruptus* (L.), were a welcome sight. Other Homoptera were: *Aphrodes makarovi* Zachvatkin, *Aphrophora alni* (Fall.), *Allygus mixtus* (F.), *Alebra albostriella* (Fall.), *Iassus lanio* (L.), *Oncopsis alni* (Schrank), *O. flavicollis* (L.), *Eupteryx stachydearum* (Hardy), *E. vittata* (L.), *Typhlocyba quercus* (F.), *Kybos butleri* (Edwards), *Doratura stylata* (Boheman), *Conomelus anceps* (Germ.), *Cixius nervosus* (L.), *Psylla alni* (L.), *Trioza remota* Förster.

The short winged conehead *Conocephalus dorsalis* (Latr.), was the commonest of the five species of Orthoptera recorded. To our delight we also captured quite a number of long winged bushcrickets and presumed them to be the related *C. discolor* (Thunb.). This species has only once been recorded from Kent, and considerable doubt now surrounds this record, despite its continued occurrence in nearby Sussex. More detailed reading of Ragge's 1965 Wayside and Woodland book on grasshoppers indicated that the specimens belonged to the taxon *C. dorsalis burri* (Ebner), a rare macropterous form of the shortwinged conehead. It may be distinguished from *C. discolor* by the presence of extra long wings, a lack of spines on the underside of the hind femora, and a more strongly curved ovipositor.

Twelve butterfly species were observed including the large skipper and ringlet.

Mr Wilberforce made a cursory investigation of the microfungi and recorded *Dasyscyphus virgineus* S.F. Gray, on a decaying *Rubus* stem, *D. palearum* (Desm.) Massee on grass stems, *Orbilia xanthostigma* (Fr.), Fr. and *O. auricolor* (Blox. ex Berk) Sacc., on rotten wood, and *Mollisia palustris* (Roberge) Karst., on rotting herbaceous stems.

Subsequent light trapping with Mr Jewess on a rather inhospitable night produced a total of 60 species of Lepidoptera, and 9 species of leafhoppers. The most notable record was the local pyralid *Nephopteryx genistella* (Dup.), in only its second recorded locality in Kent.

BENHS and Kent Field Club Field Meeting, Burnt Oak Wood, Kent, 2.ix.1984. Leader: Mr J.S. Badmin.—The weather was warm and hazy, but not too overcast for insect activity. Two members joined the leader and his family in the search for the rare attractive leafhopper *Platymetopius undatus* (Degeer), last recorded from the area by Col Duffield in the 1930s. It was decided to tackle Burnt Oak Wood in preference to Fagg's Wood so that Mr Enfield could conduct his regular butterfly census of the area. His tally of 8 species and 12 individuals was much lower than in the preceding weeks, but did include a late individual of *Pyronia tithonus* (L.).

The search for *Platymetopius* was hampered by the fact that its hostplant is not known with any certainty, and so many potential hostplants—sallows, oak, birch and bracken, were sampled regularly with sweepnet and beating tray, but without success. The search was by no means exhaustive and there is every reason to believe that *Platymetopius* still occurs in the Ham Street woods complex. Homoptera observed were: *Graphocephala fennahi* (Young), *Cicadella viridis* (L.), *Issus coleoptratus* (F.), *Idiocerus vittifrons* (Kirschbaum), *Macropsis prasina* (Boheman), *Aphrophora salicina* (Goeze), *Balclutha punctata* (Thunb.), *Alebra albostriella* (Fall.), *Javasella pellucida* (F.), and *Cixius nervosus* (L.).

Dragonflies were very much in evidence and Mr Philp recorded *Aeshna mixta* Latr., *A. cyanea* (Müller), *Sympetrum sanguineum* (Müller), *S. striolatum* (Charpentier), *Coenagrion puella* (L.), and *Lestes sponsa* (Hansemann).

BENHS Field Meeting: Church Wood, Blean, Kent, 4.viii.1984. Leader: E.S. Bradford.—Twelve members and friends attended this meeting. Church Wood, an RSPB reserve, covers an area of about 420 acres. Adjoining Church Wood is the Blean National Nature Reserve. With these two reserves there are, in all, about one thousand acres of continuous woodland in this section of the Canterbury ring woods.

Only a small part of Church Wood was surveyed during the meeting. The weather was fine but cooler than had been the case during the previous few weeks. This was noted especially in the evening when the light traps were operating. The temperature between 9.30 p.m. and 12.30 a.m. was 16°C, with a cold breeze. Even so, the light traps did well.

During the day members worked the extensive rides, where *Pyronia tithonus* (L.), was very common. Along one ride several small cockroaches *Ectobius lapponicus* (L.), were caught. In one of several open areas along the main ride there were a number of large logs and old tree stumps. Running around one of the logs was a specimen of the local Coleopteron *Leptura quadrifasciata* (L.). Also in this clearing *Chrysops caecutiens* (L.), made its presence known.

In the evening one mercury vapour lamp and one Heath trap were run, about 250 yards apart, until approximately 12.45 a.m.

Little was attempted on the second day of the meeting: rain put in an early appearance and persisted, driving everyone and everything to shelter.

The following is a list of insects and leaf mines taken or seen during the day, and of insects recorded at the light traps in the evening.

LEPIDOPTERA: *Ectoedemia angulifasciella, E. mediofasciella, E. pulverosella, Fomoria septembrella, Stigmella aurella, S. continuella, S. plagicolella, S. salicis, S. floslactella, S. tityrella, S. perpygmaeella, S. hemargyrella, S. atricapitella, S. crataegella, S. distinguenda, S. luteella, S. lapponica, S. confusella, Tischeria ekebladella, T. marginea.*

Phylloporia bistrigella, Incurvaria pectinea, Taleporia tubulosa, Psyche casta, Leucoptera spartifoliella, Lyonetia clerkella, Parornix anglicella, P. devoniella, P. betulae, Phyllonorycter harrisella, P. quercifoliella, P. oxyacanthae, P. corylifoliella, *P. maestingella, P. quinnata, P. ulmifoliella, Argyresthia brockeella, A. goedartella, A. retinella, A. pruniella, A. curvella, A. albistria, Yponomeuta evonymella, Swammerdamia caesiella, S. pyrella, Prays fraxinella, Ypsolopha nemorella, Y. dentella, Y. scabrella, Y. sylvella, Y. parenthesella, Y. ustella, Schreckensteinia festaliella.*

Coleophora lutipennella, C. flavipennella, C. serratella, C. glaucicolella, Batia lunaris, B. unitella, Esperia oliviella, Carcina quercana, Pseudatemelia josephinae, Paltodora cytisella, Eulamprotes atrella, Monochroa tenebrella, Recurvaria nanella, Exoteleia dodecella, Rhynchopacha mouffetella, Bryotropha senectella, Sophronia semicostella, Syncopacma larseniella, Anacampsis populella, A. blattariella, Brachmia blandella, Batrachedra praeangusta, B. pinicolella, Mompha raschkiella.

Agapeta hamana, Eupoecilia angustana, Pandemis cerasana, Ptycholomoides aeriferanus, Clepsis consimilana, Epagoge grotiana, Ditula angustiorana, Cnephasia incertana, Croesia forsskaliana, Acleris notana, Celypha striana, Olethreutes lacunana, Apotomis turbidana, A. betuletana, Endothenia pullana, Bactra lancealana, Eudemis profundana, Ancylis uncella, A. unculana, Epinotia brunnichana, Zeiraphera isertana, Gypsonoma sociana, Epiblema uddmanniana, Eucosma cana, Spilonota ocellana, Rhyaconia pinicolana, Lathronympha strigana, Cydia fagiglandana, C. splendana.

Chrysoteuchia culmella, Crambus perlella, Agriphila selasella, A. straminella, A. tristella, A. inquinatella, A. geniculea, Catoptria pinella, Acentria nivea, Scoparia ambigualis, Eudonia mercurella, Parapoynx stratiotata, Pyrausta aurata, Eurrhypara lancealis, Anania verbascalis, Opsibotys fuscalis, Pleuroptya ruralis, Hypsopygia costalis, Endotricha flammealis, Acrobasis consociella, Oncocera palumbella.

Thymelicus sylvestris, Pieris brassicae, Polyommatus icarus, Inachis io, Pyronia tithonus, Maniola jurtina, Aphantopus hyperantus.

Falcaria lacertinaria, Drepana falcataria, Habrosyne pyritoides, Tetheella fluctuosa, Ochropacha duplaris, Geometra papilonaria, Cyclophora albipunctata, C. porata, Timandra griseata, Idaea biselata, I. fuscovenosa, I. dimidiata, I. aversata, I. emarginata, Xanthorhoe ferrugata, X. quadrifasiata, Epirrhoe alternata, Ecliptopera silaceata, Hydriomena furcata, Rheumaptera undulata, Eupithecia haworthiata, Chesias rufata, Lomaspilis marginata, Semiothisa notata, S. liturata, Crocallis elinguaria, Biston betularia, Alcis repandata, Cabera pusaria, C. exanthemata, Lomographa temerata, Campaea margaritata, Notodonta dromedarius, Eligmodonta ziczac, Pheosia gnoma, P. tremula, Ptilodon capucina, Pterostoma palpina.

Miltochrista miniata, Eilema complana, Phragmatobia fuliginosa, Meganola albula, Agrotis exclamationis, Axylia putris, Ochropleura plecta, Noctua pronuba, N. comes, N. janthina, Lycophotia porphyrea, Xestia triangulum, Mythimna ferrago, M. impura, Parastichtis suspecta, Acronicta psi, Thalpophila matura, Euplexia lucipara, Cosmia trapezina, Apamea monoglypha, Mesoligia furuncula, Mesapamea secalis, Photedes minima, Hoplodrina blanda, Colocasia coryli, Autographa gamma, Herminia tarsipennalis, Paracolax derivalis.

HETEROPTERA: *Lygocoris pabulinus, Stenodema calcaratum, Amblytylus nasutus, Phylus melanocephalus, Dolichonabis limbatus, Phytocoris ulmi, Stenotus binotatus, Orthotylus virescens, Plagiognathus arbustorum, Capsodes flavomarginatus, Phytocoris tiliae.*

NOTES ON SPECIES OF ICHNEUMONIDAE REARED AS ECTOPARASITES OF SPIDERS

by I. R. HUDSON

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During the last few years I have been rearing polysphinctine ichneumonids from spiders that I have collected in Hampshire and West Sussex. This paper records my observations on the seven species that I have reared to date, with full data of those recorded in Hudson, *Proc.Trans.Br.ent.nat.Hist.Soc.* **17**:66, 1984. Because these ichneumon larvae are ectoparasites it is possible to monitor their development closely. Sizes are approximate, accurate measurement not always being possible.

Schizopyga frigida (Cresson) reared from *Clubiona terrestris* Westring (Family Clubionidae).

The sub-adult and adult hosts of both sexes were found inside hollow, dead stems of umbelliferous plants, in wooded areas around Gosport and Hilsea, Hants. They usually occupied silk cells that they spun as daytime retreats. Most were found in early spring although one parasitized host was collected in early November.

Sex	*Collection Date*	*Size (mm.)*	*Pupation Date*	*Final Size (mm.)*	*Emergence Date*
♀	26.3.81	1.5	31.3.81	6.5	11.4.81
♀	10.4.81	6.0	12.4.81	7.0	26.4.81
♂	17.3.82	1.0	28.3.82	7.0	13.4.82
♀	17.3.82	1.5	28.3.82	7.0	13.4.82
♂	18.3.82	1.0	30.3.82	6.0	14.4.82
♀	3.4.82	1.0	12.4.82	6.5	25.4.82
♀	22.1.83	0.5	24.4.83	7.0	14.5.83

Polysphincta tuberosa Gravenhorst reared from *Araneus cucurbitinus* Clerck (Family Araneidae).

The small immature hosts were found in woods at Hilsea, Portsmouth on the leaves of low growing trees and bushes, where they had spun characteristic, tiny orb webs. The two hosts that were collected in March and April moulted during captivity but remained immature until they were killed. All fed well during confinement.

Sex	*Collection Date*	*Size (mm.)*	*Pupation Date*	*Final Size (mm.)*	*Emergence Date*
♂	23.3.82	0.5	30.4.82	6.0	16.5.82
♂	28.4.82	0.5	5.6.82	6.0	17.6.82
♀	7.5.82	0.5	1.6.82	5.0	12.6.82

Zatypota bohemani (Holmgren) reared from *Theridion mystaceum* L. Koch (Family Theridiidae).

The hosts were found on and under loose bark of trees growing in open playing fields at Hilsea, Portsmouth, where they had spun small webs of tangled silk. The spiders were small and immature when collected. The two that were collected in April had almost fully mature larvae on them and were killed within 2 days, whereas the one taken in March survived for 17 days and was actively feeding for most of that time.

Sex	*Collection Date*	*Size (mm.)*	*Pupation Date*	*Final Size (mm.)*	*Emergence Date*
♂	5.3.82	0.5	21.3.82	4.5	11.4.82
♀	19.4.82	2.0	20.4.82	3.5	6.5.82
♀	19.4.82	2.0	21.4.82	3.5	7.5.82

Zatypota percontatoria (Müller) reared from *Theridion* spp.

The hosts, which were all tiny spiderlings and therefore not identifiable, were found by sweeping the heather on open heaths at Browndown, Gosport and Rhinefield, New Forest and were of two species. They all produced male parasites. A female was sent to me after being reared from a mature *Theridion tinctum* Walckenaer) collected at Blackheath Common, Surrey.

Sex	*Collection Date*	*Approx. Size (mm.)*	*Pupation Date*	*Final Size (mm.)*	*Emergence Date*
♂	27.4.83	0.5	26.5.83	3.0	9.6.83
♂	12.5.83	1.0	26.5.83	3.0	7.6.83
♂	20.5.83	1.0	5.6.83	3.0	16.6.83
♀	27.7.83	Not known	Not known	4.5	8.8.83

Zatypota albicoxa (Walker) reared from *Achaearanea simulans* (Thorell) (Family Theridiidae).

This parasite is previously unrecorded from Britain, although specimens apparently exist in J.P. Brock's collection from Oxford, 1968, now in Ulster Museum. The host, itself not common, was collected by beating oak tree foliage in Botley Wood, Hants. I also have a female specimen, reared from *Achaearanea lunata* (Clerck) which was collected in Southern France.

Sex	*Collection Date*	*Size (mm.)*	*Pupation Date*	*Final Size (mm.)*	*Emergence Date*
♂	9.7.83	1.5	10.7.83	4.0	30.7.83

Acrodactyla degener (Haliday) reared from *Lepthyphantes tenuis* (Blackwall) (Family Linyphiidae).

The adult ♀ host was found low down amongst long grass at Hamble Common, Hants. The larva was quite well developed at the time of collection, being about two-thirds final size, although the spider did remain active for a few days. Another female specimen was sent to me after being reared from *Lepthyphantes mengei* Kulczynski collected at Arundel Park Woods, Sussex on 18.7.82.

Sex	*Collection Date*	*Size (mm.)*	*Pupation Date*	*Final Size (mm.)*	*Emergence Date*
♀	10.4.82	2.0	17.4.82	3.0	2.5.82

Acrodactyla quadrisculpta (Gravenhorst) reared from *Tetragnatha* sp. (Family Tetragnathidae).

The hosts were immature and could not be specifically identified. The first was collected by sweeping undergrowth in Downpark Wood, Hants. The larva was almost fully developed when found and pupated within two days of collection. The 1984 host was swept from undergrowth in Swanpond Copse, Isle of Wight.

Sex	*Collection Date*	*Size (mm.)*	*Pupation Date*	*Final Size (mm.)*	*Emergence Date*
♀	6.5.83	3.0	8.5.83	5.0	22.5.83
♀	27.4.84	3.5	1.5.84	5.5	23.5.84

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I would like to thank Dr. Mark Shaw of the Royal Scottish Museum for identifying specimens and offering invaluable advice. Mr. Dick Jones kindly supplied many of the specimens, and identified a number of the hosts.

A Royal Entomological Society handbook on the Pimplinae, which includes the tribe Polysphinctini, is currently in preparation and this will give a broader picture of the distribution and biology of the species mentioned.

BOOK REVIEW

Atlas of Butterflies in Britain and Ireland, by J. Heath, E. Pollard and J. E. Thomas. Viking, London, October 1984. £17.95.

This new work fills a genuine gap in the present butterfly literature. Most field guides suffer from maps reduced so much in size that they become irrelevant, but here are maps large and legible. This book is a compilation of the butterfly records sent to the Biological Records Centre at Monk's Wood, which started in 1967 under John Heath's direction, and finished, to many entomologists' regret, in 1982. Many earlier records are mapped, having been extracted from collections and the literature. Each map is accompanied by a commentary on the adult insect's behaviour and notes on recent populations trends. Small ink drawings of the butterflies, in characteristic pose, head each species's page.

The maps are only as good as the records submitted and while some enthusiasts may quibble about the odd misplaced dot, present distribution and trends are revealed at a glance. The star symbol used for pre-1940 records is not as distinct from the solid dot symbol as it should be.

The commentaries though brief, are very useful. They contain references to the most recent literature, and take particular note of the increasing emphasis on the study of butterfly behaviour.

The final chapter presents an essay on insect ecology and discusses the relationship between butterfly populations and environmental influences. The story is a gloomy one, but the authors hope to stimulate further understanding of butterfly ecology and through this, insect conservation.

I feel the price is too high for most private individuals, but the book should be a valuable asset to public libraries and schools of biology.

T.N.D.P.

SECONDARY NESTS OF THE HORNET, *VESPA CRABRO* (L.) (HYMENOPTERA: VESPIDAE), PRODUCE QUEENS

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During 1983 and 1984 three colonies of *V. crabro* were collected which contained more adults than could have been reared in their respective nests. Two such colonies were also collected in 1981 and were called secondary nests as they did not represent the original or primary foundation of the colonies (Archer 1984). The 1984 colony would have started to produce adult queens a few days after the capture of the colony.

The first 1983 colony was taken on 21st August near Groton, Suffolk (TL 9541). The nest was situated inside an outhouse at the apex of the roof, being about five metres above the ground. The two combs were covered by an envelope and the entrance to the nest was ventral. The older comb consisted of 115 small cells containing 65 sealed brood, 38 larvae, 4 eggs and 8 empty cells. The sealed brood were all workers and would have probably started to emerge the day following capture of the colony. The younger comb consisted of 27 small cells containing 13 larvae, 9 eggs and 5 empty cells. Since no empty cell with a meconium was found this nest had not yet produced workers, yet 21 workers plus the mother queen were collected with the nest. Clearly these 21 workers had been reared in another nest, probably the primary nest, and had moved with the queen to another site to establish the secondary nest.

The second 1983 colony was taken on 23rd August at Elsworth, north-west of Cambridge (TL 3163). The nest was situated inside an outhouse in a corner about 2.7 metres above the ground. The two combs were covered by an envelope on the top and at the sides but the bottom of the nest was open and the combs were clearly visible. The older comb consisted of 174 small cells containing 25 sealed brood, 114 larvae and 35 eggs. The sealed brood consisted of worker pupae which had only recently pupated and would have probably emerged as adults about two weeks after the capture of the colony since the sealed brood stage lasts for about 16 days (Matsuura, 1979 personal communication). The younger comb consisted of 124 small cells containing 61 larvae, 61 eggs and 2 empty cells. Again this nest had not produced workers yet 38 workers plus the mother queen were collected with the nest. This colony was observed to have started about the 5th August and was, therefore, about two and a half weeks old. Thus about 18 days were required for the oldest brood to reach the early sealed brood stage; a time period closely agreeing with the data given by Matsuura, 1979 personal communication.

The 1984 colony was received on 11th September and had been taken from a hole in an ash tree, about 5 metres above the ground, at Boxworth, near Cambridge (TL 3464). The tree had been felled the previous day and no adults were recovered with the nest. An envelope was only present at the top of the nest which consisted of three combs. The oldest comb consisted of 116 small cells containing 71 sealed brood, 28 larvae, 6 eggs and 11 empty cells. The sealed brood consisted of 68 workers, nine of which had emerged since the nest was collected, and three males which would have emerged a few days later. Of the empty cells eight contained a meconium each and thus each had produced a worker. The other two combs of 129 large cells contained 55 sealed brood, 42 larvae, 8 eggs and 24 empty cells. The sealed brood consisted of 25 queens and 30 males which would have probably started to emerge about one and a half weeks later. This colony had thus produced a maximum of eight workers yet it contained 245 cells, 210 cells of which contained brood: clearly a secondary nest.

Two further comments can be made about the 1984 colony. First that a secondary nest, although smaller than the mature size of a primary nest (mean size 1545 cells, range 618–3316 cells, Archer, 1980), it is still capable of producing queens and hence of successful development. Secondly, since large cell brood has a developmental period of some ten days longer than small cell brood (Archer, unpublished based upon Janet (1985), Matsuura (1979, personal communication), Wafa & Sharkawi (1972)) then in the 1984 secondary nest the start of the building of the large cell comb must have started a few days after the start of the small cell comb.

Finally, how common are secondary nests compared with nests which only show primary development? Between 1981 and 1984 I have collected 20 hornet nests during August and September, of which five (a quarter) were secondary nests. Secondary development is, therefore, far from an uncommon phenomenon. Archer (1984) offered three explanations for the occurrence of secondary nests: destruction of the primary nest possibly by a predator, a late starting colony that recruited workers from other colonies and the abandonment of the primary nest because it was in a cavity too small for expansion. From the three secondary nests described, no direct evidence exists to support any of these explanations. However, the small size of secondary nests and the lack of evidence for worker recruitment (Archer 1984) suggests that destruction of the primary nest is the most likely explanation.

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I would like to thank E. Milne-Redhead, W. A. Clark and many other people who helped me in the locating of hornet colonies.

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A PROVISIONAL LIST OF THE LARGER BRACHYCERA, SYRPHIDAE AND CONOPIDAE OF THE EPPING FOREST AREA

by M. W. HANSON

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INTRODUCTION

Epping Forest has long been a favourite haunt of the insect collector and there are numerous references to the Forest in the entomological literature. There are, however, very few groups that have been systematically and thoroughly dealt with, though among them are the Coleoptera (beetles) (Buck 1955 and Hammond in Corke 1979), Odonata (dragonflies), Hymenoptera—Cynipoidea (gall wasps) (see Payne 1968) and more recently the Lepidoptera (butterflies and moths) (Emmet 1978).

Apart from short notes on some of the rarer species to be found in Epping Forest and in my recently completed work on the flora and fauna of Lords Bushes (Hanson 1983) there are full accounts of only 2 of the 87 Diptera families found on the British check-list (Kloet and Hincks 1975). These cover the Tipulidae (crane-flies) (Payne 1968) and the Culicidae (gnats) (Snow and Fallis 1982).

In order to widen our knowledge I have written an account of a further ten families, those found in the larger Brachycera (soldier flies, robber flies, horse flies etc.), the Syrphidae (hover-flies) and Conopidae (thick-headed flies).

HISTORICAL

In 1888 the entomologist E.A. Brunetti had appealed in the Essex Naturalist for assistance in compiling a list of the Diptera of Epping Forest. The appeal met with little response and two years later Brunetti published a list of just 52 species he had recorded in the Forest, though of relevance to this paper he included ten common species of hover-fly.

William Cole in Buxton's 'Epping Forest' wrote 'The Diptera are a vast race, Britain contains about 3,000 species of which probably one half occur in and around our Forest . . . Epping Forest is almost unexplored in this department'.

References to the Forest are conspicuously absent in Verrall's volume eight of 'British Flies' published in 1901 and W.H. Harwood, the Colchester entomological dealer who contributed the very fine Insect section to the Victoria County History published in 1903, mentions only the Brunetti Diptera records in connection with Epping Forest. A few records of interest were made; F.B. Jennings collecting in 1906 took the rare Conopid *Myopa tessellatipennis* (Motsch), and in 1912 Philip Harwood took the rare hover-fly *Brachypalpus laphriformis* (Fall.), (as *B. bimaculatus* Macq.). In the years immediately after World War I and again in 1929 F.W. Edwards collected in the Forest, although as far as I am aware he confined his attentions to the Nematocera (crane-flies, fungus gnats, etc.). In the late 1940's and early 1950's Epping Forest was visited by a number of prominent dipterists among them C.N. Colyer, C.O. Hammond, L. Parmenter and J.F. Shillito. In the 1960's A.A. Allen, E.H. Moss and particularly R.M. Payne have added to our knowledge of Epping Forest Diptera. More recently collectors (though mainly in families not under consideration in this paper) have included D.J. Henshaw, D.A. Smith and Dr I.F.G.

McLean. I myself started collecting in about 1977 and this paper is based largely on my own recording over the last 6 years though I have made full use of the records made by the collectors listed at the end of this section. Two invaluable sources of information have been R. M. Payne's 'Hoverflies of Essex' published in 1973/4 and L. Parmenter's card-index formerly at the British Museum (Natural History) now unfortunately destroyed.

THE LIMITS OF THE RECORDING AREA

Recording for this paper has largely been confined to the area under the jurisdiction of the present Conservators of Epping Forest (this is defined on the 1983 Ordance Survey map of Epping Forest). In practice I have done most collecting in the central area between Leyton Flats in the south and Sunshine Plain in the north. I have, however, included a few records taken outside Epping Forest *sensu stricto* for example from the Roding Valley at Loughton and Claybury Woods at Woodford (the latter locality is about 1¾ miles S.E. of Lords Bushes).

DESCRIPTION OF THE AREA

I shall only give a brief description of Epping Forest here: a very comprehensive account is to be found in 'Epping Forest—the natural Aspect' (Ed. D. Corke 1978). The 6,000 acres of the Forest lies predominantly on London Clay which in places is overlain by Claygate Beds, Pebble Gravel and Glacial Sands and Gravel with Boulder Clay at the extreme north of the Forest. The Forest is a relict wood-pasture; in such a system so that the grazing of animals could be combined with the production of wood, the trees were pollarded, that is cut at 2–3 m above ground level leaving a base called a bolling which sprouts much as does a coppice stool but at a height at which animals could not browse. Pollards are characteristic of much of Epping Forest. In addition to this, there are discrete grassy plains, areas of heathland, marshes, bogs and ponds: hence there is a rich mosaic of habitats in a relatively small area maintained by what was a very conservative and ancient system of management. A species-rich flora and fauna characterised this particular group of habitiats. This relatively stable system had operated in Epping Forest probably for well over 900 years until the passing of the Epping Forest Act in 1878. The cessation of lopping with this Act has resulted in many places in the Forest becoming dense, floristically poor woodland with many of the historic pollards, particularly oak, being overshadowed by the more vigorous trees, such as beech (*Fagus sylvatica*). Decline in grazing pressure has enabled coarse grass species and scrub to invade the grassy plains, ousting the less competitive species of plant and birch has invaded many of the heathy areas and bog with a concomitant decline in the flora and ultimately the fauna.

COLLECTING

As far as I am aware (apart from rearing records) all collecting has been done with a net. At some time in the future I hope Malaise and water traps will be used to study the Dipteran fauna and probably many new species will be added to the Epping Forest and indeed the county list. In compiling this list I have assiduously collected voucher specimens and for most records if not all a voucher specimen is available.

The following are mentioned in the text by their initial letters:—

A.A. Allen	W.H. Forster	E.H. Moss
C.H. Andrews	K.M. Guichard	L. Parmenter
P. Bush	C.O. Hammond	R.M. Payne
C.N. Colyer	P. Harwood	J.F. Shillito
J.T. Eagles	F.B. Jennings	R.D. Weal
D.A. Earey	A.W. Jones	R.W. Uffen
S.J. Falk	E.T. Levy	Epping Forest Conservation Centre

INTRODUCTION TO THE SYSTEMATIC LIST

Nomenclature for the hover-flies follows Stubbs and Falk (1983) while the remaining families follow Kloet and Hincks (1975). General comments refer to Epping Forest only and not to the other locations mentioned in the text. For the more frequently encountered species only the month (in Roman numerals) they were taken is given; for less frequently encountered species usually a specific date is given. A number of records are not localised and they appear merely as Epping Forest. Localities mentioned in the text are listed on the map at the end of this paper.

* Species new to the Essex list (including those due to taxonomic revision) are labelled with an asterisk.

n.d. Indicates that no date is known.

Records without ascription are my own.

BRACHYCERA

The determination of this group follows Oldroyd 1969.

STRATIOMYIDAE

Many members of this family, the soldier-flies, are typically found in aquatic habitats, often in coastal areas. To date I have recorded just 13 of the 49 species from the Epping Forest area. Many of these, for example those in the sub-families Beridinae and Sarginae, have larvae that inhabit decaying vegetation, dung, etc. *Pachygaster* spp. feed in beetle burrows in decaying trees. The Forest seems to be particularly poor in aquatic species, only two of which have been taken: *Oxycera pulchella* Mg., and *Odontomyia tigrina* (F.).

Beris chalybeata (Forst.), v.-vi. widespread in shady places. Warren Hill, North Farm, Lords Bushes and Fairmead. *B. geniculata* Cur., 1 ♀ swept from hedgerow in the Roding Valley at Loughton on 21.vi.81. *B. vallata* (Forst.), viii. Infrequent, Lords Bushes, North Farm and Gilbert Slade.

Chorisops tibialis (Mg.), 1 ♂ and 1 ♀ taken at North Farm 27.vii.80.

Oxycera pulchella Mg., 1 ♀ on bramble leaf at Fairmead, July 1978 and 1 ♀ from ditch by Gilbert Slade on 21.vii.83.

Pachygaster atra (Pz.), Monks Wood, 28.vi.51 (L.P.), 1 ♀ North Farm, 28.vii.79 and 1 ♀ Leyton Flats, 21.vii.83. *P. leachii* Cur., 1 ♂ Gilbert Slade, 21.vii.83, swept from elm (*Ulmus* sp.), suckers.

Chloromyia formosa (Scop.), vi-vii. Never found in any numbers, Lords Bushes, Leyton Flats and Gilbert Slade.
Microchrysa polita (L.), v-viii. Frequent throughout.
Sargus bipunctatus (Scop.), ix-x. A number of records from Lords Bushes and a garden in Buckhurst Hill. *S. cuprarius* (L.), Epping, 14.viii.67 (E.H.M.). *S. iridatus* (Scop.), High Beach, n.d., (C.O.H.), Epping, 13.vii.64 (E.H.M.).
Odontomyia tigrina (F.), 1 ♂ and 2 ♀♀ Goldings Hill Pond, 14.vi.83, 1 ♀ Fairmead Pond, 22.vi.83.

XYLOMYIIDAE

The three members of this family are rarely taken; the larvae have been found beneath bark on rotting stumps and many records come from ancient woodland though *Solva marginata* (Mg.), is not restricted to this habitat; I captured a specimen in the cab of a J.C.B. whilst working on a country coalyard near Ongar some distance from any ancient woodland!

Solva maculata (Mg.), Epping Forest, 26.vii.50 (W.H.F.), R.W. Uffen reared 2 ♀♀ from beech wood mould from Epping Forest on 12.vi.75. *S. marginata* (Mg.), Epping Forest, n.d. (C.O.H.).

RHAGIONIDAE

I find most members of this family on or about hedgerows or woodland margins bordering onto herb rich meadows; the exception, *Rhagio lineola* (F.), seems to be a true woodland species.

Chrysopilus cristatus (F.), vi-vii. Kemps lawn, North Farm, Goldings Hill and Gilbert Slade.
Symphoromyia immaculata (Mg.), 2 ♀♀, Roding Valley at Debden, 21.vi.81.
Rhagio lineola (F.), vi-ix. Lords Bushes, High Beach and Gilbert Slade. *R. scolopacea* (L.), v-vi. North Farm, Whitehall Plain and Fairmead. *R. tringarius* (L.), vi. In some numbers in old meadows in the Roding Valley at Loughton.

TABANIDAE

This family includes the troublesome biting horse-flies. Sadly they seem to be rather uncommon in Epping Forest and I have only taken one and have records of two other species. I would think that when larger herds of grazing animals were present, they would have been rather more frequently met with.

Haematopota pluvialis (L.), vi-vii. North Farm, Warren Hill and Fairmead.
Hybomitra bimaculata (Macq.), Epping Forest n.d., reared from a larva found under the bark of a rotten oak stump; the larva (and a record of its bionomics) is figured in Colyer and Hammond 1968. *H. distinguenda* (Verr.), Epping 27.v.48 (C.H.A.). I saw what was probably this species on cattle in the Conservators' Nursery Road pound at Loughton on 23.vi.83.

ASILIDAE

The robber-flies are a distinctive group of very bristly predatory flies. The fine *Asilus crabroniformis* (L.), is probably extinct; it is a species more often found on heaths and heathy commons.

Asilus crabroniformis (L.), Epping Forest n.d. (C.O.H.).
Epitriptus cingulatus (F.), Epping forest, 22.viii.37 (K.M.G.).

Machimus atricapillus (Fall.), 1 ♂ High Beach, September 1978, 1 ♂ and 1 ♀ Staples Road, 7.ix.80.

Neoitamus cyanurus (Loew), 2 ♂♂ Lords Bushes, 22 and 23.vii.79, 1 ♀ Warren Hill, 9.viii.80.

Leptogaster cylindrica (Deg.), A number of specimens from North Farm on 5.vii.80.

Dioctria atricapilla (Mg.), 1 ♀ Warren Hill, July 1978, 1 ♂ Leyton Flats, 4.vii.81. *D. baumhaueri* (Mg.), vi-viii. Warren Hill, Hatch Forest, Lords Bushes, Gilbert Slade and Leyton Flats. *D. linearis* (F.), vi-vii. Warren Hill, Lords Bushes and Earls Path. *D. rufipes* (Deg.), 1 ♂ Fairmead, 21.vi.81. In numbers Whitehall Plain, 1976 (E.F.C.C).

SCENOPINIDAE

Commonly called window-flies because they are almost invariably found as adults on windows. The one species recorded below is truly a domestic species; its larvae living on carpets etc., predating the larvae of clothes moths and fleas.

Scenopinus fenestralis (L.), 1 ♀ Buckhurst Hill, 26.vii.81, 1 ♀ Loughton, 30.vi.83.

ACROCERIDAE

This is the only family of Diptera under consideration in this paper for which all the known British species have been recorded in Epping Forest. The small, rotund, bizarre adults are rarely recorded. The larvae are internal parasites of spiders.

Acrocera globulus (Panz. in Mg.), Near the Wake Arms, 16.viii.41 (J.T.E.), Sunshine Plain, 2.viii.80 (possibly this is the same locality as the 1941 record).

Ogcodes gibbosus (L.), Epping Forest, 28.vi.47 (J.T.E.). *O. pallipes* (Latr.), Epping Forest 12.vii.48 (P.B.).

BOMBYLIIDAE

The bee-flies are so called because of their mimicry of bees and the fact that the larvae of many species are parasitic upon those of bees. I have taken only one of the 12 British species.

Bombylius major (L.), iv-v. This species graces many of the grassy rides in the Forest in early spring. Warren Hill, Strawberry Hill, Fairmead, Broadstrood, Staples Road and Connaught Waters.

SYRPHIDAE

The hover-flies are probably the most studied of all groups of British flies and in collecting for this paper I have paid particular attention to this family. The Epping Forest area still retains a rich syrphid fauna. I have collected over 110 species during the six years of the survey and including historical records and records from the literature I now have a list totalling 126 species from the Epping Forest area of the 256 on the British list, with 119 species coming from Epping Forest *sensu stricto*. The larvae of hover-flies exploit a wide variety of micro-habitats as diverse as sap-runs, decaying wood, rot-holes in trees, rotting vegetation, plants and dung. In addition, a number of species feed on aphids and a few are found as commensals in the nests of bees, wasps and ants. Thus a hover-fly fauna rich in species is indicative of a great diversity of habitat as for example is found in a wood-pasture such as Epping Forest.

The most important habitat within Epping Forest is undoubtedly the ancient woodland component. Stubbs (1982) has drawn up a provisional list of 46 species which have a strong association with this habitat in lowland Britain giving each of these species a code which represents: (1) how strongly the species is associated with ancient woodland, and (2) how frequently the species is met with. It is interesting to compare the numbers of species from within this selected group for different localities for which data has so far been obtained.

Hayley Wood, Cambs.	5
Wharnecliffe Wood, S. Yorks.	12
Monks Wood, Hunts.	13
Epping Forest, Essex	20
Windsor Forest, Berks.	29

No doubt in part due to their superior size (Hayley Wood for example is 122 acres, Epping Forest is 6,000 acres) the Forests have a greater proportion of associated ancient woodland species. Windsor with 29 of the 46 is an exceptional site but Epping also has a rich ancient woodland fauna. Interestingly only three species recorded from Epping: *Brachypalpus laphriformis* Fall., *Brachypalpoides lenta* (Mg.), and *Epistrophe nitidicollis* (Mg.), are considered by Stubbs to be grade 1 (i.e. only ever found in ancient woodland) indicator species out of the 12 grade 1 species on the list and just three species on the list found in Epping are Red Data Book status. These species are *Ferdinandea ruficornis* (F.), *Mallota cimbiciformis* (Fall.), and *Pocota personata* (Harris). (Note: the Red Data List has recently been modified by Stubbs (pers. comm.)).

Larvae of the majority of species on the list of ancient woodland indicators are found associated with one or other of the micro-habitats found on over-mature trees (i.e. pollards) or dead trees.

Another important habitat type in the Forest is the acid bog and wet heathland which is now greatly reduced in Essex as a whole. This habitat too has its characteristic species including *Chrysogaster macquarti* Loew, and *Sericomyia silentis* (Har.). Epping may in fact be the only place in Essex where *Sericomyia* still occurs. Typical grassland species include most of the *Platycheirus* spp. and *Chrysotoxum* spp. Aquatic habitats are also very important; the Forest contains innumerable wet ditches and small ponds, home for species such as *Anasimyia lineata* (F.), *A. contracta* Torp & Claus., and the uncommon *A. transfuga* (L.), as well as more frequently encountered species such as the *Helophilus* spp. *Eristalis* spp., *Neoascia* spp. and *Lejogaster metallina* (F.). Interestingly a number of species recorded have a more usually coastal distribution including *Eristalinus aenus* (Scop.), *Helophilus trivittatus* (F.), and *Cheilosia intonsa* Loew.

It is difficult to state definite absences from any given area but I have been baffled by the apparent absence or rarity of a few species. One such is *Pyrophaena granditarsa* (Forst.). I have taken this species in a number of places including counties other than Essex but I have never seen it in Epping Forest. The *Criorhina* spp. are also somewhat enigmatic. They are typically found in ancient woodland, but I have taken only *Criorhina berberina* (F.), in the forest. Other species such as *C. asilica* (Fall.), and *C. floccosa* (Mg.) (the latter I have recently taken in nearby Hainault Forest) should be present. *Criorhina* spp. always appear to have been uncommon in

Epping Forest though in other ancient woodland sites such as Windsor Forest they can be comparatively abundant as adults. More *Cheilosia* spp. will no doubt be added to the list. Interestingly Epping Forest is probably one of the very few sites in Britain where all five species of *Volucella* have been taken.

Nomenclature follows Stubbs and Falk 1983.

Syrphus ribesii (L.), iv-ix. Common throughout. *S. torvus* Osten-Sacken, iv. North Farm, Broadstrood, Connaught Waters and Lords Bushes. *S. vitripennis* Mg., iv-vi, ix, xi. Frequent throughout.

Epistrophe eligans (Har.), v-vi. Frequent throughout. *E. grossulariae* (Mg.), vi-vii. Baldwins Hill (R.M.P.), Fairmead, Earls Path and Broadstrood, almost invariably I take this species on flowers of Umbelliferae in woodland margins. *E. nitidicollis* (Mg.), 2 ♀♀ and 1 ♂ Roebuck Green, 17.vi.79, and 1 ♂ here on 1.vii.79, taken on flowers of heath bedstraw (*Galium saxatile*).

Metasyrphus corollae (F.), vi-ix. Sunshine Plain, Lords Bushes and South Woodford (E.H.M.) probably more frequent than my records suggest. *M. latifasciatus* (Macq.), iv-ix. North Farm, Roebuck Green, Lords Bushes, Warren Hill, Whitehall Plain, Sunshine Plain and Fairmead. *M. luniger* (Mg.), iv-x. Frequent throughout.

Scaeva pyrastri (L.), vii-viii. Lords Bushes, Warren Hill, Buckhurst Hill and South Woodford (E.H.M.). The occurrence of this migratory species seems to fluctuate greatly year by year. *S. selenitica* (Mg.), Wanstead 25.iv.60 (E.H.M.).

Dasysyrphus albostriatus (Fall.), v-vi, viii-ix. North Farm, Earls Path and Lords Bushes. *D. tricinctus* (Fall.), v-vi, viii. North Farm, Potkiln Wood and Lords Bushes. *D. venustus* (Mg.), v-vi. Warren Pond, Warren Hill, North Farm, Lords Bushes and the Lower Forest.

Leucozona lucorum (L.) v-vi. Warren Hill, Kemps Lawn and the Lower Forest.

Melangyna labiatarum (Verr.), vi. Warren Pond, Warren Hill, Staples Road and Woodredon. *M. lasiopthalma* (Zett.), iv-v. North Farm, Warren Hill, Lords Bushes, Roebuck Green and Connaught Waters. Taken on the flowers of maple (*Acer campestre*), sallow (*Salix caprea*) and blackthorn (*Prunus spinosa*). *M. umbellatarum* (F.), Epping Forest n.d. (C.O.H.). *M. cincta* (Fall.), v-vii. Pole Hill, Warren Hill, Broadstrood, Roebuck Green and Lords Bushes. I often find this species hovering in dense shade and feeding on the blossom of sycamore (*Acer pseudoplatanus*). *M. triangulifera* (Zett.), 3 ♂♂ Warren Hill, 12.v.84 (S.J.F.).

Parasyrphus punctulatus (Verr.), iv-v. North Farm, Whitehall Plain, Connaught Waters, Lords Bushes and Broadstrood. I have found this species on blackthorn, sallow and cherry laurel (*Prunus laurocerasus*) blossoms.

Xanthogramma citrofasciatum (Deg.), 1 ♀ North Farm 17.v.80. *X. pedissequum* (Har.), vi-vii, ix. Pole Hill, Warren Pond, Lords Bushes and Fairmead.

Meliscaeva auricollis (Mg.), iv-ix. North Farm, Lords Bushes, Roebuck Green, Warren Hill and Pole Hill. I have netted this species on the flowers of sallow. *M. cinctella* (Zett.), v, viii. Broadstrood, Warren Hill and Lords Bushes. I have taken this species on flowers of sycamore and wild angelica (*Angelica sylvestris*).

Episyrphus balteatus (Deg.), ii-iii, vi-xi. Common throughout. In January 1979 I found a number of dead specimens at the end of four small tunnels in a dead beech tree at Hill Wood, presumably the work of a Crabronid wasp.

Sphaerophoria menthastri agg. Epping Forest 31.v.59 (E.T.L.). *S. scripta* (L.), iv-ix. Frequent throughout in grassland. *S. taeniata* (Mg.)* 1 ♂ Roebuck Green 25.v.80.

Chrysotoxum bicinctum (L.), vi-viii. Yardley Hill, North Farm, Hatch Forest and Warren Hill. *C. cautum* (Har.), vi. Warren Hill, Warren Pond, Lords Bushes and Epping (E.H.M.). *C. festivum* (L.), 1 ♀ 7.vii.79 and 1 ♂ 25.vii.79 Lords Bushes, 1 ♂ North Farm 11.vii.83. *C. verralli* Col., 1 ♀ North Farm, July 1978 and 1 ♀ Hatch Forest, 13.viii.78.

Baccha sp. v-x. Frequent throughout. There is still some uncertainty over the specific status of this species, though the specimens I have key to *B. obscuripennis* Mg.

Melanostoma mellinum (L.), v, vii-viii. Warren Hill, North Farm, Lords Bushes, Hatch Forest and Gilbert Slade. *M. scalare* (F.), iv-x. Common throughout. I found 122 of both sexes attached to the stems of common ragwort (*Senecio jacobaea*) plants on Warren Hill. All were dead, infected with a fungus, presumably *Entomophthora muscae*.

Platycheirus albimanus (F.), iv-x. Common throughout. *P. angustatus* (Zett.), v-vii, ix. North Farm, Lords Bushes, Chingford Plain and Gilbert Slade. *P. clypeatus* (Mg.), v-ix, xi. Frequent throughout. *P. fulviventris* (Macq.), vi-vii. Lord Bushes, Staples Road and Wake Valley Pond. *P. manicatus* (Mg.), v-vi. Frequent throughout. *P. peltatus* (Mg.), v-vi, viii. Hawk Wood, Lords Bushes and North Farm. *P. scutatus* (Mg.), v-vi, viii. Frequent throughout. *P. tarsalis* (Schum.)*, v. Warren Hill, Pole Hill, North Farm and near the Robin Hood. This apparently rare species flies, in my experience, only in the last two weeks in May. I have taken it on flowers of Ladies' Smock (*Cardamine pratensis*) and Greater Stichwort (*Stellaria holostea*). *P. ambiguus* (Fall.), iv-v. Whitehall Plain, North Farm, Roebuck Green and Warren Hill. An early spring species almost always taken on blackthorn, occasionally apple (*Malus sylvestris*) blossom.

Pyrophaena rosarum (F.), v-ix. North Farm, Broadstrood, Chingford Plain, Staples Road, Fairmead and Hill Wood. Almost always swept from damp areas with buttercups (*Ranunculus spp.*).

Paragus sp. 1 ♀ Claybury Woods, Woodford 14.vi.81.

The taxonomic characters which separate the members of the genus *Pipiza* tend to be rather variable and the specific status of some species is not yet fully known. It would thus be advisable to treat the records of *P. bimaculata* and *P. fenestrata* with some caution.

Pipiza austriaca Mg., 1 ♀ Hawk Wood, June 1978, 1 ♂ Fairmead 1.viii.82 and 1 ♀ Fairmead 22.vi.83. *P. bimaculata* Mg., Loughton. 28.vii.63 (R.M.P.). *P. fenestrata* Mg., 1 ♀ Roding Valley at Loughton, 17.iv.81. *P. luteitarsis* Zett., v. Warren Hill, Whitehall Plain, Pole Hill and Lords Bushes. Quite frequent in the Forest and always an early spring species, I have taken it on maple, sycamore and apple blossom. *P. noctiluca* (L.), v-vi, viii. Frequent throughout.

Pipizella varipes (Mg.), v-vii. Frequent throughout. *P. virens* (F.), 1 ♀ Fairmead 15.vi.80.

Heringia heringi (Zett.), 1 ♂ Claybury Woods, Woodford 4.v.81.

Neocnemedon latitarsis (Egger), 1 ♂ Epping Forest 25.viii.46, taken as the prey of the spider *Meta segmentata* (L.P.). *N. vitripennis* (Mg.), v, vii-viii. Lords Bushes, Whitehall Plain and Warren Hill.

Cheilosia albipila Mg., Epping Forest 7.iv.1896 (F.B.J.). *C. albitarsis* Mg., v-vii. Frequent throughout, always found on buttercup (*Ranunculus spp.*). *C. fraterna* (Mg.) High Beach 28.v.50, (C.O.H.). *C. grossa* (Fall.), 1 ♀ Lords Bushes 14.iv.79, 1 ♂ North Farm 4.v.79, 1 ♀ Staples Road 18.iv.79. *C. honesta* Rond., 1 ♂ Yardley Hill 15.v.79 on chickweed (*Stellaria media*). *C. illustrata* (Har.), Epping 28.vii.62 (E.H.M.), this species in my experience is rather uncommon in Epping Forest. *C. intonsa* Loew, 1 ♀ Hatch Forest 8.x.78. *C. paganus* (Mg.), iv-vi, ix-x. Frequent throughout. *C. praecox* (Zett.). 1 ♂ North Farm, 1 ♂ Warren Hill, 1 ♂ Strawberry Hill all taken 13.v.79. *C. proxima* (Zett.), (The species D. of Stubbs and Falk (1983)) 1 ♀ North Farm 18.v.79. *C. scutellata* (Fall.), vi-ix. Locally frequent throughout, almost invariably on flowers of Umbelliferae. I have taken it on hemlock water-dropwort (*Oenanthe crocata*), wild angelica, ground elder (*Aegopodium podagraria*) and also gipsywort (*Lycopus europaeus*). *C. vernalis* (Fall.), iv-x. Frequent throughout. *C. variabilis* (Panz.), v-vi. Potkiln Wood, Warren Hill, Whitehall Plain, Fairmead and the Lower Forest.

Portevinia maculata (Fall.)*, Claybury Woods, Woodford May 1981. This species was seen in numbers (all males) flying about ramsons (*Allium ursinum*). I have looked for this species on the big patch of ramsons behind the Robin Hood but have so far not seen it there.

Rhingia campestris Mg., v-ix. Hatch Forest, Fairmead, Pole Hill and Whitehall Plain. This species with its dung-feeding larva presumably would be met with more frequently if more cattle grazed the Forest.

Ferdinandea cuprea (Scop.), 1 ♂ Lords Bushes 10.vi.79, Wanstead Park 25.vi.60 (E.H.M.), Epping 4.vi.60 (E.H.M.). *F. ruficornis* (F.), Epping Forest 21.v.46 (C.O.H.).

Myolepta luteola (Gmel.), 1 ♂ Earls Path 15.vi.80, also in numbers here on 21.vi.81, 2 ♂♂ Hill Wood 22.vi.83. I have found this species feeding on ground elder flowers.

Chrysogaster hirtella Loew, 1 ♂ Warren Pond 11.v.80, 2 ♂♂ Staples Road 7.vi.80 and Fairmead Pond 22.vi.83. *C. macquarti* Loew, 2 ♂♂ Fairmead on 3.vi.81 and 21.vi.81. *C. solstitialis* (Fall.), 1 ♂ Earls Path 21.vi.81, 2 ♂♂ Fairmead 21.vii.81. *Lejogaster metallina* (F.), v-viii. Whitehall Plain, Warren Pond and Fairmead in wet flushes.

Orthonevra brevicornis (Mg.)*, 3 ♂♂ and 1 ♀ Whitehall Plain 17.v.80. *O. nobilis* (F.), 2 ♂♂ Roebuck Green 17.vi.79 taken on flowers of Heath Bedstraw. *O. splendens* (Mg.), 2 ♂♂ Whitehall Plain 17.v.80.

Brachyopa insensilis Col., 1 ♀ North Farm 16.v.83 taken on a horse chestnut (*Aesculus hippocastanum*) sap-run by the road.

Sphegina clunipes (Fall.), Wake Valley 16.vii.69 (A.A.A.), 1 ♀ Warren Hill 27.vii.80. *S. kimakowiczi* Strobl., 1 ♂ Lords Bushes 5.vii.83.

Neoascia meticulosa Scop., (*aenea* sensu Coe 1953), Epping 20.vii.52 (C.H.A.), Loughton in pond by the High Road in numbers 16.v.83. *N. tenur* Har., (*dispar* sensu Coe 1953), 1 ♂ Fairmead Pond 7.ix.80, 1 ♀ Kemps Lawn 14.vi.81. *N. obliqua* Coe, (Loughton), 18.v.46 (C.N.C.). This record requires confirmation. *N. podagrica* F., v-ix. Frequent throughout.

Eumerus strigatus (Fall.), 1 ♀ High Beach 27.vii.79. *E. tuberculatus* Rond., v-viii, x. Earls Path, Chingford Plain and Lords Bushes, also very common in local gardens.

Fig. 1 *Sericomyia silentis* (Har.)

Volucella bombylans L., vi-viii. Pole Hill, North Farm, Lords Bushes and Fairmead. *V. inanis* (L.), vii-viii. North Farm, Warren Hill, Whitehall Plain, Fairmead and Wanstead Park (E.H.M.). I have taken this species feeding on the flowers of bramble (*Rubus fruticosus*) and creeping thistle (*Cirsium arvense*). *V. inflata* (F.), 1 ♀ Wintry Wood 27.vi.48 (A.W.J.). *V. pellucens* (L.), vi-viii. Frequent throughout. *V. zonaria* (Poda), vii-ix. Fairmead, also numerous records from gardens in Wanstead (E.H.M.), Leytonstone (D.A.E.), South Woodford (E.H.M.), and Buckhurst Hill.

Sericomyia silentis (Har.), 1 ♀ Sunshine Plain 2.x.78 and a further ♀ here on 7.ix.80, also 1 ♂ and 1 ♀ Hill Wood 22.vi.83. I have found this species on flowers of bramble and ling (*Calluna vulgaris*).

Xylota abiens Mg.*, 1 ♂ Furze Ground 14.vii.83. *X. segnis* L., v-ix. Frequent throughout. *X. sylvarum* L., vi-viii. Broadstrood, Warren Hill, Warren Pond, Lords Bushes, Hill Wood and Earls Path. *X. xanthocnema* Col., 1 ♂ Hill Wood 1.vii.83.

Chalcosyrphus nemorum (F.), vi-vii, ix. Broadstrood, Lords Bushes, Earls Path and Hill Wood.

Brachypalpoides lenta (Mg.), 1 ♂, 1 ♀ Roebuck Green 17.vi.79, 1 ♂ Earls Path 21.vi.81, 1 ♂ Hill Wood 22.vi.83. I have taken this species feeding on the flowers of heath bedstraw.

Brachypalpus laphriformis Fall., Epping Forest 12.v.12 (P.H.); Epping Forest 6.vi.22 and a further specimen a week later (F.B.J.).

Syritta pipiens (L.), v-xi. Frequent throughout.

Pocota personata (Har.), J. F. Shillito reared a series of 41 specimens of this magnificent insect in its lemon-yellow form from pupae collected from a cavity in a beech tree at High Beach; emergences of the adult fly took place between 23rd April and 2nd May 1947. Shillito released the majority of these insects on the edge of the Forest (Payne 1973/4). Possibly the lemon-yellow colour is teneral: the six Shillito specimens in the B.M.N.H. collection are now typical.

Criorhina berberina (F.), Lower Forest 2.vii.51 (A.W.J.), 2 ♂♂ Hill Wood (inc. f. *oxyacanthae* (Mg.)), 1 ♂ and 1 ♀ Woodredon 15.vi.80 and 1 ♀ Fairmead 23.vi.83.

Merodon equestris (F.), v-vii. Frequent throughout.

Helophilus hybridus Loew, v, vii-viii, x. Hatch Forest, Lords Bushes, North Farm, Pole Hill and Fairmead. *H. trivittatus* (F.), 1 ♀ Hatch Forest 19.viii.78, Lords Bushes 24.vi.79 and another specimen seen on 15.vii.79. *H. pendulus* (L.), v-ix. Frequent throughout.

Anasimyia contracta Torp and Claus.*, 1 ♂ Staples Road 7.vi.80, 2 ♂♂ Fairmead Pond on 21.vi.81 and 1.vii.83. *A. lineata* (F.), v-vii. Warren Pond, Whitehall Plain, North Farm, Lords Bushes and Fairmead. *A. transfuga* (L.), 1 ♀ Staples Road 7.vi.80.

Parhelophilus frutetorum (F.), vi-vii. Warren Pond, Hill Wood, Lower Forest and Leyton Flats. *P. versicolor* (F.), vi-vii. Lords Bushes, Baldwins Hill, Staples Road, Earls Path and Fairmead.

Mallota cimbiciformis (Fall.)*, Of 7 or 8 specimens seen, I took 1 ♀, 1 ♂ and 2 ♂♂ at Hill Wood on 22.vi.83 and 1.vii.83 respectively. This fine insect was flying with great speed low over bramble patches; 1 ♂ was also noted feeding at bramble flowers.

Eristalis arbustorum (L.), v-ix. Frequent throughout. *E. horticola* (Deg.), 1 ♀ Warren Hill 14.vi.80, 1 ♀ Earls Path 15.vi.80, on the latter occasion feeding on ground elder flowers. *E. intricarius* (L.), iv-vii. Frequent throughout. *E. nemorum* (L.), vi-ix. Hatch Forest, Lords Bushes, Staples Road and South Woodford (E.H.M.). *E. pertinax* (Scop.), iv, vi-ix,xi. Frequent throughout. *E. tenax* (L.), iv-xi. Frequent throughout.

Eristalinus aeneus (Scop.), Epping 12.vii.62 (E.H.M.), 1 ♀ North Farm 22.iv.79 (S.J.F.). *E. sepulchralis* (L.), v-vii. Strawberry Hill Pond, Warren Pond, North Farm, Lords Bushes, Fairmead and Lower Forest.

Myathropa florea (L.), v-xi. Frequent throughout.

CONOPIDAE

The so-called thick-headed flies (most species have unusually wide heads) as larvae are endoparasitic on adult bees and wasps. I have records of just 7 of the 24 British species.

The identification of this family follows Smith (1969).

Conops flavipes L., viii. North Farm, Staples Road and Whitehall Plain. *C. quadrifasciata* Deg., viii-x. Fairmead, near Wake Arms, North Farm, Lords Bushes, Chingford Plain and Sunshine Plain.

Leopoldius signatus (Wied.)*, 1 ♂ Buckhurst Hill 14.ix.78, taken about flowering ivy (*Hedera helix*) on a garden wall.

Physocephala rufipes (F.), Loughton, Epping Forest 15.vii.34 (L.P.), 1 ♂ North Farm July 1978.

Myopa tessellatipennis (Motsch.), 3 ♂♂ Epping forest 26.iv.1896 and 19.iv.06 (F.B.J.). *M. testacea* (L.), 1 ♂ Potkiln Wood 19.v.79, 1 ♀ Pole Hill 11.v.80.

Sicus ferrugineus (L.), 1 ♂ North Farm July 1978.

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MAPS AND REFERENCES

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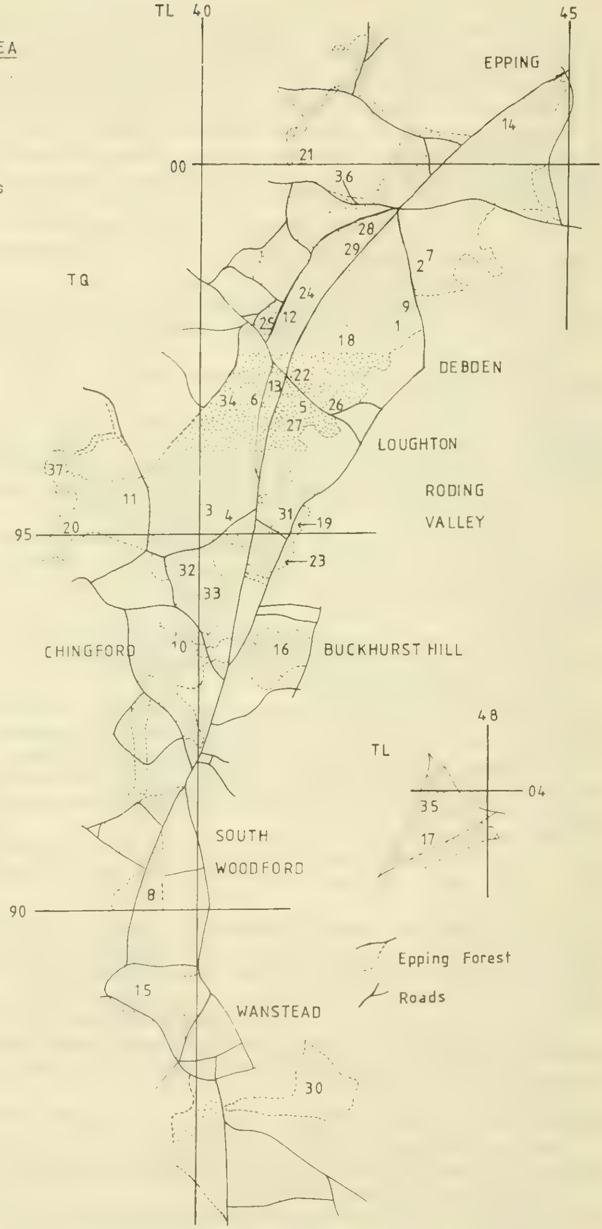
THE EPPING FOREST AREA

1. Baldwins Hill
2. Broadstrood
3. Chingford Plain
4. Connaught Waters
5. Earls Path
6. Fairmead
7. Furze Ground
8. Gilbert Slade
9. Goldings Hill
10. Hatch Forest
11. Hawk Wood
12. High Beach
13. Hill Wood
14. Kemps Lawn
15. Leyton Flats
16. Lords Bushes
17. Lower Forest
18. Monks Wood
19. North Farm
20. Pole Hill
21. Potkiln Wood
22. Robin Hood
23. Roebuck Green
24. Rushey Plain
25. Speakmans Pond
26. Staples Road
27. Strawberry Hill
28. Sunshine Plain
29. Wake Valley
30. Wanstead Park
31. Warren Hill
32. Warren Pond
33. Whitehall Plain
34. Whitehouse Plain
35. Wintry Wood
36. Woodredon
37. Yardley Hill



Colour Identification Guide to the Moths of the British Isles, by B. Skinner and D. Wilson, x + 163 pp. of text and appendices, 42 coloured plates, i + 57 text figures. Viking, London, 1984. Price £20.

The author states in the Preface that the prime object of this book is to provide coloured illustrations which will enable those interested to identify by wing pattern almost all those species of larger moths traditionally called macrolepidoptera which are likely to be encountered in the British Isles. The second aim is to contain all the illustrations and text material within a single, moderately sized volume. The result is a beautiful, concise, accurate and informative book which comes within the price range of any committed lepidopterist.

Very nearly all the species recorded in the British Isles are included among the 1,600 or more colour illustrations, together with many local races and interesting forms; a further 29 are mentioned in the text, all of which refer to single specimens or species that have not been reported in the region for many years. The illustrations themselves are mostly of specimens in Mr. Skinner's own immaculate collection. They are very good indeed, and far superior to any others available in British literature, though something has been lost in making reproductions from Mr. Wilson's excellent original photographs. On the whole, the greens have failed to come out properly, as in the *Chloroclystis* spp. (Pl.10), the green forms of *Hylaea fasciaria* (Pl.17) and *Calamia tridens occidentalis* (Pl.39), but the moths are readily recognisable. A few of the plates are a trifle 'wishy-washy', but again this hardly detracts from their usefulness as aids to identification. I find only one figure that fails to convey the message, that of *Hydrelia sylvata* f. *goodwini* (Pl.11, fig. 27), which looks no darker than the typical individual next to it. The use of a faintly tinted background and subtle use of a hint of shadow makes the subjects stand out in a most realistic manner. The captions are tabled opposite the plates and cross referred to the text.

The brief text is under the subtitles *Similar species*, *Variation*, *Imago* and *Larva*, though not every species is given a mention under the first two of these sections. For the sake of brevity, the *Similar species* section is often just a cross reference to the alternative species and to appropriate colour figures; it is sometimes reinforced by delicate and accurate line drawings, again by Mr. Wilson, and it is unfortunate that some of these, too, have lost their sharpness in reproduction. The reviewer feels that the use of a little more space to spell out some of the more subtle differences would have been justified, and regrets the authors decided against including genitalia figures, which would have completed the book as a tool for identification of our moths. The one genitalia study which has been included, comparing the male valvae of *Acronicta tridens* and *A. psi* (fig.40) as seen after brushing away the scales at the tip of the abdomen, shows what the artist could have achieved. The section on *Variation* is treated erratically, and may include information on sexual and seasonal differences, local races or well known aberrations. Under *Imago*, the wingspan is always stated; information on similar species and on habitats and distribution is provided here, when appropriate. Details of all records of the very rare vagrants are given in full. Rightly, in the reviewer's opinion, there has been no attempt to describe the *Larva*, but notes on habits, foodplants and other scraps of useful information are given, and the readers is invariably told in what stage the species overwinters.

The Glossary which precedes the text is rather trivial and one wonders whether its inclusion was necessary (we are told, for instance, that frass = larval droppings).

There is, however, a very good figure showing the superficial features of body and wings of a moth, clearly and usefully labelled.

Following the colour plates there is a page which includes a list of species which it is now illegal to collect or molest in any way, a short *Bibliography and further reading* section, and the addresses of the three national entomological societies. Next comes a two page list of the scientific names of foodplants mentioned in the text, a compact and non-repetitive way of including this information. Finally, there are separate *Indices* of scientific and English names. The last entry in the English index is the Yorkshire Y, referred to p.151 as a synonym of Essex Y. According to the text, the only two British specimens are from Essex and *Hampshire*, and 'Yorkshire Y' is not mentioned! The anomaly has been resolved by Mr. Skinner: there *is* an ancient record from—Yorkshire!

The nomenclature used is that of Bradley and Fletcher (1979), *A Recorder's Log Book of British Butterflies and Moths*, updated. The book seems to be almost entirely free of misprints: the only one of any consequence, perhaps, is under *Lymantria monacha* (p.76) where the black f. *eremita* is incorrectly spelt.

One feels that it would be impertinent to criticise this fine book. Those of us who knew it was on the way can scarcely be disappointed now that it has been published, for it fulfils all one could reasonably expect from the pen of the Master and the camera of one of our best amateur photographers. To those who were unaware of his other talent, Mr. Wilson's drawings came as a surprise and a delight. B.G.

Spiders of the World, by Rod and Ken Preston-Mafham. Blandford Press, 1984. 191pp., 61 col. pls., 69 figs., appendix and glossary. £8.95.

It is indicated in the preface that the purpose of this book is to provide a much needed general introduction to spiders for the non-specialist, thus filling the gap which existed at this level in natural history books. The book clearly reaches this target and is a beautifully illustrated and clear descriptive account of the range of diversity in both structure and life-styles to be found in spiders throughout the world.

The opening chapters are a very readable account relating spiders to other arthropods with text figures showing their internal and external features. This naturally leads on to a chapter on classification where some 26 families are described and illustrated with photographs.

Chapters on the behavioural aspects of spider biology: courtship, mating, life histories, prey capture and defence mechanisms run to over 100 pages of text with illustrations. The chapter on defence mechanisms is where the book is probably most appealing and where the authors have been able to provide from their foreign travels such superb illustrations of crypsis and mimicry.

It is perhaps an indirect tribute to former distinguished arachnologists, in particular the late W. S. Bristowe, that some of their very familiar line-drawings appear to be re-drawn for this present volume. A few errors have crept in here, the most noticeable being the conversion of the stridulating file on the linyphid chelicera into setae on p. 23, and a moulting spider defying the laws of gravity on p. 97!

The book is well indexed and the useful appendix and glossary will help the novice graduate to a higher level. Above all, acknowledgement must be given for the variety and high quality of fine photographs which surely represent a vast amount of time, patience and photographic skill. The colourful and bizarre forms shown can only make the reader more fascinated by the variety of these small animals that occur in every continent. C.I.C.

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VOLTINISM IN BRITISH *AGLAIS URTICAE* (L.) (LEP.: NYMPHALIDAE): VARIATION IN SPACE AND TIME

by R. L. H. DENNIS

The Manchester Grammar School, Manchester M13 0XT

Several British butterflies are known to vary in the number of broods they have. This variation can be geographical, with fewer broods to the north in *P. brassicae* L., *P. napi* L., *C. minimus* F., *C. argiolus* L. *P. aegeria* L. and *C. pamphilus* L. (Heath *et al.* 1984; Lees 1962, 1965, 1969, 1970, Dennis 1977). Voltinism can also differ from year to year and many butterflies do occasionally have additional broods, *e.g. P. machaon* L., *L. sinapis* L., *A. cardamines* L., *L. phlaeas* L. (a third brood), *C. minimus* F., *L. coridon* Poda, *I. io* L., *B. selene* D and S, *A. euphrosyne* L. (Heath *et al.* 1984, Collier 1961; Payne 1972). These additional broods are generally partial, of very small size and occur but infrequently. However, annual variation in voltinism of the Small Tortoiseshell seems to be on a very different scale. The typical pattern allegedly comprises two broods in England and one brood in Scotland (Thomson 1980). In England, overwintering adults appear in April and lay eggs which produce adults in June and early July. These in turn mate and lay eggs resulting in a second brood in August. In Scotland, overwintering adults appear later and produce a single brood in mid-July onwards. As with second brood adults in England, these then feed up for hibernation. In fact, the situation is more flexible than this as the number of broods varies from year to year, both in this country and on the continent, for instance in Scandinavia (Pyornila 1976a; Henriksen and Kreutzer 1982). In Cheshire (U.K.), evidence from distinct periods of larval webs points to two large broods in 1982 and 1984, but apparently only one in 1983. More recent evidence from the British Butterfly Monitoring Scheme (see Pollard 1979; Heath *et al.* 1984) has confirmed these observations. It has also provided indirect evidence that the second brood in southern England may often be a partial one, with late emerging adults of the first brood feeding up and then entering hibernation.

These observations have encouraged a more careful examination of the BBMS data for several widely spaced sites over the past three years. The BBMS data comprise weekly counts made from transects (between April 1 and September 30 each year) at some 80 sites covering the length of mainland Britain. Details of the transect technique, conditions under which transects are carried out and tests of accuracy (error between observers, influence of weather) are discussed elsewhere (see Pollard *et al.* 1975; Pollard 1977 and 1979). However, before referring to details from this scheme some of the limitations of the data should be briefly considered; those, that is, which may influence the interpretation of *A. urticae* broods. It is especially important to realize that the transects are discontinued at the end of week 26 in September, even though some *A. urticae* have not emerged at this time in some years (Luker 1984). The size of broods along a BBMS transect depends on the availability and proximity of the hostplants (*Urtica dioica* L. and *U. urens* L.) and nectar sources. The behaviour of butterflies procreating a new generation is very different to those preparing for hibernation. The first set up territories around nettle patches and the second are involved in intensive nectaring (Baker 1972). As a result, the adults from the first and second broods can differ in their local geography and therefore in their seasonal occurrence along transects. Thus counts from different sites are not comparable, particularly as transects vary in length, nor strictly (depending on what is being compared) are counts from the same site during different broods. It has been suggested that late butterflies in Scotland could comprise individuals that have migrated north. Thomson (1980 p. 138) suggests that these butterflies can be distinguished from local 'non-migrants' by the amount of wing wear and by differences in marking. It is possible too that the longevity of some adults may confuse the pattern of broods.

WHAT PATTERNS OCCUR IN ADULT EMERGENCE?

BBMS data for the past nine years reveal distinctive and changing patterns of emergence (see figure 1; Pollard 1981; Heath *et al.* 1984). The variation has three obvious components.

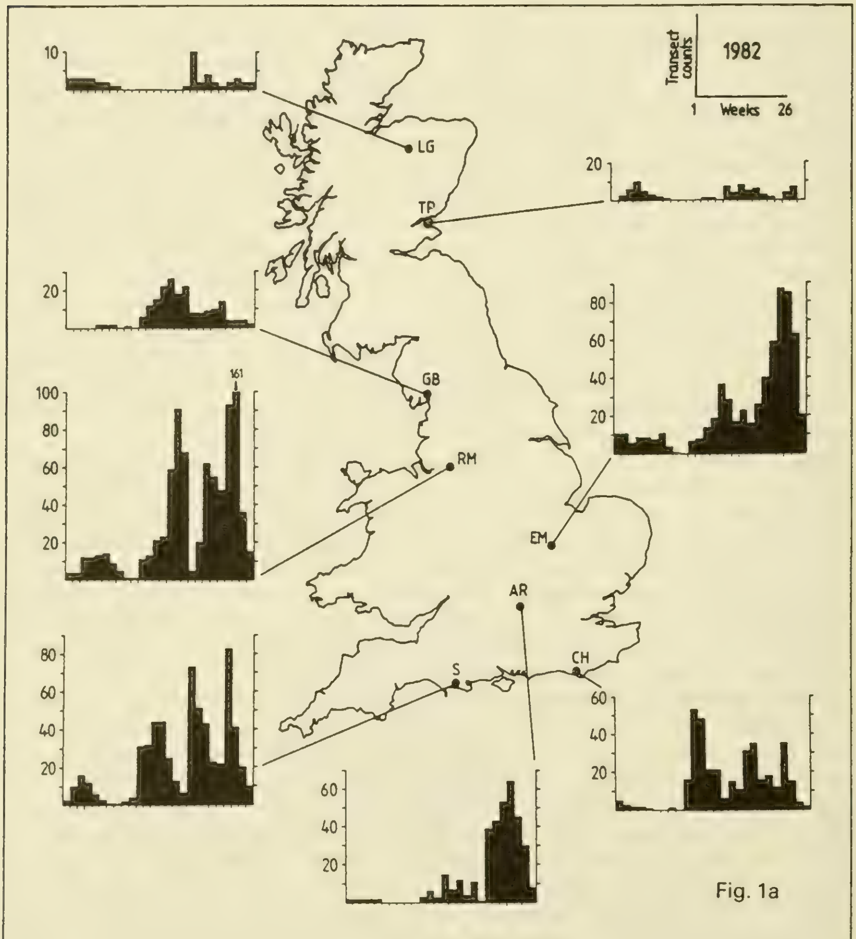

Fig. 1a

The number of broods can vary from year to year over much of the British Isles. For instance, two broods occurred well into Scotland in 1982 and 1984, but only in the southern half of Britain is there some evidence of a second brood in 1983 and this may not have been successful. Luker (1984) reports on a batch of some 100 larvae in October which pupated as late as December (in open conditions). Although some of those emerged, all died by Christmas having failed to feed.

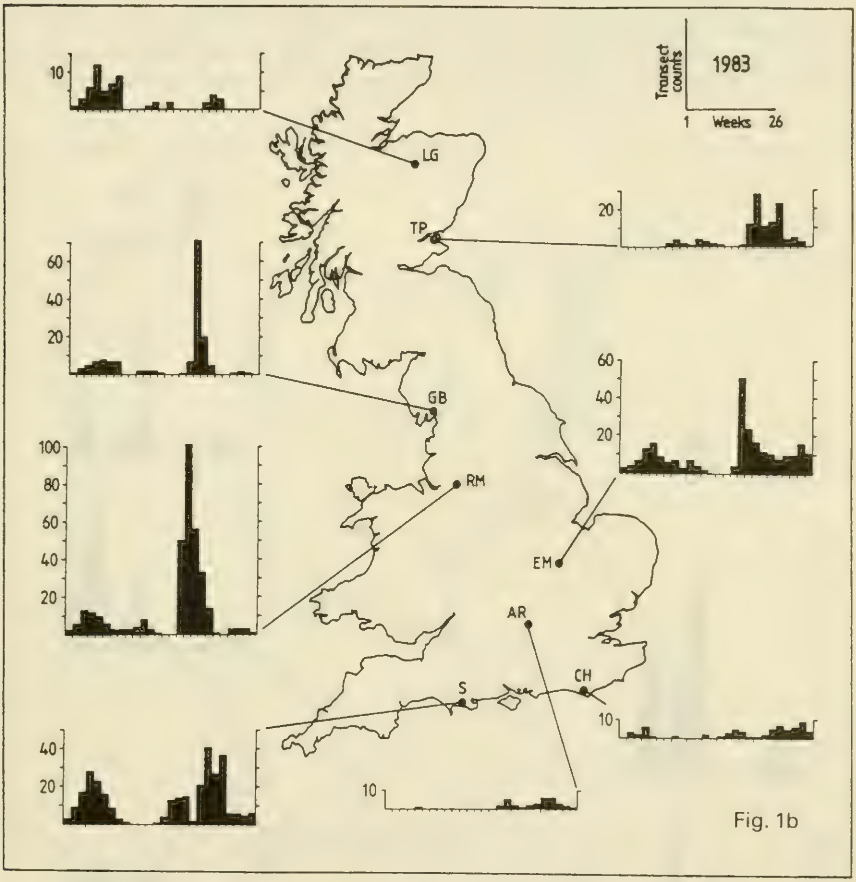

Fig. 1. Weekly counts of *Aglais urticae* along transects at eight sites in mainland Britain for three years: (a) 1982; (b) 1983; (c) 1984. Sites: LG, Loch Garten; TP, Tentsmuir Point and Morton Lochs; GB, Gait Barrow and Castle Hill; RM, Rostherne Mere; EM, East Midlands (Woodwalton Fen, Monks Wood, Woodhurst, Holme Fen, Bevills Wood); AR, Aston Rowant north and south; S, Swanage and Radipole Lake; CH, Castle Hill, Woods Mill and Lullington Heath. Week 1 starts on April 1st in each year. Courtesy of Dr. E. Pollard (data from ITE BBMS).

Secondly, partial broods appear to be a characteristic feature of *A. urticae* phenology. Typically, larger numbers of adults occur for second broods than first broods in southern England. During 1979 and 1983, this pattern broke down and implies that at most only the first of the summer butterflies to emerge mated to produce a second brood. Partial broods may be more common in northern Britian. There is perhaps some suggestion from the Rostherne Mere data (figure 1b) that a very small second brood occurred in Cheshire in 1983 (not witnessed during the egglaying survey in the Bollin valley; Dennis 1984), but the September adults this year could also have been late first brood individuals feeding up for autumn. Transect data certainly require careful interpretation. Even when two obvious broods occur, as along the southern English coast in 1984, it cannot be assumed that all the individuals of the first brood mate to produce a second. That many 'tail-enders' of the

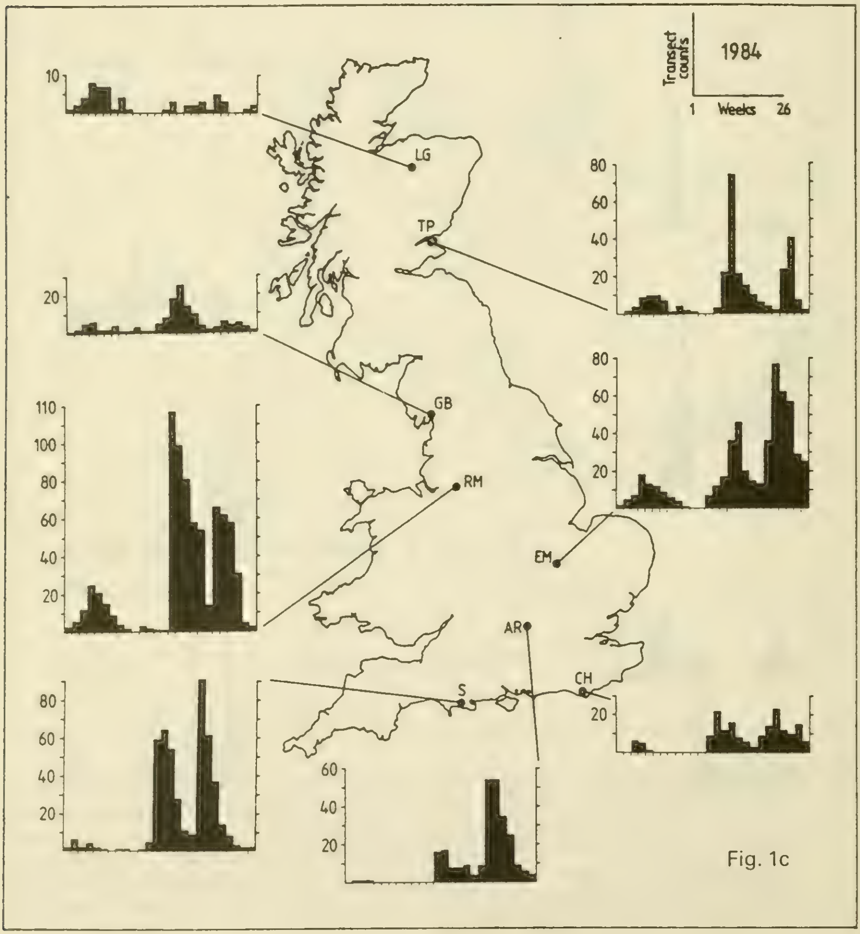

Fig. 1c

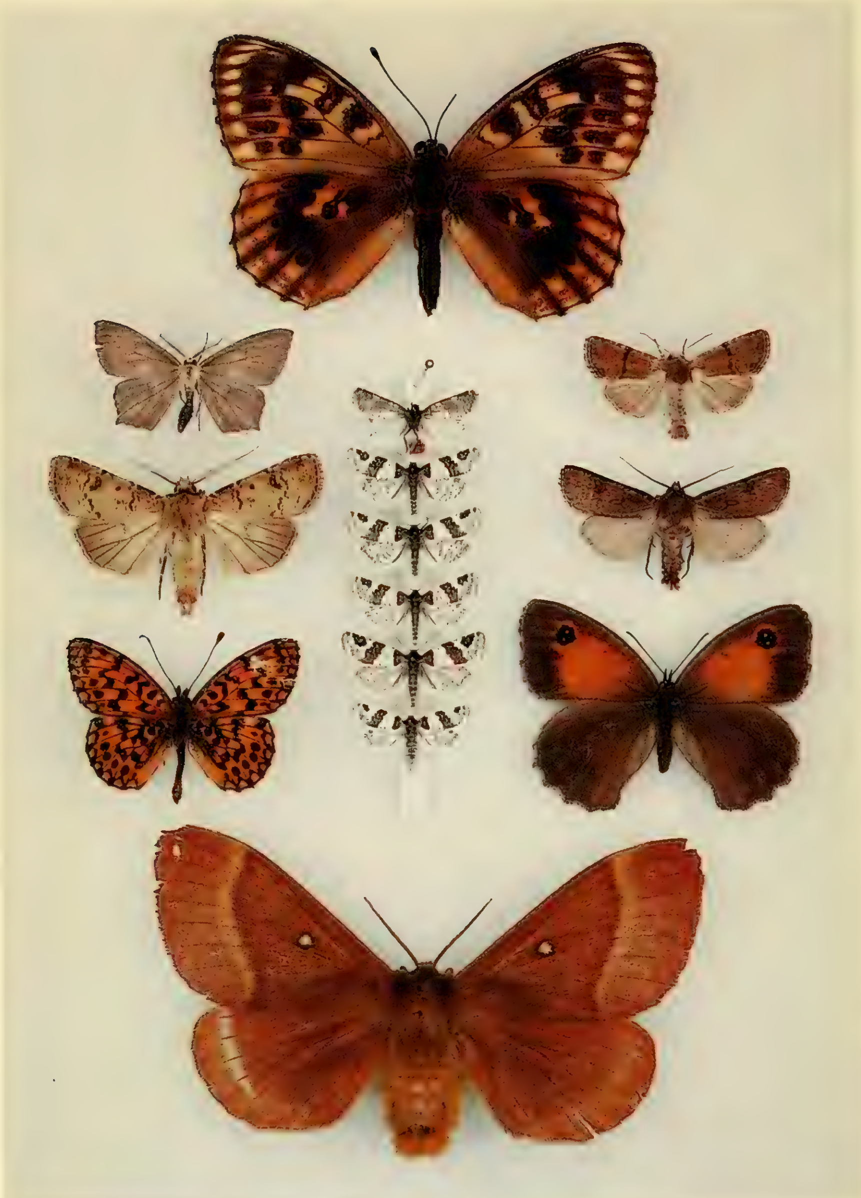

PLATE 1. ANNUAL EXHIBITION

T. griseata
Playden 5.x.84, M.Tweedie

A. aglaia
A.Moon

M. furuncula ab. vinctiuncula
Highcliffe, Dorset, E.Wild

Paraclepsis cinctana
Tiree 30.vi.84, M.Harper, M.Young

Agrotis clavis, Addington, Sy vi.84, B.Skinner
Boloria dia, N.Downs, Sy 26.viii.84, P.J.Cribb

Agrotis puta, Addington 14.vi.84, B.Skinner
M. tithonus Waresley, Beds. 6.viii.84, B.Fensome

Lasiocampa quercus
Hadham, Herts. 14.vii.84, D.Wilson

PLATE 2 ANNUAL EXHIBITION

Aglais urticae
Mere Downs, Wilts 29.viii.84, G.Trebilcock

Orth. gracilis Ledbury, Heref. 12.iv.84, M.Harper

Archanara sparganii, Shell Bay, Sflk 5.viii.84 and
P.fagana, Downham Mkt, Nflk 8.vii.84 both M.Halsey

L. coridon, Hants 15.viii.84 E.Simson

Diloba caeruleocephala
Larva Warwick vi.84, J.Halsey

Boloria euphrosyne ab. *albinia*
Parkhurst, I.o.W. 30.v.84, D.Trew

Maniola jurtina ab. *alba,* H.Phelps

O. sambucaria ab. *olivacea*
Sheppey, Kent 8.vii.72, F. Clouter

Apatura iris ab. *iolata*
Surrey 13.vii.84, A.Jones

first emergence feed up and pass directly into hibernation is perhaps suggested by much lower adult numbers 7 to 9 weeks later when their progeny would be expected (but see below for other factors involved). Thirdly, the timing and duration of corresponding broods in different years is considerably influenced by weather conditions. The pattern of emergence within broods can also vary to produce more than one peak (polymodality). Occasionally, bimodal peaks may simulate the appearance of separate broods and the two phenomena can then only be distinguished by relating development under controlled conditions to the pattern of weather.

All these features of voltinism in *A. urticae* are illustrated in transect counts from 1982, 1983 and 1984 (figures 1a, 1b and 1c) which can be compared with weather data obtained from the London Weather Centre. Figures for maximum temperatures, rainfall and sunshine are displayed in figure 2 as deviations from mean conditions for the period 1941 to 1970 to highlight better the contrasts between different years. In 1982 and 1984, two broods occurred throughout much of Britain, although the pattern is less clear and difficult to interpret in Scotland, especially in the far north. Certainly, a second brood occurred at Tentsmuir/Morton Lochs in 1984. In 1983, evidence for second broods (probably partial) is found as far north as the English Midlands, but it would be unwise to interpret the small late peaks in Cheshire, Lancashire and further north as such. It is noticeable, in this year, that spring adults had an extended flight period. Thus it is more probable that the two peaks have been

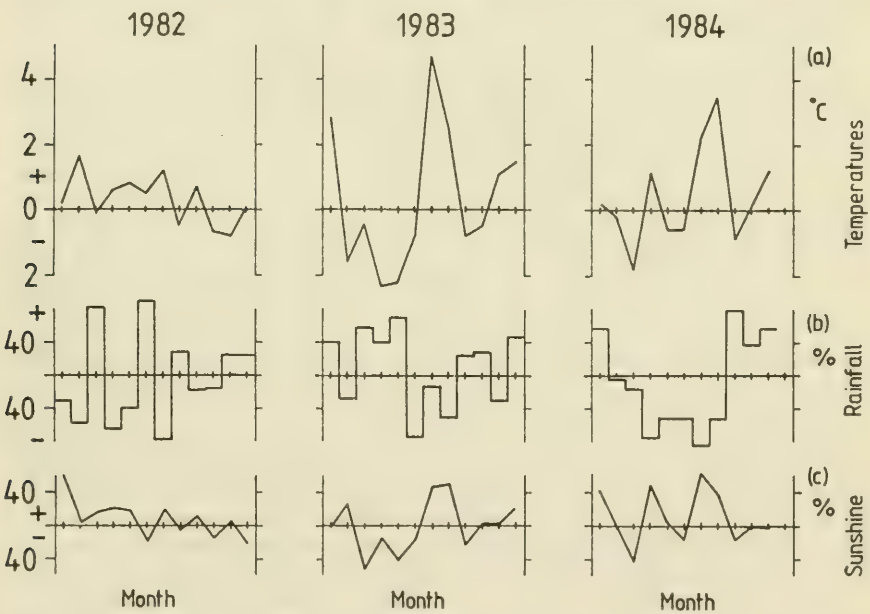

Fig. 2. Mean monthly weather conditions (temperatures, rainfall and sunshine) at Rostherne Mere for 1982, 1983 and 1984, illustrated as deviations from normal conditions (averages from 1941 to 1970).

produced by egg batches laid early and late in the spring respectively, as indeed is implied by the bimodality in the appearance of post-hibernating adults. The reasons for these differences between years is clear from the climatic data. The fourth coldest, dullest and wettest spring since recording began was experienced in 1983. This led to the long spring flight period, slow development of early stages and a late first brood. Throughout much of Britain, adults hibernated after nectaring in spite of July receiving the highest mean temperatures this century. By contrast, in 1982 and 1984, both sunshine levels and temperatures have been higher than usual during the spring and summer months.

A more intriguing feature to emerge in the transect data is the occurrence of triple peaks during the summer months of 1982 for sites along the south coast. This feature is particularly distinctive for Swanage and Radipole Lake and to some extent simulates the appearance of a third brood, though the developmental period (5 weeks) is too short. The feature elsewhere is either absent or poorly developed (cf., Woods Mill/Castle Hill/Lullington Heath; Rostherne Mere). To investigate these examples more closely, data for three of the sites have been redrawn and sunshine and temperature figures overlaid (figures 3a, 3b and 3c).

Two hypotheses may account for the polymodality during the second brood at Swanage/Radipole Lake in 1982. First, the transect counts may simply reflect the response of adult butterflies to weather during those weeks. Although transects are carried out only if minimal conditions have been established (see Pollard 1979), nevertheless, different butterflies do not share the same response to different conditions of sunshine and temperature. Secondly, the 'trough' in the second brood may imply arrested development of early stadia forming part of that brood.

The coincidence of the first peak in numbers with the peak in temperatures and then of falling numbers with falling temperatures initially suggests the direct impact of weather on adult activity. The number of insects seen on transects depends on conditions when the transects are being made, but some observations point away from the direct impact of temperature and/or sunshine levels in producing the trough in adult numbers. Temperatures during week 19 (21.7°C), when butterfly numbers are declining, were much higher than during week 23 (20.1°C) when the second peak of adults was recorded on the transect that year. Also peak numbers have been recorded on different sites in poor conditions. For instance, at Rostherne, record numbers of adults (93, 161) were recorded during weeks 23 and 24, which experienced relatively low temperatures (18.1°C and 18.9°C) and sunshine (28 hours and 29 hours). Compare the minimal figures for temperature (18.6°C) and sunshine (36 hours) for the 'trough' at Radipole Lake and Swanage. Moreover, peak numbers for spring broods occur in much lower temperatures.

With reference to the second hypothesis, it is interesting that in each of the three examples graphed, the shape of the sunshine hours curve (two or three weeks earlier) and of the trough in the adult numbers corresponds very closely. It is particularly significant that the decline in the sunshine hours occurs some two to three weeks before the drop in adult numbers. The trough in adult numbers is probably explained by the contrasting dependence of larvae and pupae on sunshine and temperatures respectively. In a parallel example Dr. Keith Porter (1982, 1984) has shown that *E. aurinia* larvae use sunshine, both corporatively (when gregarious) in early instars and singly later on (by a bask-feed cycle), to raise their body temperatures and by doing so assimilate food faster and develop more rapidly. *A. urticae* are similarly gregarious in early instars and are coloured black later on. As pupae are generally suspended under cover their development probably depends more on ambient temperatures.

The first peak at Radipole Lake then has been produced by pupae (from early egg batches) which have developed rapidly in the high temperatures of weeks 15 to 18. The second peak, however, represents the arrested development of individuals (from later egg batches) first as larvae, subject to low sunshine levels in weeks 18, 19 and 20, and then as pupae affected by lower temperatures in weeks 20, 21 and 22. Much depends on temperature-sunshine-stadia interaction, and though the timing is different for the three localities, the scenario can be seen to be much the same.

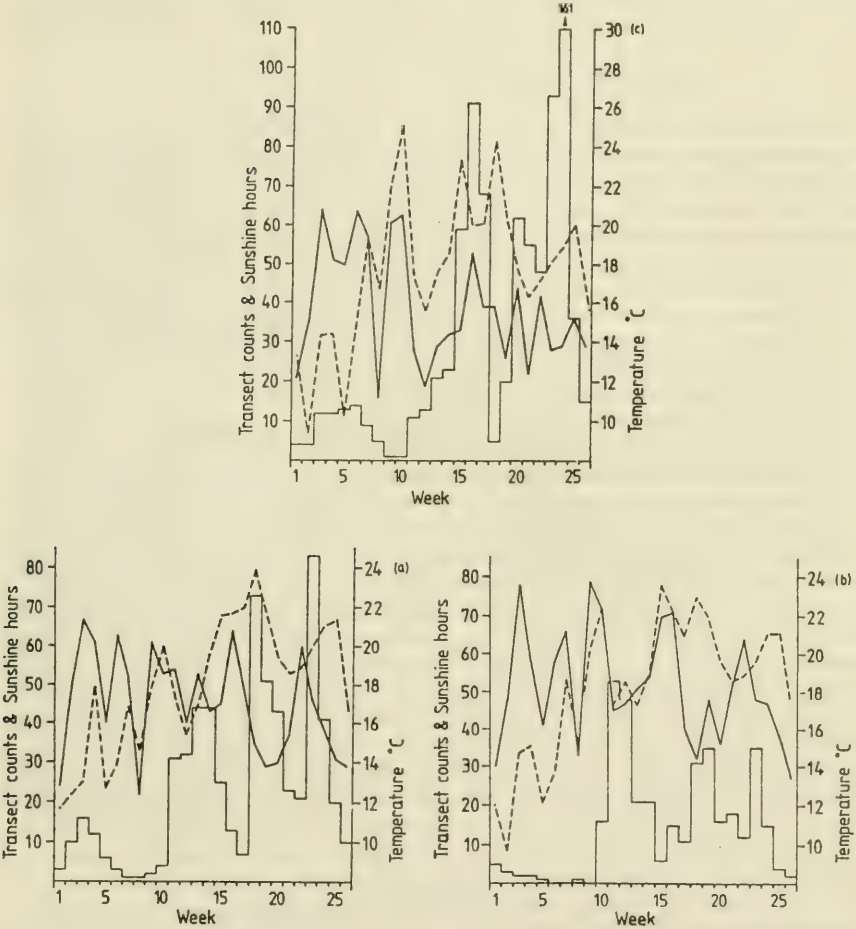

Fig. 3. Transect count histograms and weekly weather conditions (sunshine and temperatures) for three BBMS sites for 1982: (a) Swanage and Radipole Lake; (b) Castle Hill, Woods Mill and Lullington Heath; (c) Rostherne Mere. Temperatures (dashes) are mean weekly maxima whereas sunshine hours (solid lines) are cumulative weekly totals.

Bimodality in the second brood is least obvious at Rostherne perhaps for two reasons. First, both temperatures and sunshine levels rose consistently during the first brood and for several reasons this has probably led to a more compressed second brood emergence. Egg laying was more synchronized, having been delayed early on in the first brood; larvae from egg batches laid later on in the first brood grew more rapidly, the gap in development between early and later batches narrowing as a result. Secondly, the slump in sunshine levels which affected the development of larvae at the southern localities presaged the second brood at Rostherne, thereby arresting the development of most larvae forming the second brood, especially as the earliest eggs laid would have been held back by the lower temperatures before week 14.

WHY DOES THE NUMBER OF BROODS VARY?

The varied occurrence of broods suggests a fluctuating balance of advantage and disadvantage influenced by weather conditions. What might these advantages and disadvantages be? A bivoltine strategy, it has been argued, acts much as a multiplier and has the capacity for greatly increasing population numbers. For instance, the earliest recoveries amongst butterfly populations severely depleted by the 1976 drought belonged to the second broods of bivoltines in 1977 (Thomas and Merrett 1980). From such numbers, it may be expected, more will survive hibernation to mate in the following spring, especially as the hibernation period will be shorter for bivoltine than for univoltine butterflies. The length of the hibernation period is important as energy reserves (fat content) are continually depleted throughout the winter (see Chaplin and Wells 1982).

Against this, however, bivoltine *A. urticae* have a more restricted choice of suitable hostplants and perhaps a shorter period for nectaring. *A. urticae* oviposits preferentially on short nettle patches with new growth rather than on older tall nettles (see Dennis 1984). Although older larvae spread out and eat taller nettles in the centre of nettle beds as they develop, it is very likely that older nettles are less nutritious, more difficult to digest and that growth is slower for larval batches placed on them. By the time egglaying is about to proceed for the second brood (early July), most of the nettle patches have grown tall and the nettles 'tough'. Choice of egglaying sites are then greatly restricted, the number of suitable sites depending much on human interference. Larvae in those batches laid on tough nettle beds may fail to deal efficiently with the mechanical and chemical defence of the plants. By growing slowly they may also expose themselves for longer periods to parasitoids (see Pollard 1979) and predators and leave less time for nectaring. In an early, warm and sunny season, nectaring in itself may not be a problem as the butterflies will often have until the end of September and early October to feed up. But second broods are frequently late (Figure 1b), in which case nectar resource quality and weather conditions in September become more critical. The cooler the September and the longer the nectaring period, the more exposed adults are to birds and dragonflies. Moreover, weather conditions during the hibernation period will also be significant. Unfortunately, so little is known of the response of our butterflies to different hibernation conditions.

Other factors remain which cannot be ignored. Do the increased numbers associated with a second brood result in a density-dependent response from parasites and predators? (but see Dempster 1983, 1984 for a discussion on the significance of density-dependent controls). How does a second brood affect parasitoid-host synchronization and what are the effects on population numbers? (see Pyornila 1976 a, b, c). Do first brood adults intent on producing a second brood and facing a shortage of suitable hostplants migrate further north than those inclined to nectar and hibernate and spring adults faced with pristine nettle beds? These, at least, are important questions and are interdependent.

Second broods in 1982 and 1984 depended very much on the cutting of verges and river banks and the mowing of ley grass fields for silage. Along one stream bank on Alderley Edge golf course in Cheshire (1984), where part of the nettle beds had been shaved and part left over the same distance, egglaying was clearly biased to the new growth (Dennis, in press). Second brood larval batches tend therefore to have a clumped distribution. What effect does this have on survival? (see Dennis 1984). Large numbers of adults entered the nearby suburban gardens from this second brood. Of these, a small percentage (10%) were dwarfed; some were little more than half the size of normal specimens. Does this imply a shortage of hostplant for the developing larvae? Many, if not all, displayed wing damage; some with beak marks on the wing, most having tears. Another *A. urticae* was seen being neatly picked off the wing by a patrolling dragonfly *Aeshna cyanea,* taken up into a nearby conifer and devoured head to tail. Of course, none of this is evidence of a density-dependent response on large numbers of second brood *urticae.* Wing damage does not measure successful predation so much as the insect's potential for escape. The Small Tortoiseshell sports warning colouration on the wing uppersides exposed when feeding and this suggests that it may be distasteful (although wing tears compared to beak marks are argued by some, I suspect incorrectly, to point to palatability (Bowers and Wiernasz 1979; Pough and Brower 1977)).

All these factors have to be weighed against fluctuating weather conditions from year to year. A mild sunny spring has a chain reaction on several factors—emergence from hibernation, mating, oviposition, larval development and eclosion from pupae, leaving more than sufficient time for a second brood. Against this, a late first brood continuing into a second brood could be critical, larvae and pupae failing to develop before the onset of colder weather and adults similarly being unable to build up resources for hibernation. These conditions can eliminate any 'multiplier' effect of the second brood. The likelihood of this increases northwards to Scotland (and with altitude) where summer weather is cooler and wetter (see Meteorological Office 1975); there, single broods are usual. Henriksen and Kreutzer (1982) describe numbers of larvae and pupae (2nd generation) failing to eclose or survive both during 1968 and 1978 in Scandinavia. Luker (1984) reports a similar situation from Surrey (UK) in 1983. The other extreme of weather conditions, drought, can also result in brood failure. In 1976, second brood larvae had to cope with leathery hostplants and subsequently the adults with viscous nectar, both of which apparently took their toll (see Heath *et al.* 1984).

HOW IS THE NUMBER OF BROODS CONTROLLED?

Despite a late first brood, a second brood could probably pass through to hibernation if the summer was sunny and warm. However, the dismal spring of 1983 led to one brood in Cheshire, which after nectaring passed quickly into hibernation, even though the spring was followed by an unusually hot, dry summer. Although the control of diapause has not been thoroughly researched in *A. urticae* (as far as I know), it probably synchronizes its developmental cycle with seasonal weather conditions much as does *I. io* (Danilevski 1961; Beck 1980) being sensitive more to photoperiod or changing photophase (in the larval or pupal stage) than to temperature, although some interaction with temperature is likely. This is the case in *Araschnia levana* L. (Kratochwil 1980) where lower temperatures increase the critical day length and reduce the risk of a diapause-free development at the end of favourable conditions. Clearly, some sensitivity to temperature could provide an adaptive advantage for *A. urticae* inhabiting high altitude sites as on the Pennine Moors.

The objective of this note, intentionally highlighting more questions than providing solutions, has been to signal our profound ignorance on many aspects of one of Britain's commonest butterflies. It is hoped that by touching on a few of the issues, some research on this interesting and ubiquitous insect might be encouraged, especially as larval webs are easily found. It has also demonstrated, once again, the value of simple observation techniques, and in particular the synoptic BBMS transect data (see Pollard and Welch 1977).

ACKNOWLEDGEMENTS

Grateful thanks are due to Dr Ernie Pollard and Mrs Marney Hall for so kindly making the BBMS data readily available and for guidance and comments on the paper, and to Mr. Leslie Musk of the Department of Geography in the University of Manchester for supplying me with data from the London Weather Centre. I am also indebted to Mr Norman Bardsley for photographically reducing the diagrams in Figure 1 and to the BBMS recorders at the sites mentioned in the text. The BBMS has its headquarters at Monks Wood Experimental Station and is supported by the Institute of Terrestrial Ecology and the Nature Conservancy Council.

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Pyornila, M. 1976c. III. Parasitism of larval stages by Ichneumonids. *Ann. Ent. Fenn.* **42**: 156–161.

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Hibernating first and second brood *Aglais urticae (L.)*—From late July 1984 a Small Tortoiseshell hibernated on the wall of my shower room until December, when it battered itself at the window and was released. In late August a second *A. urticae* hibernated in a bedroom, but died in January. Both losses are attributable to heating in December. See Dennis (*antea*) for brood dates.—R.W.J. Uffen, Welwyn, Herts.

WILDLIFE LINK IN 1984

Wildlife Link is a forum for concentrating the concerns of all bodies interested in wildlife conservation and communicating them to government departments and major landowners holding power over wildlife habitats. The Society subscribes one third of a joint membership with the Royal Entomological Society and the Amateur Entomologists' Society. The entomological representative on the Link, Dr P.E.S. Whalley, reports directly to the Joint Committee for the Conservation of British Insects, on which the Society is represented.

Dr Whalley reports for 1984 that the Link is now actively and productively established as a source of advice on policy and priority which has earned the attention and respect of government and can be used in practical conservation.

The diversity of organisations assembled in the Link means that many topics are not of universal interest, so progress is expedited by declarations being negotiated and signed only by those bodies committed to the relevant subject. None the less, an immense amount of paperwork has to be scanned for potential conflicts of interest and to confer a wide basis of support to issues which merit it.

Wildlife Link played a large part in formulating the strategic document *Nature Conservation in Great Britain* (Nature Conservancy Council, April 1984, pp 111, £7.50). Comments on that document will be welcomed. A plan of recommended action is being formulated in conjunction with the N.C.C. and it is hoped that conservation movements in Britain will be widely involved in the collection of data and the monitoring of local conservation issues. This is clearly an activity which relies on the active participation of members of such societies as our own.

The politics of definition of, import, export and collection of endangered species has been contentious. E.E.C. regulations have been made without full understanding of the protection of butterfly foodplants gained in Papua New Guinea by the development of butterfly farming. This was the subject of a lecture to the Society by Dr M.G. Morris on 26th January 1984. European nations expect Britain to take the lead in making rational proposals for a list of protected European species, but the Department of the Environment has shied off promoting at Berne Convention negotiations the recommendations made to it. Presumably lack of expertise and low vote-winning priority contribute to this timidity.

Wildlife Link has pressed its views on the Ministry of Agriculture and Fisheries and the conservation lobby is being heard in its opposition to the absolute rights to the exploitation of land and the unbalanced improvement grants enjoyed by farmers. The House of Commons Environment Committee has asked the Link to provide submissions on improving the Wildlife and Countryside Act (1981) and associated societies will submit separate reports to the House of Commons Committee. Link will comment particularly on the vulnerability of S.S.S.I. during the first three months after proposition and on the abuse of demands for payment for 'conservation' projects, which can mean maintaining the *status quo*. On a similar topic, the D.O.E. has been pressed as far as expressing intent to revise its 1977 circular on planning permission, which had resulted in damage to S.S.S.I.

The Link has been asked to help the N.C.C. in identifying British wetland sites of European significance in a move to broaden the traditional use of the Ramsar Convention on protection of wetlands of international importance beyond the subject of wildfowl. Submissions should be made through the Society to the J.C.C.B.I. in relation to insects.—Ed.

NOTES ON SOME BRITISH CLUSIIDAE AND REDUCTION OF *CLUSIODES FACIALIS* (COLL.) TO SYNONYMY

by P. WITHERS

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A recent paper dealing with this family (Stubbs, 1982) provided a welcome key to the adults of this distinctive group of acalypterate flies. Since few ecological observations appear to have been published, the following notes on selected species may be found to be of interest.

Clusiodes albimana (Mg.) Although this species and the following have been reared repeatedly from dead wood sources, the precise trees involved have apparently escaped record. I have a female bred from a damp rotten ash (*Fraxinus excelsior*) in Enderby, Leicestershire (SP 5399), on 27.vi.1977. Males of *C. albimana* and *C. gentilis* were plentiful around a shaded beech log (*Fagus sylvaticus*) in the Axmouth Undercliffs NNR (SY 2690) on 19.vi.1980. A female was taken on a beech log in Priory Park, Southend, Essex (TQ 8785).

Clusiodes gentilis (Coll.) I possess a male and female ex pupae in rotten willow (*Salix* sp.) from Narborough Bog, Leicestershire (SP 5497), found 9.iii.1977, and emerged 7th April. Two males and a female emerged from pupae found in a rotting birch (*Betula* sp.) in Ulverscroft NR Leicestershire (SK 5214) on 1.v.1977.

Clusiodes (Columbiella) verticalis (Coll.) A pupa found in rotten birch in Horseshoe Wood, Malham Tarn, N. Yorkshire (SD 8967) on 5.v.1978 produced a male of this species on 2nd June.

Clusiodes (Clusaria) facialis (Coll.) Whilst on the Diptera Recording Schemes field meeting in Epping Forest on 26.ix.1982, I found several clusiid larvae and pupae beneath the bark of a recently felled hornbeam (*Carpinus betulus*) by Wake Valley Pond (TQ 4298). A male and two females emerged on 6.v.1983, and I was delighted to find that these were the very local *C. facialis*, which I had not previously encountered.

The illustration of the right outer lobe of the male genitalia in Stubbs (l.c.) implies that the lower process projects ventrally. In the specimen I have, the processes of both right and left surstyli curve inwards and almost meet medially—seen from the side they do indeed closely resemble the figure in Séguy (1934, fig. 472) purporting to be *ruficollis* Mg.

The two females noted above have very varied facial darkening, thus:

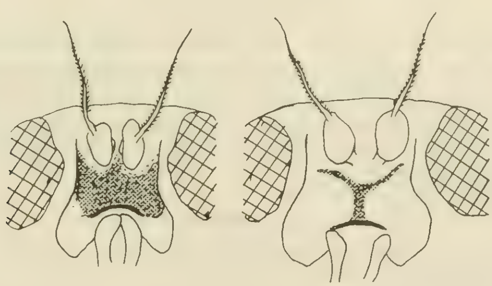

Fig. 1 Fig. 2

It is evident that if the dark area can be as reduced as in fig. 2, it is not inconceivable that in some specimens it may be altogether absent, thus conforming to the condition claimed for *ruficollis*. An urgent examination of Meigen's type of this close relative was required to clarify this dilemma, as it appeared that Stubbs' doubt as to the validity of *ruficollis* might be justified.

Whilst in Paris recently, Dr Martin Speight kindly examined both the Meigen collection and the general collection in the Musée National d' Histoire Naturelle. There are no specimens above the name *ruficollis* in the Meigen collection, and both the specimens above this name in the general collection (a male, det. Benard, and a female, det. Séguy) are in reality *Clusia flava* (Mg.). There is a significant size dimorphism between male and female *flava*, which is not found in *Clusiodes* sp. Meigen, however, originally described all these Diptera in one genus, and may not have appreciated this; it may be significant that there are no *flava* in the Meigen collection either. It thus seemed eminently possible that he recognised the females as *flava*, while the males he considered to be *ruficollis*.

An examination of Meigen's catalogue revealed that both species were described from specimens contained in the Winthem collection, now in Vienna. Through the kindness of the Vienna museum I was loaned a male *ruficollis* and a female *flava*. The specimen of *flava* differs in many respects from that of *facialis*, not least in the absence of post-vertical bristles and the number of dorsocentrals. It was quite clear that this was a valid species. The male *ruficollis* differs from my *facialis* in only minor details: the face is pale yellow, and the thorax has no lateral dark bands, being paler overall. In all other respects they are identical, and most significantly the male surstyli show no differences. It is therefore evident that *facialis* must be taken as a junior synonym of *ruficollis* (**syn. nov.**), a species much more variable in the extent of facial darkening than has previously been appreciated.

Dr Speight found that the specimen standing in the Meigen collection as *C. nubila* is a female *C. albimana*. There is no material above the name *albimana*, nor as already stated, any *ruficollis* or *flava*. Two specimens of unrecorded sex standing above *C. geomyzina* are genuinely this species.

The figure in Séguy of the *ruficollis* pupa (fig. 475) appears to have posterior spines which curve in towards each other. This is at variance with the puparia of my own bred material, and *verticalis*, which have these spines curved ventrally, but laterally divergent. Excepting that the pupa of *verticalis* is much paler than that of *ruficollis*, there appears to be little to distinguish between them.

ACKNOWLEDGEMENTS

Thanks are due to Henry Disney, who passed on the specimen of *C. verticalis* for my consideration, and to D.C. Lewis for his gift of the material herein cited from Leicestershire. Martin Speight was both generous and thorough in his investigations of the Parisian material. In particular, I would like to express my gratitude to Frau Contreras-Lichtenberg for the loan of critical material from Winthem's collection in the Vienna Natural History Museum.

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IS THERE A FUTURE FOR BUTTERFLY COLLECTING IN BRITAIN?

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The Society held a discussion meeting on this topic on 25 April 1985. The President invited publication so that the membership as a whole may reflect on the issues raised. This paper draws upon the introductory presentation, takes account of the views expressed and considers a possible way forward.

Notes on the pros and cons of collecting (see Appendix I) were circulated among those present at the start of the meeting so that a lot of the basic points could be taken as read, enabling discussion to centre on essentials.

The issue of butterfly collecting, and whether it should be controlled, is a fraught and emotive subject that none of us would wish to raise—least of all myself who found himself in the hot seat. It is a measure of the seriousness of the subject that I should raise it. We could all have a jolly good pillow fight as an entertaining evening but a cool logical approach is essential (it is to the full credit of the Society and the 50 or so members present that a very constructive approach was achieved).

Over the years I have been encouraging entomologists to participate in the conservation effort. The reciprocal part of the equation is that your interests should be defended—and I can reassure you that this is very much the case (See Presidential Address—1982, *Proc.Trans.Br.ent.nat.Hist.Soc.* **15**: 55–67).

On key issues, such as legislation, this and other leading Societies have been consulted, directly or via the Joint Committee for the Conservation of British Insects. I have felt it right that if there is an issue where I cannot speak for current Society policy, or I cannot maintain the status quo, then I should openly step forward to discuss it. Though billed as a discussion meeting, this is in fact a consultation meeting to help the membership, and Council in particular, gain the perspective on which future decisions can be made when the need arises.

My role in the Nature Conservancy Council is to develop and implement policy on invertebrate conservation (and bear in mind that NCC is a public body that is there to serve the general public, including you). It is one thing to develop policy but implementation has two particularly important pre-requisites.

1. The case must be logical, consistent and convincing, in order to get the attention and resources in NCC and elsewhere.
2. It must carry the support of the entomological community. As part of that support is the trust that entomologists are being treated fairly, as referred to above.

Make no doubt about it, your support for the Invertebrate Site Register, the Red Data Book (shortly to be published) etc. has worked wonders—and these are the trump cards in defence of the reasonable needs and activities of field entomologists. It is nowadays possible to show that the entomological community is responsible, and increasingly concerned and helpful towards conservation. There will always be people who are out of tune with that image but by and large they are not in Societies such as ours.

There is one glaring blot on the image of the entomological community, and one that is difficult to live down from the past. The butterfly collector is no longer viewed as an eccentric but harmless fellow, rather he is conspicuously an enigma in this conservation conscious age. When other naturalists have forgone birds' egg collecting, as well as collecting and uprooting of plants—and that took a certain amount of legal pressure—why should entomologists collect butterflies? Such insects can be identified without the need to collect and any argument in defence of this activity tends to be treated as special pleading, and with some disbelief that entomologists should try to defend the indefensible.

Of course we recognise that butterfly collecting is not pursued in the Victorian style of amassing vast series of specimens, and indeed many entomologists have given up butterfly collecting because they do not regard it as justified in this day and age. Thus we come to a key question. If entomologists are so responsible, and so sympathetic to conservation, why do they still want to be able to collect butterflies? And if it is true that this activity is dying out voluntarily, why not legislate to put pressure on those who are still behaving unreasonably?

The status of butterflies in the countryside has been declining, in some cases rapidly (*e.g.* the retreat of violet eating fritillaries) and it is predictable that further decline is inevitable, especially in woodland. At the same time the conservation movement, and public at large, are recognising the need for action and are increasingly trying to manage sites to protect butterflies.

The declining graph of butterfly numbers, set against the rising graph in effort to protect butterflies, clearly raises the question as to what happens when the two graph lines cross. Superimpose one group of people wanting to collect what the other group wants to protect, and here we have a situation that cannot do the image of entomologists any good at all.

Some entomologists would argue that their type of collecting assists conservation, especially to rear stock and release it so as to boost numbers—thus increasing butterfly numbers rather than reducing them. There may well be a case for rearing release schemes where they form part of a designed and monitored conservation plan. Unfortunately, most of this rearing release is done surreptitiously and in consequence many conservation bodies have become very critical of such 'cowboy' activities. Too many people are quietly trying to establish their own introductions, causing great annoyance to those who are trying to record natural distribution and natural migration patterns. Even if butterflies are being released back at their source site, this can make it difficult to assess whether the management of the site is right or not (indeed it is possible to be lulled into continuing a bad management policy). Also it brings into question whether the genetics have been weakened and in some circumstances whether too many caterpillars/butterflies have been released for the food supply! What matters is the natural carrying capacity of the site and in the majority of cases rearing/release is irrelevant as a conservation tool—site management is the real conservation issue. Thus one of the main justifications of collecting has very awkward flaws in practice.

When it comes down to serious debate, the collecting case is full of weaknesses. There are endless refinements that one can invoke in support of collecting, including the fact that often it may do no harm. However, we are dealing not just with logic, but also with fear, and a protectionist code of ethics among conservationists. This makes it difficult to argue the case when the collecting logic is not terribly sound to start with. Thus the position of entomologists is inherently weak with regard to butterfly collecting.

There are several circumstances that could lead to early apprehension among entomologists.

1. The Quinquennial Review of the Wildlife and Countryside Act, 1981 is being prepared this year. For historic and illogical reasons the list of protected species has anomalies that many of us would like to remove. There is no scientific reason why the swallowtail should be on (but it has now become a conservation flag) and the chequered skipper is not even a Red Data Book species. Such anomalies set standards that could suck in other species, or to try to take off anomalous species may in itself open up a backlash. The protected list can be changed at any time by the Secretary of State for the Environment (this should be on the advice of NCC, but there are many pressure groups far stronger than entomological societies).
2. The Act itself is up for amendment. The government is currently resisting much change, but there is strong pressure to introduce a whole series of changes. There is no knowing what ideas may come into vogue.
3. Conservationists are becoming more sophisticated in their questioning of the need to collect. It is their issue, not just ours. Even without legislative implications, it would only take one or two incidents involving butterfly collectors to generate a fraught situation.
4. Trading and commercial trends are becoming increasingly conspicuous and the need for controls may well be a further catalyst for legislation or other action.

The entomological community has been caught on the defensive before (witness the last rounds of legislation). This time we would do well to anticipate events and get used to thinking about the issues. It would be far better to be seen to be positive and in control of the initiative rather than risk falling into disarray—and at present a sudden challenge over collecting would catch us without a coherent policy.

The meeting was invited to discuss 4 main issues.

1. Is it practical to develop a pro-collecting argument that will satisfy the conservation movement?

I believe it is impractical (see Appendix I) and within the time available no one was able to come up with a convincing line. Some of the audience agreed that there was no sustainable justification.

A point of particular concern is that youngsters are drawn into entomology through starting to collect butterflies (as with myself). There was a sense that draconian measures were undesirable. To what extent other parties would accept this or say that everyone must move with the times cannot be fully anticipated.

One speaker reminded us that there is a good deal of effort on rearing parasites from wild caught stock in early stages (this point was not in the Appendix).

2. Should we seek to control trading and related issues?

This can easily be done by putting butterflies on Schedule 5 with the annotation (with respect of section 9 (5) only)'. Section 9 (5) prohibits sale etc. except under licence. This would allow individuals to collect for their own reasonable purposes but would discourage collecting to sell or to pass on to dealers for sale. The maximum fine for even offering for sale is £1000 per specimen (even a butterfly egg) without a licence. Reasonable trading would be able to continue. Thus it would reassure the conservation bodies that the trade was kept respectable via licences.

It is also possible to control rearing and release indirectly. Licence holders could be required to send an NCC approved leaflet on release policy to anyone buying livestock. Butterfly display houses (which are doing a good job in interesting the public in live butterflies) would need a licence to buy or sell British species.

Project Papillon (a Guernsey based venture that would have meant large scale release of butterflies had not the conservation bodies protested), and any akin schemes, would realise that any gift promotion cannot lead to commercial application and there would be greater moral pressure against these promotions.

The audience seemed to accept the logic of this idea. There also seemed to be acceptance that the free for all in releasing butterflies needed restraint. One speaker reminded us that the Botanical Society of the British Isles had similarly expressed its concern over the promotions to spread wildflower seed in an uncontrolled manner. (Subsequent to the meeting I am able to quote from a joint NCC/BSBI leaflet, and am able to confirm that it has RSNC support speaking for the county trusts: 'Wild flower seeds should NEVER be scattered in the countryside' as an uncontrolled introduction. Butterflies are clearly in a parallel category).

3. How do either of the above issues relate to avoiding the wider escalation of legislation that may spread collecting controls to other insects?

Within NCC there is an unambiguous answer which is increasingly shared by other conservation bodies. If the conservation movement wants entomological records and other information, the source is the field entomologist and he has to be allowed to collect in order to provide accurate identification in practically all groups of invertebrates.

This implies an element of trust both ways, and that trust is being successfully built. If there are people who rock the boat, then they cannot expect much sympathy from any quarter.

Butterflies are in a league of their own (together with dragonflies). They are pretty, a high public profile group, and one where identification of all the species is practical in the field. There is no way that the conservation movement is going to see collecting as necessary in most circumstances (specific needs have to be clearly presented). It is therefore best to concede this difference from other invertebrate groups.

We were reminded of a few circumstances where field identification of British butterflies can cause problems. Mr. Bretherton said that it is essential to have a voucher sent for records of the two pale clouded yellows (*Colias hyale* and *C. australis*)—these are migrant species that rarely breed here.

4. The broader tactical policy

To discuss matters is one thing, to reach a tactical policy is another.

(a) We could let matters ride, leaving decisions to others. That does not seem wise—we usually complain at what happens outside our control.

(b) It is possible to cover butterflies under Section 9 (5). That is a positive stance, which does not restrict the individual yet it does plug the fear of dubious trading.

(c) Prepare to counter on the basis of a reasoned statement supporting butterfly collecting. That may be neither practical or wise.

(d) Any other ideas.

The question of which alternative should be pursued was put to the meeting.

Perhaps foremost was the need to control farming and other habitat loss, these being the culprits for the loss of butterflies, not the entomologist. The existing legislation does of course deal with habitat protection on SSSI, this already being tighter under the 1981 Act and there are strong moves to close the remaining loop-holes. There has also been a big public and parliamentary swing in attitudes as regards agricultural subsidies and there is already a wind of change of opinion, to their credit even among the farming community.

Our discussion centres on species legislation, not habitat legislation, even though the two are related. To argue, as one member of the audience attempted, that species should be listed to protect their habitat is a dangerous road to follow, since this opens the door to huge numbers of species being 'protected'. Species legislation, in so far as it can be made relevant to insects, should (in my view) be restricted to collecting controls where really necessary. We can use habitat protection law to protect insect habitat without raising the collecting spectre.

It was generally accepted that collecting had not caused the extinction of British species—habitat destruction was to blame. None-the-less we have to recognise that at a local level, there are locally scarce butterflies that local people wish to provide a future for—local collecting is unacceptable to many people and an easy target for blame over any declines.

We did not attempt a conclusion, since as much as anything the occasion was one the purpose of which was to acquaint ourselves with the issues, leaving time to reflect pending the day when decisions by the Society would have to be made. I would, however, offer one theme followed by a draft statement:

If the entomological societies, and their respective memberships, as well as entomologists in conservation bodies, are to be treated seriously, they must be seen to be objective and logical. To argue against the odds that butterfly collecting is necessary in turn brings into question whether we are logical over the need to collect other insects, and indeed whether we are worth listening to at all. Other parties will then take decisions for us—'for our own good'.

Butterfly collecting, in the Victorian sense, is virtually a thing of the past in Britain as far as a Society such as ours is concerned and the reasonable needs of members can be catered for even if there is increased legislation. It is not worth fighting a non-existent or lost cause which as a minimum will be counter-productive as far as the image of the entomologist is concerned.

Draft statement on butterfly collecting policy*

This is a head point statement that could be used as a basic model. It may well need modification, but if all Societies were able to endorse a common statement that can be made available to conservation bodies, the initiative and respect gained could be of

*[Members' comments on this draft statement will be welcomed by Council, and should be sent to the Editor for collation. At the meeting, no members spoke about collecting varieties. As this activity can be construed as affecting the genetic balance of a population, the aspirations of members collecting varieties particularly need ventilating. — Ed.]

considerable benefit. I would hope to gain approval to put NCC's name to such a statement.

1. The entomological community is playing a major role in gaining knowledge on the status of invertebrate species in Britain and increasingly in providing advice to the conservation movement.
2. The JCCBI Code for Insect Collecting is the guideline that members are expected to follow.
3. There is, in general, a need to have the facility to collect some material as part of the process of providing accurate identification and records of insects and other invertebrates. This does not usually apply to resident species of butterflies.
4. Butterfly collecting for its own sake is outmoded, though there are circumstances where individuals have reason to take material with due restraint and it is to be expected that they should be prepared to offer good cause for doing so.
5. A total ban on collecting would be currently felt unduly draconian, noting that many youngsters find their way into entomology by being able to find and keep butterfly caterpillars, and for that matter collecting a few adults. Youngsters should be educated to be sparing and to take common species only.
6. There is cause for concern over the developing nature of trading in butterflies and over the activities of some commercial or promotional organisations. It is noted that it is possible to list butterflies under Schedule 5 of the Wildlife and Countryside Act 1981, with respect to Section 9 (5) only. This would go a long way towards establishing confidence that trading was kept respectable via licensing, whilst not penalising the responsible individual or trader.
7. The conservation bodies are fully supported by the entomological community that there should be no collecting of butterflies at all on reserves or other areas managed for butterflies (unless there should be a specifically approved reason).
8. Whilst the position has been lax and unsatisfactory in the past, it is essential that butterflies should not be released for any purpose except by prior agreement and arrangement with NCC as part of a purposeful conservation programme.

APPENDIX 1

The for and against arguments for butterfly collecting

The following notes list pro-collecting arguments and give the anti-collecting response that might be received. There are many different combinations and refinements that could be made. If an attempt is to be made to defend butterfly collecting, or to anticipate wider issues, then it is as well to know what one may be up against. The anti-collecting comments are phrased in the context of legislation being used to bring control (as the 'worst' scenario) whereas it would be hoped that voluntary restraint would not result in the need for licences.

PRO-COLLECTING	ANTI-COLLECTING RESPONSE
—It does no harm	—Well, entomologists would say that wouldn't they. —Special pleading.
—It brings youngsters into entomology;	—Youngsters should be educated to observe, not kill.

PRO-COLLECTING	ANTI-COLLECTING RESPONSE
	—Nowadays there are plenty of books, keys, BRC schemes etc to enable people to start with other groups if they wish to collect.
—The study of entomology will shrivel up without the facility to collect butterflies.	—Attitudes must move with the times. —That was said about egg collecting, yet the study of birds is strong.
—Butterflies have more young than birds and can recover populations rapidly.	—True, but nowadays in many localities butterflies are in low numbers so the removal of even a few could tip the balance or create fear that this is so. —Well, why aren't butterflies common then?
—The mortality of butterflies is enormous in the wild so collecting a few does not matter.	—We lack your confidence.
—Rearing and releasing butterflies is assisting conservation and hence is a positive outcome of collecting.	—What matters is the natural carrying capacity of a site. —Release masks whether site conditions are favourable or deteriorating. —The conservation movement is getting fed up of what has become a widespread cowboy activity. —There are circumstances where the population may be boosted too high for the food supply, causing a population crash. —An excuse for collecting. —There is a fear for local genetics, especially if not released at source site. —BBCS has abandoned this idea as a general policy. —In cases where this is appropriate, it can be done under licence.
—Collecting enables the study of genetic and geographic variation.	—Surely there is enough material in collections by now! —Excuse for 'stamp collecting'. —Licensing can permit serious study, including breeding.
—The study of the natural history/ecology of butterflies will be halted.	—There is plenty of work relevant to conservation that does not require collecting (monitoring behaviour of adults, location of the early stages). —Licensing can provide for studies that involve handling etc. —Licensing has actually led to increased

PRO-COLLECTING	ANTI-COLLECTING RESPONSE
	scientific study of birds and bats because of the kudos of owning a licence.
—It is not really possible to identify all butterflies without taking them home.	—There are so few species that even a beginner ought to learn to identify things in the field (as with birds).
—Some butterly species may have to be caught to identify them.	—With patience it is possible to find individuals sitting in a position where they can be identified (as with birds). —If this really is a significant problem then there may well be ways round this as regards permissible activities (*e.g.* catch and immediate release).
—There is no harm in rearing butterflies in captivity if source stock can be obtained without harming wild populations	—There is fear as to the real source of stock. —There is concern over the subsequent uncontrolled release of stock (expressed above).
—Cannot schools and individuals have some concession as regards rearing?	—The pest species can be excluded from protection (small white, large white).
—Butterfly houses are good publicity for native butterflies, yet they will be unable to rear and display livestock.	—Licences can provide for this.
—It does not matter selling old collections.	—Admittedly a problem area, and perhaps not beyond solution. —There is a lack of confidence that all old stock is legitimate. —The concept of amassing private collections of dead butterflies is out of date and unjustified.
—Protecting butterflies is ridiculous when it is habitat protection that is the real requirement.	—You cannot argue for one without the other. —Why should we spend time and effort protecting habitat if entomologists are going along to fill up their collections? —What sympathy do you expect when the conservation movement is increasingly taking action over habitat? —Don't you realise that it looks bad to see some people collecting butterflies, of all things, when other people are trying to save them in their habitat?
—It is reasonable to take unusual varieties. The chance occasion cannot be anticipated.	—Ornithologists cannot shoot rare varieties of birds. —If you are serious about breeding and

PRO-COLLECTING	ANTI-COLLECTING RESPONSE
	the study of genetics, then licences could be obtained in advance by *bona fide* people.
—If a legal ban on butterflies were in force, then everyone with a net (even those not collecting butterflies) could find themselves castigated and reported to the police.	—This is one scenario but it may not be the case. It is up to entomologists to present a favourable image to the public.
—We are on a slippery slope once more/ all butterflies are protected.	—It's up to entomologists, to be convincing why this should not be so.

APPENDIX 2

Stop press developments

1. This issue was first raised at the autumn 1984 meeting of the Joint Committee for the Conservation of British Insects and mentioned under communications at the BENHS December 1984 meeting. April 25th 1985 was the first meeting of the new calendar.

   Thus on April 25 1985 we were still speaking theoretically and with some uncertainty whether and how this issue would be raised by other parties. On May 1st DoE asked NCC to advise on a written parliamentary question, which appears in Hansard for 7 May. The Secretary of State was asked if he would list those species of butterflies found in the United Kingdom which the Nature Conservancy Council regards as having significantly or substantially declined or as threatened or endangered. Whilst this question from Dr. David Clark does not seem to have been directed at adding to protected lists, it does show how bolts can come out of the blue.

2. The East Midlands Trade Fair, held at Leicester in April 1985 permitted trading without licence of protected species which are listed on Schedule 5. This has also brought to a head the concern about increasing levels of abuse of the Convention on International Trade in Endangered Species (CITES). The licensing authority, the Department of Environment, is seriously considering sending enforcement officers to future trading exhibitions. A North London Trade Fair has its first event in May 1985 and various other trading outlets seem to be increasing. This focus of attention on trading in butterflies is likely to result in disquiet about the whole question of butterfly collecting.

FIELD MEETINGS

BENHS Field Meeting: Dancers End, Bucks., 18.viii.1984. Leader: R.K. Merrifield.—Dancers End, a Site of Special Scientific Interest, is a reserve of the Berkshire, Buckinghamshire and Oxfordshire naturalists' Trust (BBONT) in the Chilterns near Tring. It includes beechwood, post-war conifer plantations and regenerating woodland, areas of which are now coppiced. There are also areas of open grassland and a gradation in soil types providing a wide diversity of habitats, from which 264 species of vascular plants have been recorded.

Six people attended the meeting on a hot summer's day and the Warden, Mick Jones, took us on an informative conducted tour of the reserve. We saw the original meadows on which Dr Miriam Rothschild undertook her studies, in the early 1960's, on the use of sheep-grazing to prevent the encroachment of scrub onto chalk grassland after the decline of the rabbit population. Annual grazing is being continued to maintain the chalk flora in these meadows and new experiments are being conducted to evaluate methods to control dogwood regeneration in newly felled clearings.

The weather stayed clear into the night and became too cool to expect large numbers of moths. However, 50 species were recorded at the two lights that were run.

BENHS Field Meeting: Featherbed Lane, Addington, Surrey, 28.x.1984. Leader: J.M. Chalmers-Hunt.—Although wet weather was forecast and it was in fact drizzling up until the start of the meeting, the rain fortunately cleared altogether until late afternoon, so enabling the 12 assembled lepidopterists (mostly micro-lepidopterists) to enjoy a reasonably pleasant day.

Among those present we were pleased to welcome from abroad, Messrs W. De Prins from Antwerp, and F. Coenen from Brussels.

One of the chief specialities of Featherbed Lane is *Phyllonorycter scabiosella* (Douglas), but although we managed to find a number of larvae in their blister-like mines on the undersides of the lower leaves of *Scabiosa columbaria*, the species appeared to be much less plentiful than usual. Other interesting micro larvae noted were: *Reuttia subocellea* (Steph.), (cases numerous on the seed heads of *Origanum vulgare*); *Bucculatrix frangulella* (Goeze), and *Stigmella catharticella* (Stainton), on the leaves of *Rhamnus catharticus; Caloptilia auroguttella* (Stephens), cones on *Hypericum; Coleophora discordella* Zeller, cases on *Lotus corniculatus*, some full grown, others quite small; *C. albitarsella* Zeller, cases on *O. vulgare; C. gryphipennella* (Hbn.), cases on rose; *C. anatipennella* (Hbn.), a case on hawthorn. The only moth seen was a single fresh example of the plume *Emmelina monodactyla* (L.).

INDOOR MEETINGS

BENHS meeting 27.ix.1984.—*Exhibits*. Rev. D. Agassiz: A series of *Luperina nickerlii* (Freyer), from Essex, together with ssp. *knilli* Boursin, *leechi* (Goater), and *gueneei* (Doubleday), and also *L. testacea* (D. & S.) for comparison. He also showed a distribution map prepared by Mr B. Skinner, showing the known distribution of all subspecies of *L. nickerlii* in the British Isles.

Mr R.A. Jones: *Micralymma marina* (Ström), (Col.: Staphylinidae) from Aberystwyth on 4.vi.1984, apparently the second Welsh record of this species.

Mr A.J. Halstead: Larvae of the Sedum Small Ermine Moth: *Yponomeuta vigintipunctella* (Retz.), feeding on Sedum 'Ruby Glow' (thought to be a form of *Sedum cauticolum*). The larvae were collected in the R.H.S. Garden, Wisley, Surrey. He also exhibited an adult fish louse, *Argulus* (sp.), a parasitic crustacean collected from the dorsal fin of a goldfish in an aquarium.

Membership. Messrs I.A. Johnson, E.F. Hancock, D.A. Pozorski and R. Harris were declared elected members.

Communications. Mr R.K. Merrifield transmitted an appeal for entomological records for the Lizard Peninsula on behalf of the Lizard Peninsula Project run by the University of Bristol.

Mr B.O.C. Gardiner reported the recent occurrence of *Acherontia atropos* (L.), in Huntingdonshire; and Mr A.J. Halstead a larva of the same species at Ripley, Surrey on 18.ix.84.

Lecture. Mr B.O.C. Gardiner spoke on *Laboratory breeding techniques*, and initiated a discussion on the subject in which he answered questions on artificial diets, the effects of prolonged inbreeding and other topics.

BENHS meeting 11.x.1984.—*Exhibits.* Mr E.S. Bradford: Specimens of the microlepidoptera *Cydia janthinana* (Dup.), *Blastodacna hellerella* (Dup.), and the longhorn beetle *Gracilia minuta* (F.), all emerging from old dead rose stems collected from a hedge at Whitstable, Kent.

Communications. Mr Bradford stated that a *Vanessa atalanta* (L.), was seen by his sister in Blean Woods, Kent on the 8th October. Mr D. Wilson reported that a *Colias croceus* (Fourc.), was seen at Thorpeness, Suffolk by Miss K. Robinson on 2nd September.

Lecture. Mr P.W. Cribb gave a most interesting talk entitled *A naturalist in the mountains of Europe*, mainly concerning butterflies and which was accompanied by many splendid coloured slides of insects and their habitats. Several members present had had the pleasure of accompanying Mr Cribb on his expeditions and were reminded of many memorable captures and places from France to Greece.

BENHS meeting 22.xi.1984.—The President announced the deaths of Lt Col Hall-Smith and Mr K. Webb. Both gentlemen had joined the Society within the past five years.

Exhibits. Mr R.F. McCormick: (1) Collection of photographs taken during the Annual Exhibition of 27.x.84 by his wife: "Entomologists studying entomologists" (2) Eggs of *Lithophane leautieri* (Boisd.), laid by a female taken at North Cheam, Surrey. He noted that between 29.ix and 11.xi.84 he had found 13 *L. leautieri* in his garden light trap, all males except the one female, and that this was the first time the species had appeared there.

Mr N.M. Hall: A colour transparency taken by Peggy Heard, a wildlife photographer from Bracknell, of a male *Mythimna ferrago* (F.), (Lep.: Noctuidae), with the brush organs, at the ends of the black V marks on the ventral surface of the abdomen, extended.

Mr F. Murphy: A coloured photograph of an exotic *Papilio* from Mrs J.E. Cain of Horsham, Sussex, who noted the insect in her garden in July 1984 and wrote requesting its name and place of origin. (Note: The photograph is of a female *Papilio aegeus* (Don.), distribution of which extends from New Guinea to New South Wales. One suspects the specimen shown was an escape from captivity.—J.M.C.-H.).

Membership. Miss J.J. Lambert, Drs M.J. Dumbleton, P.S. Hyman, P. Kirby, Messrs D.C. Holton, R.J. Worthy, H.K. Barton, M.J. Parker, L.T. Wooldridge, and C.R. Lee were declared elected.

Lecture. Dr C.T. David, of the Imperial College, Silwood Park, spoke on *How male gypsy moths find females in the field.*

BENHS meeting 13.xii.1984.—Mr J.M. Chalmers-Hunt: *Athrips rancidella* (H.-S.), (Lep.: Gelechiidae), a species new to Britain, taken by the exhibitor in his garden at West Wickham, Kent, and determined by Dr K. Sattler (British Museum, Natural History).

Communications. Mr Alan E. Stubbs: (1) NCC is to receive an extra £7m. next financial year, bringing the total budget to over £22m. It is most heartening that government has at last accepted the need for increased resources—linked to implementation of the 1981 Wildlife and Countryside Act. There will be some benefit to entomology, both directly and indirectly. (2) The Quinquennial Review of the list of protected species is underway, for completion early in 1986. The Council of the Society will be invited to comment on the revision of the list. (3) Project Papillon, a Guernsey based project involving the release of huge numbers of migrant and resident butterflies, is still being promoted though less vigorously than last year when NCC, backed by a number of Societies, largely quashed the idea. This and related issues deserve the Society's attention if matters are not to get out of hand.

Lecture. Mr F.A. Hunter read a paper entitled *Some aspects of woodland beetle ecology*, which was accompanied by slides.

BENHS meeting 10.i.1985.—The President announced the death on 10th November 1984, of Professor O. W. Richards, at the age of 82. This distinguished entomologist was an honorary member of this society.

Exhibits.—The President: A female of the Scarce Umber Moth (*Agriopis aurantiaria* (Hbn.)), found on a wooden paling fence at Orpington, Kent, on the 8th January. The outside temperature was –4°C, with a substantial covering of snow on the ground.

Mr Richard A. Jones: Two male and one female *Sinodendron cylindricum* (L.), (Least Stag Beetle), from a half submerged log, floating on Crummock Water, Cumbria, 30.xi.84. Despite the freezing water, the adults were active and larvae and pupae were present in the waterlogged, soft white wood.

Membership. Messrs S. Swift, D. McNamara, Dr E. Benton, I.F. Stacey and S. Button were elected.

Communications. Sqn Ldr Parker reminded the meeting of the effective effort by the Ministry of Defence Conservation Officer, Lt Col C.N. Clayden (who gave a talk to the society in 1981). One of the M.O.D. sites, the range at Newtown, Isle of Wight, would be the subject of a spider survey on 11.v.85. The survey was being organised by Mr P.D. Hillyard (of B.M.N.H.), who might welcome a few more specialists.

Mr S.H. Church reported seeing at Lurgashall, W. Sussex, *Agriopis leucophaearia* (D. & S.), on 1st January. He also reported seeing there specimens of *Peridroma saucia* (Hbn.), and *Agrotis ipsilon* (Hufn.), in a mercury vapour light trap on 10.xi.84, the same specimens of which were still alive in the trap on 1.i.85.

Colour transparencies. In the unavoidable absence of Mrs A. Hughes, the scheduled programme, the film *The land provides*, was postponed. Instead, those in the audience were favoured with an excellent series of colour slides shown by Mrs F. Murphy and Messrs R. Jones, N.A. Callow and E. Bradford.

BENHS meeting 24.i.1985.—*Exhibits.* Mr Richard A. Jones showed *Thymalus limbatus* F. (Col.: Peltidae) from Lurgashell, W.Sussex, 28.xii.1984.

Mr T. Fox had reared two female *Chlosyne janais* Druce (Lep.: Nymphalidae) from larvae found near Porto Limon, Costa Rica, 1.xi.84.

Lecture. Mrs A. Hughes presented a film entitled *The land provides*, showing aspects of her dairy farm in Hampshire being run with a view to the conservation of wildlife there.

BENHS meeting 14.ii.1985.—Mr B.R. Baker (vice-president) announced from the Chair the deaths of Mr D.W. Daly, who died on 19th December 1984, and of Mr R.D. Hilliard.

Exhibits. Mr J.M. Chalmers-Hunt: Several triangular cases of *Solenobia triquetrella* Hbn., collected by him that morning from beneath the copings of an old concrete fence at West Wickham, Kent.

Mr R.A. Jones: *Aphrophora major* Uhler (Hom.: Cercopidae) from Wicken Fen, Cambs., 13.viii.83, by sweeping. This rather local bug was first recognised as British in 1926; it feeds on *Myrica gale.*

Lecture. Dr B.J. MacNulty read a paper entitled *Outline life histories of some West African Lepidoptera: Geometridae*, which was accompanied by a series of coloured slides of the insects.

BENHS Ordinary Meeting 28.ii.1985.—*Exhibits.* Rev. D. Agassiz: *Scrobipalpa klimeschi* Povolny, taken by him at Chippenham Fen, Cambs., 22.vi.1973 (2) and 6.vi.1973 (3) and only lately recognised as new to Britain.

The President, Mr P. A. Sokoloff: Paintings by Eric Bradford illustrating the genus *Teleiodes*, the subject of part of his presidential address.

New members elected. Paul Carney, Valerie Carney, Barry Cook, John Dobson, Dr Andrew Duff, Ernest Emmett, Catherine Griffith, John Kramer, Ann Piatkus, Bryan Pickess, Peter Ryan, Michael Simmons, David Stokes, Brian Taylor, Terry Triggs.

BENHS Annual General Meeting 28.ii.1985, at the Alpine Club, 74 South Audley Street, London W.1. The President, Mr Paul Sokoloff, in the chair and 47 members present.

Minutes of the last Annual General Meeting were read and approved.

Reports were read by the Secretary Mrs F.M. Murphy (for Council), the Treasurer, Col. D.H. Sterling, the Curator, Mr E.S. Bradford and the Librarian, Mr S.R. Miles. The Hering Memorial Research Fund report was read on behalf of its secretary, Dr M. J. Scoble. These reports are appended.

The President proposed the adoption of the reports, Mr Colin Penney seconded the proposal and it was adopted unopposed.

1985–6 Officers and Council. The President declared the following elected unopposed:

President: P.J. Baker, *Vice-Presidents:* P.A. Sokoloff, J.M. Chalmers-Hunt.

Treasurer: Col. D.H. Sterling, *Secretary:* Dr J. Muggleton, *Editor:* R.W.J. Uffen.

Curator: E.S. Bradford, *Librarian:* S.R. Miles, *Lanternist:* R.A. Jones.

Ordinary members of Council: C.B. Ashby, B.R. Baker, R. Dyke, J. Heath, P.J.

Johnson, I. McClenaghan, C.G. Penney, B.F. Skinner, D.H. Walker, D.H. Yendall.

Question under bye-law 22d: Mr G. Prior asked about the terms on which the Society rented its rooms at the Alpine Club. He was told that the Society has 'a licence to occupy' since its formal lease expired. Mr Prior thought this to be an unsatisfactory arrangement, but did not suggest an alternative.

The President read his report and gave his address. He then installed the new President, Mr P.J. Baker.

Mr Baker proposed a vote of thanks to the retiring President and asked for permission to publish the Presidential Address. Permission was granted.

Mr S.N.A. Jacobs proposed a vote of thanks to the retiring Officers and Council, seconded by Mr Prior.

The Auditors, Messrs A.J. Pickles and R.A. Bell were re-appointed.

BENHS meeting 14.iii.1985.—*Exhibits.* Mr Chalmers-Hunt: *Bankesia conspurcatella* Zeller (Lep.: Psychidae), living male and female together with larval case, all collected by the exhibitor in East Kent, 13.iii.1985.

Communication. The President stated that *Inachis io* L., *Vanessa atalanta* L. and *V. urticae* L. had all been seen in his garden the weekend of 9/10.iii.85.

Lecture. Dr J.A. Thomas read a paper entitled *The increase of the Lulworth Skipper and the decline of the Adonis Blue—two side effects of modern farming.*

BENHS meeting 28.iii.1985.—*Exhibits.* Mr Richard A. Jones: *Silvanus bidentatus* F. (Col.: Silvanidae), a single example from under the thick bark of a felled oak tree, Hampstead Heath, 16.x.1984, in company with the common and closely related *S. unidentatus* Olivier.

Membership. The following were declared elected: Dr Peter C. Howard, Howard Mendel, Erica Cecille Farrow, Amanda Jane Gipson, Robert Dore; Christopher Townsend.

Communication. Mr P. Sokoloff stated he had captured a specimen of *Phyllonorycter messaniella* Zeller on 28.iii.1985, at Bromley, Kent.

Lecture. Mrs L.M. Pitkin gave an interesting talk on *British marine life,* which was accompanied by some excellent coloured slides.

BENHS meeting 11.iv. 1985.—The President announced the death of Mr Alan Hayes at the early age of 46.

Exhibits. Mr. R.D. Hawkins: (1) The ladybird *Chilocorus bipustulatus* L. found at Guildford on an ornamental *Chamaecyparis* sp. in an abandoned nursery. The bush also harboured a scale insect, possibly its prey, which was also found on a neighbouring bush of *Juniperus communis.*

Mr Colin Hart: The Dew Moth, *Setina irrorella* L., three larvae recently out of hibernation, bred from South Hampshire stock. The larvae appear on pebbles in good weather at about 10 a.m. and 6 p.m., but rarely in the afternoon.

Mr Richard A. Jones: *Myrmecina graminicola* Latreille (Hym.: Formicidae), from The Undercliff, Newhaven, East Sussex, 7.iv.85, under a fallen sandstone rock on the landslip.

Communications. Mr Brian Baker: *Hyles livornica* Esper, Rushmoor, Surrey, one, 2.iv.85; Weymouth, Dorset, five, weekend of 6-7.iv.85; Aldermaston, Berks., one, 9.iv.85. *Spodoptera exigua* Hbn., Burghclere, one, 3.iv.85. *Mythimna unipuncta* Haw., one, Portland Bird Observatory, weekend of 6-7.iv.85.

Mr Colin Hart: *H.livornica*, one, Lymington, Hants, 6.iv.85.

Two shieldbugs were found in Sheffield the weekend of 6/7 April 1985: *Acanthosoma haemorrhoidale* L. and *Cyphostethus tristriatus* F.

Lecture. Dr L.K. Ward gave an interesting talk on *The fauna of juniper*, which she illustrated with slides.

BENHS meeting 25.iv.1985.—The President announced the death of Mr. G.B. Oliver.

Exhibits. Mr A.S. Wheeler: The following Australian butterflies. *Trapezites symmomus symmomus* Hbn., *Hesperilla ornata ornata* Leach, *Cephrenes trichopepla* Lower, *Pelopidas agna dingo* Evans, *P.lyelli lyelli* Rothschild, *Gettoneura acantha acantha* Donovan, *Oreixenica lathoniella herceus* Waterhouse & Lyell.

Mr Richard Jones: *Brachygaster minuta* Olivier (Hym.: Evaniidae), found crawling on the sand-dunes of Hengistbury Head, Bournemouth, 26.vii.1977.

Membership. The following were declared elected: Robert John Tremayne Cartwright, Richard Vigant Goulding, Daphne Joan Goulding, Ian Dan Ferguson.

Communications. Mr R.F. Bretherton read a note on migrant Lepidoptera in April, recording *Hyles lineata, Cynthia cardui*, etc.

Lecture. Mr A. Stubbs led a discussion meeting entitled "Is there a future in butterfly collecting?" a resumé of which will be published in the *Proceedings*.

BENHS meeting 9.v.1985.—The President, Mr Peter Baker announced the deaths of Mrs A.M. McClure and F.D. Lawton, who died in 1983, and A.E. Wright, J.G. Gully and M. Walker, who died in 1984.

Exhibits. Colin Plant showed a weevil, *Otiorhynchus aurifer* Boheman, which was new to Britain. The specimens, dated 12.viii.78, 19.iv.80, 19.vi.81 and 28.viii.81, were found by D.A. Smith at Harold Hill, Romford, Essex. Their identity had been determined by Dr R.T. Thompson at the B.M. (Natural History). *Otiorhynchus aurifer* is native to Turkey, Algeria, Italy and Corsica. It closely resembles the common pest, the vine weevil *O. sulcatus*, but can be distinguished by the absence of a spine on the swelling at the distal end of the hind femora.

Richard Jones showed some beetles, *Cicones undatus* Guer. (Col.: Colydiidae), found in some numbers under dry flaking bark on a dead standing sycamore in Windsor Forest on 27.iv.85. This species was new to the British list when found at Windsor by Howard Mendell in 1984. Also exhibited was the other British member of this genus, the rare *C. variegatus* (Hellw.) which occurs under beech and oak bark.

Communications. Colin Hart reported finding a Ruby Tiger moth on a shed at Reigate, Surrey, on 6.v.85. It was generally agreed that the recent cool weather was causing the late emergence of most insects.

Lecture. Dr Michael Proctor gave a talk on *Adaptive trends in insect-pollinated flowers*. He outlined the ways in which the association between flowers and insects may have evolved and gave examples of flowers that are designed to be pollinated by particular types of insect. The talk was illustrated with slides of outstanding quality.

BENHS meeting 23.v.1985.—*Exhibits.* Mr R.F. Haynes: *Rheumaptera undulata* L.: Scallop Shell, one bred from Raggatt Plantation near Peel, Isle of Man, larger and darker than the mainland form.

Mr C. Hart: (1) Photo of a larva and pupa of the plume moth *Crombrugghia distans* Z. on its foodplant *Crepis capillaris.* Larvae and one pupa were found near Barton Mills, Suffolk, 11.v.85. Emmet (*Ent.Rec.*, **95**:15) gives a good description of the early stages. (2) Larvae and pupae of the two British *Agdistis* (a) *A.bennetii* Curtis, Nagden near Faversham, Kent, larvae common on *Limonium humile,* 16.v.85. (b) *A.staticis* Millière, Ope Cove, Dorset, larva and three pupae on *Limonium binervosum,* 19.v.85.

Mrs F. Murphy: The salticid spiders taken in Majorca in April 1985: *Aelurillus monardi* Lucas, male, female; *A.cervinus* Thorell, male, female.

Mr R.W.J. Uffen: *Eriocrania* (Lep.) larvae and mines from Oxwich N.N.R., Glamorgan: *E.chrysolepidella* Zeller (also from Ilston Valley), confirmed from Hering's key by the larval prothoracic markings; *E.sangii* Wood, and another sp. on birch.

Mr E.S. Bradford: (1) An immature spider, thought to be *Thomisus onustus* by the exhibitor, but suspected by Mrs Murphy to be a much rarer species (see minutes of 13.vi.85), from E. Blean, Kent, 19.v.85. (2) *Dorcus parallelopipedus* L. (Lesser Stag Beetle), found breeding in a rotten elm stump at Borstal Marsh, Rochester, Kent, 22.v.85.

Richard A. Jones: *Leptinus testaceus* Müller (Col.: Lepitinidae), from wood mould and litter in a large hole in a hollow poplar tree, Hampstead Heath, 17.v.85. This very local beetle is associated with the nests of bees, birds and small mammals, and has also been found in bat droppings. It is extremely active despite lacking eyes and wings.

Membership. Royston James Ledgerton was declared elected.

Transparencies. An interesting and varied selection of coloured slides of as usual the highest quality was shown by Messrs. A. Callow, M.W.F. Tweedie, R.A. Jones, and Mrs F.M. Murphy.

BENHS meeting 13.vi.1985.—*Exhibits.* Mr I. R. Hudson. Two rare hoverflies taken by the exhibitor in the New Forest in 1985: (1) *Brachyopa pilosa* Collin, several males hovering over fallen beech trunk, Mark Ash Wood, 29.v.85. (2) *Psilota anthracina* Meigen, female taken feeding at hawthorn blossom, Denny Wood, 29.v.85.

Mr R. Lovell-Pank: (1) Living third instar larvae of *Drymonia ruficornis* Hufn. and *Peridea anceps* Goeze from eggs from a female taken Hillsford Bridges, North Devon, 18.v.85. (2) *D.ruficornis,* aberrant male with median area of forewings almost immaculate, and strongly patterned hindwings; same locality as above, 17.v.85..

Mr E.S. Bradford: (1) A female of the spider *Pistius truncatus* Pallas, which had emerged from some dead branches and sticks collected in East Blean, Kent in March-April 1985. The species was last found in this country about 100 years ago in the New Forest. Little is known of its biology. On the continent the species in widespread but local. This is the first record of its occurrence in Kent. (2) From the same dead wood specimens of the beetle *Melasis buprestoides* L.

Lecture. Dr A.G. Irwin of the Castle Museum, Norwich, gave a talk illustrated with slides entitled *The magnificent maggot.* He described how the simple external form of the cyclorrhaphous fly larva copes with many different habitats and pabula. He demonstrated his subject with the aid of a cuddly giant model maggot which appeared destined to replace the usual teddy bear in his children's toy collection.

BENHS meeting 27.vi.1985.—Mr Richard A. Jones: *Pentarthrum huttoni* Wollaston (Col.: Curculionidae), from frass in open 'wound' of an old ash tree, Willesden Green, London NW2, 24.vi.85; also the very similar *Euophryum confine* Broun for comparison.

Mr A.J. Halstead: A specimen of the local chrysomelid beetle *Cryptocephalus bipunctatus* L., White Downs, Surrey, taken on a wild rose bush, 16.vi.85.

Mr A. Valletta: (1) *Maniola jurtina hispulla* female, with right wing smaller than left and with eye-spot missing. (2) *Pontia daplidice*, all-black form. (3) *Pontia daplidice*, gynandromorph.

Mr R. Hawkins: A female *Doros conopseus* F. (Dipt.: Syrphidae) which was ovipositing on a trunk of an isolated ash tree surrounded by chalk downland and scrub, Banstead, Surrey, 16.vi.85.

Transparencies. In the absence of Mr R.J. Paxton with the scheduled programme, Mr Michael Tweedie kindly showed a selection from his superb collection of colour slides together with commentary. They included microlepidoptera, Coleoptera, shield bugs, lacewings and spiders.

BENHS meeting 11.vii.1985.—*Exhibits*. Mr E.S. Bradford: Small psychid moth cases, found under stones on shingle with lichens but devoid of vascular plants, at Dungeness, Kent. Many stones had once case, some two and occassionally three attached to the underside.

Mr Richard A. Jones: A snakefly, *Raphidia notata* L., found resting on the bole of a large pine tree at the BENHS field meeting at Chobham Common, Surrey, 26.v.85.

Mr A.J. Halstead: (1) A *Mordella villosa* Schrank (Col.: Mordellidae) found on flowers of hogweed at the Sheepleas, Surrey, 6.vii.85. This species is locally distributed in England up to Cambridgeshire. The larvae are associated with decaying wood. (2) A longicorn beetle, *Leptura scutellata* F., found on a bracken frond alongside the Basingstoke Canal at Sheerwater, Woking, Surrey 7.vii.85. This uncommon species is usually associated with beech trees.

Mr R.W.J. Uffen: (1) A moth, *Leioptilus carphodactyla* (Hbn.), captured in the exhibitor's garden, where *Inula conyza* had been grown from seed the previous year. There is a colony of the moth about 0.5km away beyond a wood. (2) Larvae of *Coleophora ochrea* (Haw.) from the lip of the Avon Gorge, Bristol, whence they were recorded over 100 years ago (Stainton: *Insecta Britannica*, p. 212). This micro moth is enjoying a resurgence which has led to its detection in Glamorgan and E. Kent. The exit holes beneath the mines are ragged like those made by *Mompha miscella* and not always neat round holes as for most coleophorids. (3) Larvae of *Coleophora leucapennella* (Hbn.) from the Wickwar Woods locality in Avon discovered by Newton and Price. Some seedheads are lightly spun together before the seedhead cases are made.

Membership. Dr R.S. Key and Messrs. J. Bisconti and D.A. Moore were declared elected.

Communications. Mr Bradford recorded a Large Tortoiseshell, *Nymphalis polychloros*, flying in his garden at Pean Hill, Whitstable, Kent on 20.vi.85.

The PRESIDENT noted two late dates, one of *Orthosia gothica* in S.Devon on 4.vii.85, the other being *Lysandra bellargus*, the Adonis Blue, still in good condition at Brighton on 6.vii.85.

Lecture. Dr STEPHEN SUTTON of Leeds University spoke on *High life in the tropical rain forest*. Dr Sutton outlined the development of his project (carried out jointly with Dr Christopher Rees of the University of York) to investigate the spatial distribution of flying insects in tropical rain forest. Using specially developed traps and access techniques, it had proved possible to make strictly comparative studies in all three major blocs of rain forest (South-East Asia, Africa and the Americas). Initially the work concentrated on the vertical distribution; the majority of individuals and species were shown to be concentrated in the upper canopy 20–40 m above the ground. Using Operations Drake and Raleigh as vehicles of support, the use of aerial walkways had been developed, and currently work was under way to look at the distribution of insects between the crowns. The lecture was illustrated with numerous coloured slides showing the localities studied, some of the insects found and the equipment used for trapping and observing insects within the canopy. A lengthy discussion then followed, and Dr Sutton answered a number of questions from the floor.

OFFICERS' REPORTS

CURATOR'S REPORT FOR 1984

The thinning of the Society's main collection of Lepidoptera, discussed with members last year, is in abeyance for the time being. The re-organisation would be a major undertaking, involving very many hours of concentrated work. It has not yet been decided exactly how to proceed with this task.

I am pleased to report that the Cyril Hammond collections are completed, thanks to Mr P. J. Chandler's work on these groups. I am also grateful to Mr W. Parker for sorting and rearranging many Coleoptera and Lepidoptera, a behind-the-scenes activity that goes on all the time. Progress on the restaging of the microlepidoptera has, however, been slow, due mainly to the infrequent visits to the Society's rooms during the past year. A few more *Anthrenus* have been found and dispatched, and several more cabinets have been treated for this pest. The situation regarding the *Anthrenus* infestation is improving.

Our Swedish member Mr Stig Torstenius has made a further donation of Scandinavian Lepidoptera to the Society. As a result of this generous gift, one more ten drawer Hill unit has been earmarked for the Torstenius collection. Mr C. B. Ashby has kindly agreed to arrange this cabinet in keeping with the other three of this collection.

Lists of the numbers of specimens of each species in the Society's collections have been compiled for the Coleoptera and the Torstenius collection. It is proposed to complete an inventory of all specimens in the Society's main collections, other than duplicates. There are still a number of duplicate macro- and microlepidoptera available to members should they wish to avail themselves of such.

During the year specimens from the Society's collections have been loaned to members for research purposes.

Finally, I would like to thank, on behalf of the Society J. M. Chalmers-Hunt, Rev. D. J. Agassiz, B. Skinner and E. S. Bradford for the donation of insects to the collections.

British Entomological and Natural History Society

PUBLICATIONS ACCOUNT FOR 1984
(Publications free to members)

1983	Expenditure	1984	*1983*	Income	1984
£		£	*£*		£
2655	Production of Proceedings	4065	*467*	Sales	633
383	Distribution Costs	396		Hammond Bequest grant for plates	1107
			2571	Net cost to Income & Expenditure	2721
3038		4461	*3038*		4461

SPECIAL PUBLICATIONS ACCOUNT FOR 1984

£		£	*£*		£
2390	Opening stock saleable publications	6324	*6080*	Sales of publications	7620
82	Correction slips/Hoverfly binding	352	*1000*	Royal Society Grant	
8002	Production of new publication		*6324*	Closing stock saleable publications	3539
299	Distribution & General costs	395			
2631	Surplus to Spl. Publications Fund	4088			
13404		11159	*13404*		11159

HONORARY TREASURER'S REPORT FOR 1984

Financially, the Society has had a very satisfactory year. You will notice that the cost of the Proceedings shown in the Publications Account was £1400 higher than last year, but this includes some plates not yet used. A grant of £1100 for all the coloured plates was made from the Hammond Memorial Fund and also receipts from sales rose, so the net cost to the Income and Expenditure Account was only increased by £150. General expenditure was just over £200 up, mainly because an extra distribution to members had to be made. No expenditure was necessary on cabinets and collections and investment income increased by 25%, partly due to 1983 investment changes and partly to the interest on the inflow of cash from Special Publication sales. Receipts from subscriptions also rose and as a consequence of all this, our overall excess of income over expenditure rose by nearly £1000, so unless unforseen circumstances arise, the current rate of subscriptions introduced in 1982 should not need altering for 1986. It must however be realised that the routine running costs of the society in 1984 exceeded by some £2250 the receipts from members' contributions, the balance being met mainly from investment income.

Turning to the Balance Sheet, the Library Fund appears as a separate item for the last time, as, from January 1st, it has been merged with the General Fund. The Special Publications Fund has risen to over £13700 with sales of over £7600 in 1984.

BALANCE SHEET AS AT 31st DECEMBER 1984

FUNDS

1983 £	£		1984 £	£
	11870	*General Fund*—Opening balance	12351	
12351	*481*	Excess of Income over Expenditure	1472	13823
	579	*Library Fund*—Opening balance	791	
	381	Income	203	
	960		994	
791	*169*	Expenditure	353	641
2308		*Housing Fund*		2308
	6995	*Special Publications Fund*—Opening balance	9626	
9626	*2631*	Surplus from sales	4088	13714
	23882	*Hammond Bequest Fund*—Opening balance	26206	
	2349	Interest and dividends	2539	
	26231		28745	
26206	*25*	Expenditure	2043	26702
	2664	*Hering Memorial Fund*—Opening balance	2713	
	302	Income	324	
	2966		3037	
2713	*253*	Expenditure	NIL	3037
53995		TOTAL FUNDS		60225

Only £3500 of this fund is now represented by stock at cost, the rest being temporarily held in short term investments, to be available when the Publications Committee have suitable material for a further publication. In addition to providing coloured plates for the Proceedings, as already mentioned, income from the Hammond Memorial Fund has been used to purchase projection equipment, cloths for covering tables at the Annual Exhibition and has borne the cost of printing the revised bye-laws. About half of this fund is still held in the National Savings investment account for quick access if necessary, as the Society's rooms continue to be occupied on a monthly licence.

Mr D.H. Walker, who has been Subscriptions Treasurer since 1979, is handing over his duties to Mr G.N. Burton. On behalf of you all, I would like to thank both Mr Walker and his wife, who has acted for him whilst he has been abroad, for all the very hard work that they have both put in, and to welcome Mr Burton in his place. I would ask all members to make this exacting task as easy as possible by ensuring that their subscriptions are paid at the correct rate on or before January 1st each year. Our thanks are also again due to our Honorary Auditors for carrying out their annual audit.

BALANCE SHEET AS AT 31st DECEMBER 1984 contd.—

THESE FUNDS ARE REPRESENTED BY

1983 £	£		1984 £	£
		Investments at cost (details appended)		
	20722	General Investments	20722	
23065	*2343*	Hering Memorial Fund Investments	2343	23065
		Stock		
	6324	Special Publications at cost	3539	
6511	*187*	Christmas cards	333	3872
		(The value of the library, collections, ties and back numbers of Proceedings is not included in the accounts)		
		Liquid Assets		
	15813	N.S. Investment Account	28354	
	1218	Debtors and advance payments	1280	
	3221	Cash on deposit	3430	
	111	Cash in transit		
	7701	Cash on current account	2264	
	28064		35328	
		Less:		
	1500	Royal Society Loan	1500	
24419	*2145*	Subs. in advance, amounts owed and provisions	540	33288
53995		TOTAL ASSETS		60225

AUDITORS' REPORT

In our opinion the annexed Balance Sheet gives a true and fair view of the Society's affairs as at 31st December 1984 and the Income and Expenditure accounts give a true and fair view of the Society's results for the year.

A.J. Pickles F.C.A.
R.A. Bell

INCOME AND EXPENDITURE ACCOUNT FOR 1984

£		£	£		£
2571	Publications Account	2721	*4297*	Subscriptions	4539
1706	Rent and Insurance	1704	*1882*	Interest and Dividends	2362
451	Stationery and General Expenses	668	*132*	Donations and bequests	44
488	Indoor Meetings and Exhibition	484	*216*	Surplus on sales (Ties, spare equipment and Christmas cards)	211
716	Cabinets and collections				
125	Subs/donations to other societies	108	*11*	Surplus on Annual Dinner	1
481	Excess of Income over Expenditure	1472			
6538		7157	*6538*		7157

SCHEDULE OF INVESTMENTS AT COST AS AT 31st DECEMBER 1984

		General £	Hering Memorial Fund £
£1600	Agricultural Mortgage Corp. 9¾% Stock 1985–8	646.49	646.48
1010	Drayton Premier Investment Trust 25p Ordinary Shares	1398.21	
410	Shell Transport & Trading 25p Ordinary Shares	477.79	771.83
236	Midland Bank £1 Ordinary Shares		624.16
150	Unilever 25p Ordinary Shares	248.45	
£4098.06	Treasury 13¾% Loan 1993	4041.44	
£6836.92	Treasury 8¼% Loan 1990	5910.00	300.00
£2138.90	Funding 5¾% Stock 1991	1670.00	
3170	Charifund Units	6330.00	
		20722.38	2342.47

ADDITIONS TO THE LIBRARY IN 1983–84

A guide to habitat creation — C. Baines & J. Smart
Chalk grassland—its conservation and management — Nature Conservancy Council
Wildlife Introductions to Britain — Nature Conservancy Council
A nature conservation review, parts 1 & 2 — Nature Conservancy Council
Ecology and nature conservation in London — Greater London Council
A bibliography of the entomology of the smaller British offshore islands — K.G.V. & V. Smith
Entomology—a guide to information sources — P. Gilbert & C.J. Hamilton
A directory of natural history and related societies in Great Britain and Ireland — A. Meenan
A bibliography of Irish entomology — J.G. Ryan, J.P. O'Connor & B.P. Beirne
Bibliography of Palaearctic Lepidoptera 1982 — P. Gilbert
The butterflies and larger moths of Lincolnshire and South Humberside — J. Duddington & R. Johnson
A practical guide to the butterflies of Worcestershire — J. Green
The Lepidoptera of the Orkney Islands — R.I. Lorimer
An Introduction to the moths of South East Asia — H.S. Barlow
Eupithecia of Japan — H. Inoue
Catalogue of the Geometridae of Japan — H. Inoue
The moths and butterflies of Great Britain and Ireland, vol. 10 Noctuidae (Cucullinae and Hypeninae) and Agaristidae — R. Bretherton, B. Goater & R.I. Lorimer
Breeding the British and European hawkmoths — P. Sokoloff
Practical hints for collecting and studying the microlepidoptera — P. Solokoff
Mariposas de Venezuela — T. Raymond
The Hemiptera-Heteroptera of the London Area 1964–1982 — E.W. Groves
Biology of spiders — R.F. Froelix
The Syrphidae of North Western Europe and European Russia — V.S. Van Der Goot
A provisional atlas of the amphibians and reptiles of Essex — Essex Biological Records Centre
Flora of the London area — R.M. Burton
Die Käfer Mitteleuropas, vol 2 — H. Freude, K.W. Harde & G.A. Lohse
Fauna Entomologica Scandinavica series. Vols. 1 & 2 are already in the library. The rest of the volumes published so far, purchased in 1984 are:
3 The Tachydromiinae (Diptera) of Fennoscandia and Denmark — M. Chvála
4 The Sphecidae (Hymenoptera) of Fennoscandia and Denmark — O. Lomholdt
5 The Agromyzidae (Diptera) of Fennoscandia and Denmark — K.A. Spencer
6 The Elachistidae (Lepidoptera) of Fennoscandia and Denmark — E. Traugott-Olsen & E. Schmidt Nielsen
7 The Auchenorrhyncha (Homoptera) of Fennoscandia and Denmark — F. Ossiannilsson
8 The Formicidae (Hymenoptera) of Fennoscandia and Denmark — C.A. Collingwood
9 & 11 The Aphidoidea of Fennoscandia and Denmark — O.E. Heie
10 The Buprestidae (Coleoptera) of Fennoscandia and Denmark — S. Bily
12 The Empididae (Diptera) of Fennoscandia and Denmark — M. Chvála
13 The Scythrididae (Lepidoptera) of Northern Europe — B.A. Bengtsson

LIBRARIAN'S REPORT FOR 1983

This report was read at the AGM minuted in vol. 17: 92.

As a result of the numerous British and foreign journals exchanged by the Society and the quantity of accessions in recent years, there is now a shortage of shelf space. Therefore the major task of the year has been to sort out duplicate and less desirable journals and separates for disposal. These rasied £230 for the library fund in sales at the Society's annual exhibition.

Further reductions in library holdings are possible where the society has more than two copies of some infrequently borrowed books. Subject to Council's agreements to library committee proposals, space can be made available for the purchase of recently-published works, particularly key works on orders other than Lepidoptera, in which the library is somewhat deficient. I am reviewing the value to the Society of the British and foreign journals exchanged, continuing a pruning of the exchange list begun by my predecessor.

One library committee meeting was held during the year, at which a decision was made to extend the limited conditions of reference and borrowing applicable to the very rare and valuable books to some additional volumes. These will come under a restricted borrowing category and will be kept on view, but in a locked cabinet, so that the permission of the librarian or his assistant (as keyholders) will be necessary to enable a member to borrow such books. It is hoped that this will ensure the proper completion of the borrowing record so that such books remain fully traceable, so reducing the risk of loss and the consequential cost of replacement.

During the year the Society received the bequest of the P. Neave Headley photographic colour slide collection illustrating butterflies and moths, with many of larvae not previously represented in our collection. This fine collection had been prepared and collated by one of our members, Mr M. Enfield, and was therefore recommended as a worthwhile addition. We are particularly indebted to Mr Headley's wife for the donation, because he was not a member. These slides are being kept as a separate collection as requested by the donor. A start has been made by Mr W. Parker on transferring the main slide collection to plastic sheets to facilitate ease of reference.

Thanks for the gift of books and papers are due to Mr R.F. Bretherton, Mr H.S. Barlow, Mr E.W. Groves, Dr H. Inoue, Dr M. A. Scoble, Mr O. Kudrna, Mr R.I. Lorimer and Dr M.G. Morris. I also thank those members and officers of the Society who have assisted me in the running of the library.

LIBRARIAN'S REPORT FOR 1984

This year has been mainly one of examination of the library contents and consideration of its future requirements. At the request of the library committee a major task has been and continues to be to produce an up-to-date list of all journal exchanges. In the course of producing this list I decided that I should also concurrently note for internal library usage a number of other facts: the current exchange organisation address; the date period and completeness of volumes held; the amount of space that these journals take up; the content as to quality, geographical coverage and entomological subject matter. Knowledge of the above should enable assessment of the future space required for this material and whether reductions are considered to be necessary. Production of this list represents an arduous and time-consuming task but it is essential I believe, for the future efficient running of the library.

One library committee meeting was held during the year at which the main decision was to recommend to Council that future purchasing of new books, apart from additions to existing series, should be directed principally towards the Society acquiring major works on entomology. The type of works in this category would be those that members would wish to borrow but would not normally be able to afford for themselves or borrow easily from their local public library.

A list of books purchased and donated during 1983/84 has been produced and will be printed in the next edition of the Society's Proceedings.

Continuing the pruning of surplus books, journals and separates raised £196 in sales during the year for the Society's funds, as following implementation of the new bye-laws there is now no separate library fund.

Further batches of separates have been sorted into appropriate subject headings and this material has been placed in box-files and deposited on the library shelves. The titles added this year have been: Genetics, Palaearctic Rhopalocera and Collecting Trips Abroad—Lepidoptera.

Mr W. Parker has continued to ably assist me in maintaining the Society's slide collection. During this period he has carried on with the task of transferring the slides to plastic wallet binders to facilitate their easy examination, a service for which I am most grateful.

I would like to thank all those who have donated books to the Society during the year and especially to the following members: Mr B.W. Weddall for a set of thirteen volumes of H.T. Stainton's 'Natural History of the Tineina', to Mr B. Skinner for a copy of his new book a 'Colour Identification Guide to the Moths of the British Isles' and to Dr P.H. Langton for a copy of his recent work, 'A key to pupal exuviae of British Chironomidae'.

Finally I would like to thank Messrs M. Brown, E. Bradford, P. Sokoloff, Mrs F. Murphy and the library committee for their help in running the library during the year.

COUNCIL'S REPORT 1984

1984 has been and gone, fortunately failing to live up to George Orwell's nightmare vision. There would have been no room for the British Entomological and Natural History Society on Airstrip One.

The Society has pressed on regardless, as it has done for the last hundred years or so. We lost 7 members by death, 28 by resignation and 44 had to be struck off for non-payment of dues. The introduction of the new bye-laws has meant that two lots of defaulters were struck off in 1984. 55 new members were elected. The society now has 720 members.

The new bye-laws were adopted at the Special Meeting in June. The 24 members present at the meeting and the 66 members who sent postal votes to the secretary were all in favour of adopting the new bye-laws. The Council record their gratitude to Col. Sterling for all his hard work in revising the bye-laws.

The Council were very pleased to elect Dr John Bradley to Honorary Membership in recognition of his services to the Society especially through his support of members' researches into the microlepidoptera. They were also happy to elect to Special Life Membership Mr R. P. Demuth, who joined the Society in 1933.

No new Special Publication was produced in 1984 but 'British Hoverflies' continued to be very popular and about 750 copies have already been sold.

Dr Muggleton's final indoor meetings program was very successful. A new venture was the joint meeting with the London Natural History Society. The venue was provided by the L.N.H.S. and we met in the rooms of the Linnean Society in Burlington House. The B.E.N.H.S. provided the speaker and our President, Mr Paul Sokoloff gave a most interesting talk entitled "Recent Changes in the Butterfly fauna of London and the South-east", taking at the last moment the place of Mr Uffen who was unfortunately unable to be present. Mr Andrew Halstead's first field meetings programme was well attended.

The Annual Dinner, arranged by Dr McNulty, was enjoyed by a number of members and the Exhibition, master-minded by Mr Ken Evans was also successful.

Mr. Bretherton has handed over as Sales Secretary to Mr Andy Callow. Mr Bretherton has been on the council for 20 years, holding office for 19 of these years and has done an immense amount for the Society and no doubt will continue to care for and watch over us in the years to come!

Now I am resigning as secretary and handing over to Dr John Muggleton and I would like, if I may, to make one or two personal remarks. The Society goes in for a large variety of activities, indoor meetings, the dinner and exhibition, field meetings, publishing the Proceedings and various Special Publications, maintaining a very good library and invaluable collections and it has a lot of hard working, devoted and totally unpaid officers to manage all these activities. Many of these jobs (including the one in which I served) are interesting and enjoyable, at least in part, but some, for example those of the Assistant Treasurer and the Distribution Secretary need careful, conscientious work and are not exciting. It is irritating for them to reflect that their work load is more or less doubled by the 200 or so members who cannot spare 15 minutes to send their subscriptions in on time or, if they cannot afford to pay, at least lash out 13p to write in and resign.

I have to confess that I myself am in no position to throw stones and one reason that I put all this to you is that I never realised before becoming secretary how tiresome my own carelessness must have been. It is not even as if our officers are glad of a little work to fill their empty hours: they are all longing to finish the job and get back to their bugs.

Finally my grateful thanks to the Council and particularly the Assistant Secretaries who have made the job so much easier and with whom I have greatly enjoyed working.

THE PROFESSOR HERING MEMORIAL RESEARCH FUND, 1984

One award of £100 was made this year to Mr Ashley Kirk-Spriggs (an associate of the Department of Zoology, National Museum of Wales) towards the cost of his study of the predators and parasites of rice pests planned for July 1985. The work is to be carried out under the auspices of the Project Wallace Expedition organised by the Royal Entomological Society of London.

The aims of the project are to collect parasites and predators of rice pests for biological cultures to be started at the Rice Unit, University College, Cardiff, and also to collect immature stage of shoot-flies (Chloropidae) of agricultural importance for taxonomic studies of the group at the National Museum of Wales. (Both these institutes are among the sponsors.)

A report was received from Mrs Radoslava Spasić, University of Belgrade, who received an award last year for a project on the Agromyzidae of Yugoslavia with particular emphasis on those of agricultural importance. Mrs Spasić reared nine species of Agromyzidae from a great variety of plants of agricultural importance from sixteen field locations and four greenhouses. She spoke about her work at a plant-protection meeting in Yugoslavia in October 1984.

Mr J. H. Donner, from the Vrije University, Amsterdam, submitted a report on his entomological visit to New Zealand in April and May 1984. He was also in receipt of one of last years awards. Mr Donner collected Nepticulidae from sixteen sites, and by rearing examples of almost all known New Zealand species he has extended our knowledge of host-plants. In addition, specimens representing twelve new species were reared. Mr Donner's visit enabled him to study material in several collections in the country.

M. Scoble

Migrant Lepidoptera in April 1985.—As many members will already know, there has been a large early immigration, which included at least six species. It apparently began on April 1 and 2, when a front crossed west and south Britain, with strong warm winds from SW and S, with similar airstreams continuing until April 8; and there seem to have been further arrivals in similar conditions about April 16. Mr Peter Davy, whom I have consulted and who has provided several records, agrees that both wind directions and species suggested that these probably came from North Africa.

So far I have records as follows:

Striped Hawks (*H.lineata livornica*): Surrey, Rushmoor, night of 2/3.4, male; Bramley, 9/10.4 in trap after a SW.gale; North Lancashire/Westmorland border, 5.4 and 6.4, two; Sussex, Brighton, 6.4; SW. Cornwall, Scorrier, 8.4 on house wall, still there a.m. 9.4; Dorset, Portland, four, dates not yet available; St Alban's Head, 16.4, faded male; Furzebrook, 17.4.

Painted Ladies (*C.cardui*): Surrey, 14.4, in garden; Frensham, 6.4; Furness & N.Lancs., 5/7.4, at least four; Cornwall, 6/8.4, nine in four places; Worcestershire, 5 & 6.4, two; S.Devon, 6 & 8.4, two; Dorset, Furzebrook, first 1.4, many more to 18.4; Ringstead, 10.4, six; Cornwall, Mawnan Smith, c.19.4, two.

There are two much earlier records: Aldermaston, Berks., c. February 5; Cornwall, Mullion 27.2.

Spodoptera exigua: Sussex: Ninfield, before 5.4; Cornwall: Mawnan Smith, c. 18.4.

Heliothis peltigera: Sussex, one; Dorset, St Alban's Head, 16.4.

Nomophila noctuella: Surrey, 16.4, one worn; Dorset, St Alban's Head, 16.4, one.

Agrotis ipsilon: Surrey: South Croydon, 5.4; Dorset, Furzebrook, before 18.4, a few; Cornwall: Mawnan Smith, 18.4, four.

This was clearly an important immigration, which should be fully recorded. I should be very grateful for further records. The influx of Striped Hawks is particularly interesting, both because of its early date and its numbers. A few have been reported in many years; but the last big invasion was in 1965, when about 40 were reported, mostly in mid-May. Before that one has to go back to the great years of the 1940s, with over 500 in 1943. A watch should be kept for larvae, of which a few were seen in that year.—R.F. Bretherton, Folly Hill, Birtley Green, Bramley, Guildford, Surrey, GU5 0LE. Read at meeting 25.iv.1985.

PRESIDENTIAL ADDRESS

by PAUL A. SOKOLOFF

I. TOPICAL REMARKS

I am pleased to report that my year as President has been devoid of major catastrophies. On this basis I hope to keep my remarks brief, although I am conscious of the comment by Cherin that ". . . sermons on brevity and chastity are about equally effective. . .". We have heard the reports of your officers, and it is pleasing to note that our Society is continuing to prosper. I must confess that I am still staggered by the amount of work put in by the officers and members of Council on our behalf, and no vote of thanks can ever do justice to the efforts of those who administer our Society, organising the myriad of activities we have come to expect, such as indoor and field meetings, exhibition, annual dinner, publications sales, production and distribution of our Proceedings, management of the Society membership, finances, collections and library. I must single out two members for special mention: Russell Bretherton is now retiring from Council, having held the offices of President, Treasurer and Sales Secretary at various times during his long association with us. I wish him well in his retirement from "official duties".

I must also mention our retiring Secretary, Frances Murphy. Of all the officers the Secretary has the most onerous of tasks, being expected always to know the answer to the most obscure of administrative enquiries. I suspect that one of the more trying tasks is keeping the President in order. Presidents are, by their very nature, an ephemeral and univoltine species. With only Chairman's duties written into the general job description, it is easy to plan great schemes and projects, and it is often necessary for the Secretary to exert a firm but diplomatic hand. I am certainly personally grateful to Frances for helping me avoid a number of blunders during my term of office, and I extend my best wishes to her for the future.

Our thanks are due to Mr R. Dyke for designing and supervising the production of our excellent new Christmas card. It is disappointing that we have been unable to launch any new publications this year, but sales of existing material are buoyant, and there are ample funds available for new publishing ventures in the future. At the last Annual Meeting, Col. A.M. Emmet retired as the Honorary Secretary to the Hering Memorial Research Fund, being succeeded by Dr M.J. Scoble. I would like to publicly record the Society's thanks to Col. Emmet for his work over the years in administering this fund on our behalf.

We have been in existence as a Society for 113 years and it is inevitable that the aspirations and requirements of members will have changed over this period. The Society has always tried to respond to change, and this year our new bye-laws, so ably revised by Col. Sterling, have been adopted. I am sure that to an active entomologist the bye-laws of a Society are very dry bones indeed. They are, however, important in providing the constitutional framework within which we operate as a Society. Our ability to communicate effectively with each other, and our long tradition gives us the strength and conviction to face the challenges of the future. It may seem a little overdramatic to use phrases such as "challenges of the future" in an address to those for whom entomology is an interest and a hobby, but I do not think so. It is a sad fact that the cancers of legislation and bureaucratic control permeate our lives and, increasingly, our hobbies. If we do not take care the faceless denizens of Whitehall and Brussels will further threaten our individual interests as well as the wider goals of insect conservation.

I am convinced that the Society will have an increasingly important role in influencing the future status of insect conservation and entomological activity. I am sure that members will be pleased to learn that the Society has for some time been active in making its views known to Official Bodies, but I suspect that the pressure on us will increase with the passage of time. We must listen carefully to our advisors and prepare cogent and rational argument to counter proposals, such as collecting bans, which may be made by those with an eye more for political expediency than common sense. I have no doubt our voice will be heard—I only hope those who matter will listen.

It is now my sad duty to remember with you those of our members who have died during the past year:-

G.S. Mansell died on July 8th at the age of 73. He was by profession an architect, publishing several books and papers on the subject. He joined BPI in 1947 later becoming editor of "The Architect and Building News". He subsequently became the managing editor of Iliffe Technical Publications, joining their Board in 1967. He had many interests including golf, photography and a life long passion for butterflies. During the last ten years he concentrated his efforts on the genus *Erebia*, particularly their early stages. He joined the Society in 1960.

H.E. Chipperfield died on 11th July at the age of 77. He joined the Society in 1958, although his interest in entomology began at the age of 7 when he started collecting in the New Forest, under the guidance of his local vicar. He moved to East Anglia in 1917, joining Lloyds Bank in 1923. He remained with the Bank, at various eastern localities, until his retirement in 1966. He was Treasurer of the Suffolk Naturalists' Trust for 33 years and collected extensively on the Broads, Breckland and fens, and during his retirement turned his attention to tortricoid moths and leaf miners. "Chip" will be fondly remembered by many members for his good companionship in the field, and generous hospitality towards all those who visited his home at Walberswick.

K.F. Webb died suddenly on 11th October. An engineer by profession he joined the Society in 1983 as a novice lepidopterist. He was a regular visitor to both indoor and field meetings, rapidly building up a comprehensive knowledge of the Bedfordshire Lepidoptera. He was fortunate enough to capture the third British specimen of the Pyralid moth *Daraba laisalis* Walker in his garden in 1984.

D.H. Hall-Smith died suddenly on 9th November at the age of 64. Although he only joined the Society in 1984 he was well known to members living in the Midlands, and more generally for his publication in 1983 of the index to Bradley and Fletcher's *Recorder's Log-book and Label List of British Butterflies and Moths*. He was a soldier by profession, joining the cavalry as a trooper in 1938, transferring to the Royal Armoured Corps during the Second World War. In 1945 he transferred to the Royal Veterinary Corps working mainly with horses and tracker dogs. He served with distinction in Singapore and Cyprus before being commissioned in 1960 and posted to Malaya, where he began to assemble his extensive collection of tropical Lepidoptera. He retired from the army in 1975 with the rank of Lt Colonel and joined the staff of the Leicester museum as an Assistant Keeper. He re-organised the museum biology collections, and set up a County recording scheme. As a result of this scheme an *Atlas of Leicestershire Butterflies and Moths* is being prepared for publication.

Prof. O.W. Richards died on 10th November at the age of 82, following a long illness. he joined the Society in 1945 and was elected an Honorary member in 1965. A distinguished entomologist, he joined the staff of Imperial College as a research assistant in 1927, remaining at Imperial for the rest of his career, retiring in 1967 as Head of the Department of Zoology and Applied Entomology. He was an authority on many areas of entomology, including the Sphaerocerid flies, aculeate Hymenoptera and insect ecology. His many publications included *The Variation of Animals in Nature* in 1936, two editions of Imms's *General Textbook of Entomology*, the later in 1977, and *The Social Wasps of the Americas* in 1978.

D.W. Daley, an overseas member, died at his home in Zimbabwe on 19th December. He was a keen collector of African butterflies, specialising in the *Charaxes*. He joined the Society in 1951.

R.D. Hilliard died on 31st January at the age of 70. He was a banker by profession until his retirement in 1974. He was a keen and expert photographer with a wide interest in natural history, particularly the Lepidoptera. He will be fondly remembered for his cheerful disposition, wide knowledge of natural history and his talent for fostering and encouraging an interest in entomology amongst both the young and the less experienced naturalists. He was one of the founder members of the Amateur Entomologists' Society and joined this Society in 1976.

You have already stood in memory of these members, so I will not ask you to do so again.

Entomologists often ensnare their prey by employing various trapping techniques, and in many cases Presidents are obtained by these traditional methods. I hasten to add that I do not suggest your Presidents are selected from the random influx to light traps or carrion traps, but rather by more subtle device, perhaps analogous to the pheromone trap. I refer of course to that most insidious of snares, the telephone. This trap was used in my own case, and I well remember the siren voice of John Heath offering a nomination for Vice President, and my own flustered and incoherent response. Nevertheless I have very much enjoyed my year in office, although it has not been the sinecure I anticipated. The pleasure afforded by this unexpected honour soon became tinged with a faint horror that I would be expected to address this august body. A great many Presidential addresses have been masterpieces of expertise and erudition, and looking through the list of past Presidents I wondered what I had to offer. It soon became clear that I did have a unique quality: I was not an expert on anything, an amateur in all senses of the word. However, this has never stopped me in the past, and I do not intend that it does so now.

BOOK REVIEWS

Woodlice in Britain and Ireland: Distribution and Habitat, compiled and edited by Paul T. Harding and Stephen L. Sutton. Biological Records Centre, Institute of Terrestrial Ecology, Huntingdon 1985. Pp 151. £5.50 including postage.

Here, admirably presented, are the results of a dedicated band of Isopod mappers who set out to devise a mapping scheme that could extract the maximum amount of information from the countless hours of field work and gallons of petrol expended in gathering data from all such projects. The faint-hearted who opted out rather than bother to fill in the accurate description of habitat required by the record card for analysis should now be ashamed at their indifference. Many other scheme organisers should be feeling very sheepish that nothing more than spots on a map will come out of their own schemes.

The book gives a check list of species, notes key works and appends descriptions of four species added to the British fauna since the mapping scheme began. It describes the origins of the scheme, illustrates the record card, reproduces the collector's instructions and describes the verification and treatment of data. Each species is accorded a page for its map and summary distribution of records, and a page of text. This describes the fascies of the animal, the percentage of records in the habitat categories, habitat notes, behaviour and distribution in and beyond the British Isles.

The book concludes with descriptions of the major habitat types and their associated species, an excellent list of references, an analysis of records by habitat and a discussion of rare and vulnerable species.

Woodlice in Britain and Ireland is a real appetiser, well produced, enthusiastically written and inexpensive. The 442 recorders listed should be well pleased. Coleopterists should find this scheme tailor-made, but mappers sampling flying insects have much greater problems in associating their captures with defined habitats. They should at least now be spurred to make a real effort.

Also available from ITE publications sales without charge are a leaflet describing the BRC and introducing the recording schemes (*Biological Records Centre: a National Data Bank*) and a bibliography of published sources of distribution maps of the British flora and fauna (*Current Atlases of the Flora and Fauna of the British Isles*).

R.W.J.U.

Coléoptères de l'Ardèche, by J. Balazuc. 334 pp, 47 ink drawings and a map. Société Linnéenne de Lyon, 33, rue Bossuet, 69006 Lyon, France. Price 220 francs.

In 1982 the Société Linnéenne de Lyon appealed for the publication of captures of insects from the Ardèche region and M. Balazuc responded after spending more than 50 years collecting beetles in the area. The result is an excellent commentary on over 2500 species.

The area covers about 5600 square kilometres and includes the south-east of the Massif Central and the middle of the Rhone Valley, hence the area roughly divides into two areas: the north-west, formed by high crystalline mountains; and the south, formed by calcareous plateaux. The systematic list and commentaries are based both on existing lists and museum collections and on the author's own researches, and entries for individual species vary in length from one line to several pages depending on the number of records available and the interest and importance of the species. Many of the most interesting ones are illustrated with the author's excellent ink drawings. Because of the position of the Ardèche, the beetle fauna has a mixed origin; some elements are typically Mediterranean, while others are restricted to the cold of the mountains or the deep caves for which the area is renowned. Cave dwellers (many of them blind) are things we know little of in this country and it is fascinating to see and read about some of these peculiar insects. The author's activity in the area is reflected by the fact that of the 45 species illustrated, three species and two subspecies are named after him and one species is named by him.

As usual with Continental works, the bewildering diversity of species compared to our almost impoverished British fauna is both intriguing and daunting, but as British collectors become more aware of the important works coming out of Europe, it is obvious that despite being an island, we cannot cut ourselves off from the European study of Coleoptera either from the point of view of nomenclature and taxonomy or of distribution.

This book is very well produced: despite being a paperback, it is well printed on good quality paper with superb illustrations. My only criticism is that the map of the area is rather scrappy and confused, a shame given the author's obvious artistic ability. Nevertheless, the book can be considered as an important contribution to the knowledge of the fauna of the south of France and a fine example of how a 'local' list should be produced.

R.A.J.

The Moths and Butterflies of Great Britain and Ireland Vol 2 Cossidae—Heliodinidae, Edited by J. Heath, A.M. Emmet. Harley Books, Colchester, 1985. £45.00.

This volume deals with Cossoidea, Zygaenoidea, Tineoidea and part of Yponomeutoidea, but not Yponomeutidae.

New volumes of this monograph are always eagerly awaited and provoke earnest controversy at society meetings, in public houses and over mercury vapour light traps. With volume prices comparable to the inflated antiquarian values of the classic nineteenth century standard works, the question is essentially whether the format of the series provides such information as to make this work an essential item in the average entomologist's library. If so, why is it highly priced and if not, what readership is it aimed at? The editors must see quite another viewpoint: at what level is it possible to find authors to give complete coverage of the British Lepidoptera?

The conceptual content of this series seems to have been an illustrated update of Meyrick's taxonomic *Revised Handbook of British Lepidoptera*. An up-market presentation, a decision to include quarter-page distribution maps and irrelevant introductory articles in a basically taxonomic work, presumably to contrive expanded sales, led to an eleven-volume library work instead of the modern vade-mecum that is the real requirement of so many lepidopterists. The micro-lepidopterist will be obliged to buy the relevant volumes, but the initial volumes on macrolepidoptera have already provoked production of Skinner and Wilson's illustrated guide to cater for the light-trapper's requirement for a replacement for South's *Moths of the British Isles*.

In some respects, this volume breaks out of the strait-jacket of the imposed format. Tremewan's contribution on Zygaenidae toes the line of the details included under each species, but precedes it with an essay on *Zygaena* ranging from detailed chaetotaxy of the larvae to dispersal, hybridisation and conservation. Sound advice is given on rearing *Zygaena*, with consideration of the diapause that can extend development to extra years.

A further break with the general scheme here is the provision of a key to larvae and a fine plate of coloured drawings of *Zygaena* by Colin Threadgall. In Gracillariidae, the problem of identifying *Phyllonorycter* from their mines has been in most cases resolved by reference to description of the pupation habits within the mine and a key to pupae of species on popular foodplants is provided.

In one respect this volume remains stubbornly Victorian. Figures of genitalia are regarded as a last resort. Pierce and Metcalfe's figures of genitalia of Tineina were the last to be published (other than the females of Noctuidae) and Pierce drew them himself to a standard far below that of earlier volumes. There were also errors of identification, inevitable in such a pioneer work, but nobody has ever published a list of corrections, even though this work has been reprinted and is still in use. MBGBI makes no synonymic or taxonomic reference to Pierce and Metcalfe. Blank quarter pages are liberally scattered throughout the text, whilst the few genitalic illustrations are strewn over complete pages. This is a major omission, as anyone attempting to map species from worn light trap catches will testify.

MBGBI is the first British book on the whole of the Lepidoptera to be published since the establishment of a reasonably rational family classification. The apparently readily workable key to families, following that of Sattler in *Fauna von Deutschland*, should prove a revelation to anyone starting out with Meyrick.

The introductory chapter is an extensive and fascinating review of British aposematic Lepidoptera by the Hon. Miriam Rothschild, so why is the frontispiece of an exotic species? Unless one has an aptitude for turning a blind eye to everything in parentheses, the flow of this contribution is marred by incessant appeals for support of every statement made from the 210 references cited. I doubt whether this will encourage the interest of the probable readership of these volumes.

The most suitable medium for coloured illustrations of moths has been a contentious issue throughout this series and remains so. The artistic licence used to fill in areas of constant tone or little detail with brush or pen marks along the wings gives a scratchy appearance and precludes conveying sheen and texture. Even the fold that is so conspicuous in many Lepidoptera is barely indicated. The hindwing cilia have been drawn coarsely, perhaps to withstand the loss of detail in reproduction. The opportunity in drawing whole moths of angling the lighting to convey the sometimes great differences in pattern contrast on the pair of wings illuminated basally compared to that illuminated apically has not been used. Would it not therefore be better to halve the artist's work by showing one pair of wings and spend some of the saving on larger drawings with more confident detail? Similar techniques are used with more success by Scandinavian illustrators when the linear infill represents single scales.

The illustrator is also handicapped by the universal use of a white background, which, in the absence of a printing in metallic ink, leaves no possibility for representing metallic tints or whites. The translucent white of the leopard moth cannot be shown and the glistening white of *Leucoptera* is parodied by grey scratchings.

What seems to be required is a modern equivalent of the 19th century process of hand-coloured lithographs. Detail and critical shading were provided in a grey line printer and colour was applied quite crudely by hand. The same principle is used today in compressing the information bandwidth transmitted in television. The poor quality of the old plates was as much in the economy of the number of tints used as the lack of detail in colour. Modern electronic platemaking aimed at long print runs takes all the neutral component of colour out and puts it into the black printer, which therefore has to be black and has to be screened. This does not seem to be the way to go for our sort of work. The three colour dye system used by the Society's platemaker makes a very adequate black on its own.

I have a cruel editorial test for the value of coloured plates. Can you key out the coloured figures in the text? I tried it on one of the most awkward genera, *Parornix* and failed miserably, both on shade and pattern. I had more success with the figures of Stainton's *Natural History of the Tineina*! The figures are not always of specimens showing the characters described as normally diagnostic, and there are no supplementary text figures to show these. Legs are not shown on the plates, and nowhere is there a figure of the characteristic leg embellishments of *Caloptilia*, or the resting posture of the moths, though both are described and used as diagnostic characters. Emmet puts forward a hypothesis of mimicry of parasitic Hymenoptera by micro moths with certain wing patterns, yet this is not supported by any figure of a resting moth. These authors and editors have been brought up to identify their moths from the entirely unillustrated Meyrick's *Revised Handbook* and the often inadequate original descriptions of species. Illustration does not come easily to them.

The strictly defined format of the presentation of species assists materially in welding the contributions of many authors into a uniform whole. The scholarship and patience of the editors in checking all that comes before them ensures a high standard of accuracy. The choice of a colour-blind author for one family must be viewed as a self-inflicted wound from which I hope that the editors have by now recovered! Other problems, such as collectors who inconsiderately add species to the British list in the middle of the preparation of plates and text, have been mastered without perceptible difficulty.

This work is greatly needed for its contribution to updating and collating published information on microlepidoptera, but we shall all continue to wish that the immense effort that goes into it could be tailored to our individual needs.

R.W.J.U.

The Macrolepidoptera of Gloucestershire, compiled by J. Newton (Moths) and G.H.J. Meredith (Butterflies). *Proceedings of the Cotteswold Naturalists' Field Club*, 1984, **39** (1), 133 pp. Reprinted as *Macrolepidoptera in Gloucestershire.* R.P. Beckinsale, 194 Iffley Road, Oxford OX3 1SD. £4.50 incl. p.&p.

This consolidates Donovan's Catalogue of the macrolepidoptera of Gloucestershire, 1942, Austen Richardson's three Supplements of 1945, 1953, 1972, with later information to 1982 assembled by the compilers. After a new general introduction, those to the earlier parts are reprinted in their original form, and all the information on each species is now brought together, using the nomenclature of Bradley and Fletcher's 1979 label list. Eight species of moths have been added since 1982, bringing the total listed to 676.

It will be a great help to all those interested in the rich and varied Lepidoptera of Gloucestershire to have the present information thus brought together in a single list. The compilers note, however, that many parts of the county, particularly in the forest of Dean and the north east, are still very little recorded. For the moths the up-dating since 1972 has been very thoroughly done in appropriate detail; but for the butterflies, alas, the compiler has confined it to generalities without places or dates, though there is a half-promise of distribution maps at some time in the future. This reviewer also expresses his hope that soon at least a preliminary list may be produced of the county's microlepidoptera.

R.F.B.

Correction to vol. 17.—p. 107, line 15: emergence of *S. formicaeformis* extends from late May to early August [not April].

PRESIDENTIAL ADDRESS II

AN INTRODUCTION TO THE GELECHIIDAE

by PAUL A. SOKOLOFF

A general introduction to the family is followed by descriptions of the British species of the genera *Teleiodes* and *Teleiopsis*.

The Gelechiidae are a fascinating and challenging group to study. Although there are probably in excess of 160 resident British species, distributed between some 55 genera, members of this family are often inconspicuous, secretive in their habits and do not readily come to the notice of the general lepidopterist. The family name derives from the type genus *Gelechia* of Hübner, a loose approximation of the Greek for "resting on the ground". Heslop[2] in his attempt to assign English names to all the British microlepidoptera chose group names including "groundling", "sober" and "obscure" for the Gelechiidae. Whilst this is certainly appropriate for some members of this family, it is a gross injustice to many.

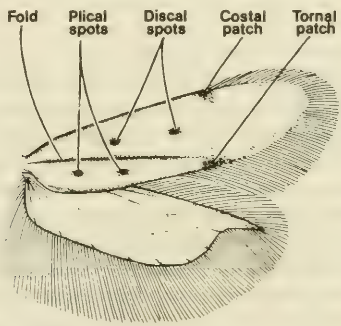


Fig. 1. Gelechiid wing markings

I do not propose to provide a definitive taxonomic description for this family—the entomologist will notice two distinctive features: in the resting insect the long, recurved labial palps, with pointed terminal joints, are striking and in the set insect the trapezoidal hindwings usually have a markedly emarginate termen, the classical "pointing finger". Not all species have this feature, although an at least sinuate termen is found in all other species bar those of the Symmocinae which have elongate-ovate hind wings. The general features of gelechiid wings are shown in figure 1.

The adult insects are mainly crepuscular or nocturnal, although many species are easily disturbed during the day. Moths are often very active, running or flying away at the least disturbance, and concealing themselves with remarkable rapidity. It is appropriate to quote J.W. Douglas[3] writing in 1860 of *Teleiodes fugitivella* (Zell.) ". . . common in chinks and crannies of the oak palings under the elm trees, whence they surveyed the world, always with an eye to the main chance of escape, which they evidently considered to be the whole duty of moths . . . wary and practiced in the shuffling arts as any of their race ever were. . .". This description could apply to many of our native gelechiids.

TABLE 1: Larval habits of British Gelechiidae

External on or under ground	8
In roots	4
In stems	9
External in webs	10
Shoots	25
Spun leaves	31
Leaf mines	9
Buds	2
Flowers	5
Seeds	18
Lichens	1
Moss	10
Detritus	4
Unknown	23
Approximate total	159

The larvae of this family are without particular distinction, having five pairs of prolegs, rarely being apodal. Like the adult moth the larva is often either active or very active when disturbed. The feeding habits of this group are perhaps amongst the most catholic of any lepidopterous family (table 1), with many species feeding in webs, silken tubes or spinnings. One must not be too dogmatic in playing the numbers game as the larvae of many species will feed on all or any available parts of their particular foodplant. One species, *Reuttia subocellea* (Steph.) constructs a portable case made from a floret or husk of *Origanum* or, less commonly, *Mentha aquatica*, whence it feeds on the seeds of these plants.

The gelechiid pupa has the first four abdominal segments fixed, and is not protruded from the cocoon on emergence. In comparison with other families of Lepidoptera we are woefully ignorant about the general biology of many of our species, and much work needs to be undertaken in this field. A number of species overwinter in the larval stage, especially those which feed on seeds. Only *Teleiodes decorella* (Haw.), *Scrobipalpa costella* (Humph. & Westw.) and perhaps a few individuals of *Teleiopsis diffinis* (Haw.) are known to hibernate as adults. One may conjecture that most overwinter in the egg or pupal stage.

Since the publication in 1979 of the "Log Book" by Bradley and Fletcher[1] nine species of gelechiid moth have been added to the British list. In 1980 *Teleiodes wagae* (Nowicki) was recognised by Dr Sattler from specimens taken in Co Clare and Hampshire[4,5]. Also in 1980 *Metzneria aprilella* (Herr.-Schäff.) was spotted by Dr Sattler in a series of moths exhibited by Dr Bland at our annual exhibition[6]. In 1982 the Rev. D.J.L. Agassiz published a paper in our Proceedings separating *Oecogonia caradjai* Popescu-Gorj from its congeners *quadripuncta* and *deauratella*[7]. 1984 proved to be a bumper year for the disclosure of new species: Mr R. Heckford bred *Syncopachma suecicella* (Wolff) from *Genista pilosa* in Cornwall[8], and Mr E.C. Pelham-Clinton bred specimens of *Scrobipalpula tussilaginis* (Frey) from larvae collected in Devon in 1983 mining the leaves of *Tussilago farfara.*[9] Mr. J.M.

Chalmers-Hunt has taken specimens of *Monochroa niphognatha* Goz. from a marsh in Kent[10] and has also identified a moth taken over a period of years in Kent as *Athrips rancidella* (Herr.-Schäff.)[10], and finally in February 1985 at a British Museum workshop for members of this Society two further species of *Scrobipalpa* were revealed. Perhaps the surprising aspect of these discoveries is that most are probably resident British species. A number of other "mystery" moths are under investigation at present, including possible new species of *Monochroa*, *Eulamprotes* and *Teleiodes*.

I would like now to briefly consider those species referable to as "pests". Most major groups of Lepidoptera contain some species of economic importance, and the Gelechiidae are no exception. Whilst the major culprits are well known, the status of minor pest species is poorly understood. This is unfortunate, as opportunistic species are often able to take advantage of changes in, for example, farming practice by switching from their natural foodplants to those supplied so abundantly by man. Thus new pests may arise which may be of considerable economic significance, particularly in Third World countries which have limited resources available for pest control.

Exotelia dodecella (L.) is occasionally a minor pest in plantations of *Pinus* species in Europe and Canada. The pre-hibernation larva mines in needles, ejecting frass from holes in each end of the needle. After hibernation the larva feeds on buds and shoots. *Recurvaria nanella* D. & S. is occasionally a minor pest in orchards where the post-hibernation larva feeds in the buds of apple, plum and cherry, as well as wild *Prunus* and *Malus*.

The Peach Twig-borer, *Anarsia lineatella* Zell. has been bred from imported apricot in this country[11]. It is essentially a Southern European species that has now spread throughout Central Asia, the Far East and North America. Although mainly a pest of peach and almond it feeds on a wide variety of trees including plum, cherry, apricot and many *Prunus* species. The larva feeds on leaves and buds, but the principal economic damage is to twigs and fruit, into which the larva bores. In northern areas the moth is bivoltine, hibernating when small. In hotter areas there may be up to four generations during the summer months.

Phthorimaea operculella Zell., the Potato Tuber Moth, or Tobacco Splitworm,[12] is a widely distributed and often significant pest in tobacco, potato, tomato, and occasionally egg plant and sugar beet. In growing plants the eggs are laid mainly on the underside of leaves. On hatching the larva mines a leaf (which may be of particular significance in crops such as tobacco) or may bore through the stem into the tuber. Females may lay directly onto potato tubers, for example in dry and cracked soils where the moth can gain direct access to the roots and tubers, or around the "eyes" in stored tubers. In storage the moth may continually breed if the temperature is sufficiently high. Larval damage provides a focus for secondary microbial infection as well as causing weight loss and shrinkage through evaporation. Control of this moth is mainly by dusting and fumigation, but recently biological controls using parasites and pathogenic viruses has been tried.

A less well known crop is pistacio nuts, harvested predominately from *Pistacia verum*. These nuts are widely grown in Middle Eastern and mediterranean countries, where arid and desert-like conditions are particularly favourable to this plant. Iran, for example, has a considerable area where pistacio is the only useful crop. Several gelechiid moths are associated with pistacio, and four may be classified as pests[13].

Telphusa pistaciae Sattler was first noticed as an unidentified pest in Iran in 1969, and was described by Sattler as a species new to science in 1982. The larva of this species bores into buds, thus damaging the flowers. In one survey 27% of all buds were found to be attacked by larvae[14]. *Schneidereria pistaciicola* Danilevsky feeds in the larval stage on developing fruitlets and may cause significant damage. It is interesting to note that damage by this species can be substantially reduced by simple hygienic measures such as scraping loose bark, and reducing the amount of litter around the base of trees. *S. pistaciella* Weber, although of uncertain taxonomic status, attacks half-ripe nuts destroying the kernel. The last pest in this complex is *Gelechia pistaciae* Filipjev, whose larva feeds on the leaves, flowers and fruit. Perhaps no single plant is host to so many pest species of the same family.

The Angoumis grain moth, *Sitotroga cerealella* Oliver is a pest of whole cereal grains, including rice, in warm, temperate regions and throughout the tropics. It is recorded in the U.K. although it is rarely of economic importance here. Infestation can occur both in the field prior to harvest as well as during storage. It is an interesting species as the larva develops within a single grain. As mobility is not important to the larva, the prolegs are greatly reduced. In stored grain infestation is usually confined to the outermost exposed areas as the moth is too delicate to penetrate densely packed grain.

Of great economic importance is the Pink Boll-worm, *Pectinophora* (*Platyedra*) *gossypiella* Saunders, one of the many pest species associated with cotton, occuring wherever the crop is grown. The moth is bivoltine, with the first brood larva feeding in a web inside the cotton flower. Larvae of the second brood complete their development within the boll, reducing the yield in infested crops. Control is usually by spraying, but increasingly pheromone traps are being used.

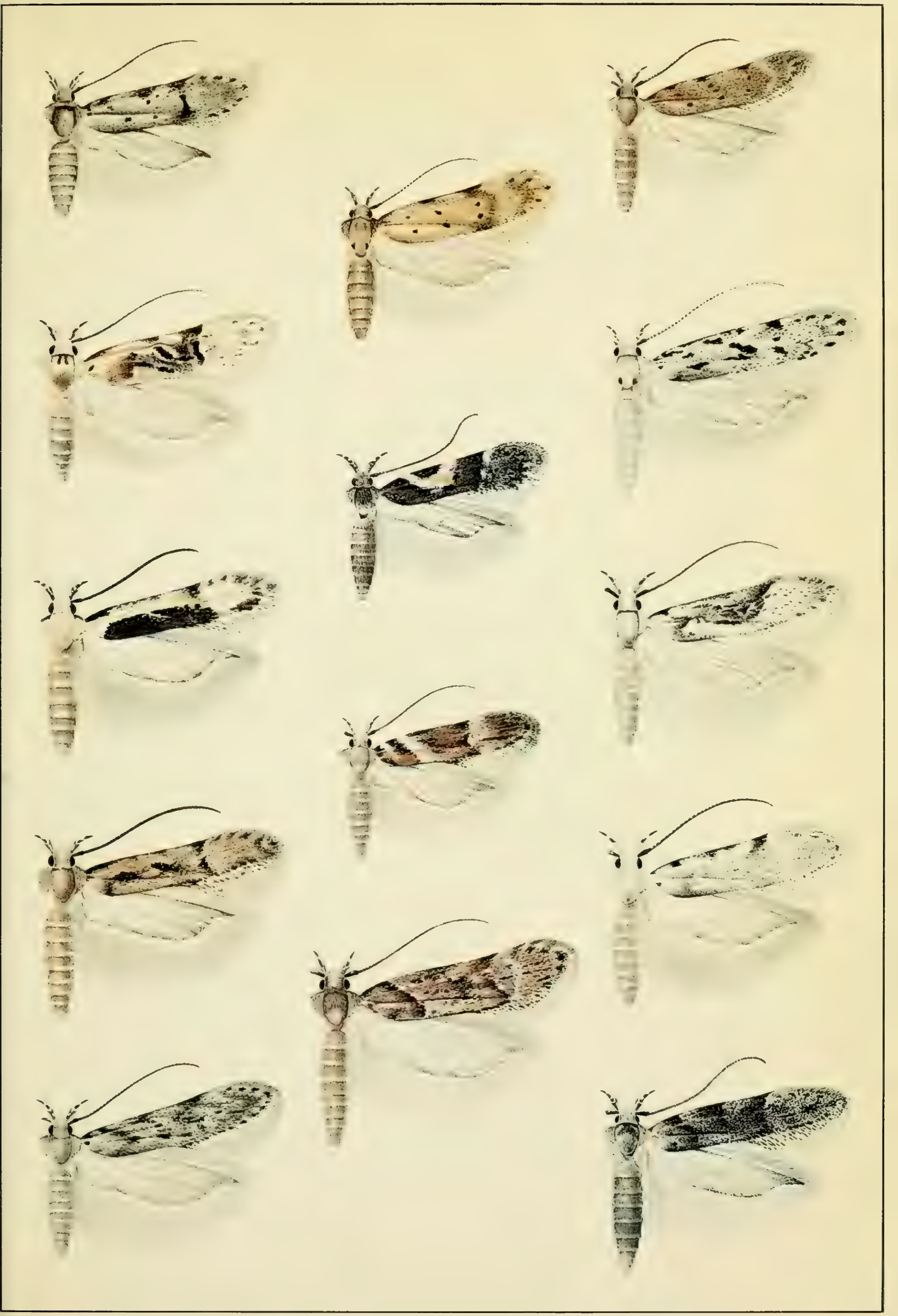
Keiferia lycopersicella (Wals.), the "tomato pinworm" is widely distributed through the Americas where it feeds on a variety of solanaceous plants, being a particular pest of cultivated tomato. The moth lays eggs on the leaves and fruits, and the larva on hatching bores into the tissue, producing the characteristic pinholes.

I conclude this section by mentioning four recently recognised pest species[15]: *Ephysteris promtella* (Staud.) is widely distributed throughout the dry grasslands of the arid zones of the Old World, where it presumably feeds on various grasses. In the mid 1970's this species was found in Turkey boring the stems of wheat (*Triticum* sp.), causing considerable crop damage. *Scrobipalpa ergasima* (Mey.) has caused damage to cultivated solanaceous plants, particularly egg plant and potato, in tropical and sub-tropical regions of the Eastern hemisphere. *Eurysacca melanocampta* (Mey.) damages potato and quinoa (*Chenopodium quinoa*) in Peru, and also in Peru *Keiferia colombiana* Pov. has been found damaging melon pear (*Solanum muricatum*).

To the new student of the Gelechiidae, the British literature has very little to offer. After 60 years, Meyrick[16] is still a fine work of reference, although difficult to use. Pierce & Metcalfe[17] figure a reasonable selection of genitalia, and Stainton's "Natural History of the Tineina"[18] offers the only recognisable illustrations of British moths, but very few species are figured. Emmet's "Field Guide"[19] is indispensable to the field worker, but apart from these the student must scour the journals for information. The need for coloured illustrations of moths of this family is pressing, and the society hopes to remedy this defect in part with a series of occasional papers on this group. Ultimately, the "Moths and Butterflies of Great Britain and Ireland"[20] will provide an accessible source of reference for those interested in the Gelechiidae.

PLATE 3. **THE BRITISH SPECIES OF *TELEIODES* AND *TELEIOPSIS***

1. vulgella
2. scriptella
3. decorella
4. decorella
5. notatella
6. wagae
7. proximella
8. alburnella
9. alburnella
10. fugitivella
11. paripunctella
12. luculella
13. sequax
14. diffinis



APPENDIX

THE BRITISH SPECIES OF *TELEIODES* AND *TELEIOPSIS* (Lep.: GELECHIIDAE)

The genus *Teleiodes* was erected in 1960 by Sattler[21], on the basis of genitalic characteristics, separating species formerly in the collective genus *Telphusa* Chambers. Eleven species are currently recognised as British. They show broad similarities in their biology, with larvae feeding between spun leaves, predominantly of trees. Only one species, *Teleiodes decorella*, hibernates as an adult, the remainder overwintering in the pupal or egg stage. The genus *Teleiopsis* was similarly erected in 1960[21], the sole British representative of this genus being *Teleiopsis diffinis*, formerly assigned to the genus *Gelechia*.

Teleiodes vulgella (Hübn.).(*aspersa* (Haw.)) Fig. 1

Wingspan 11–13 mm. Forewings grey with scattered black scales. Indistinct darker spots on costa near base, at one-third and three-fifths. Most noticeable feature a black bar from tornus at two-thirds stretching towards, but rarely reaching, the costa. Bar composed of raised scales, although this is often difficult to see in a set specimen. The only appreciable variation is in the ground colour which varies from light grey to dark grey.

Moth June and July. Common and widely distributed in England and Wales, but apparently absent from Scotland.

Larva greenish-grey with black spots; head light brown; thoracic plate black and bisected. Feeding April and May between spun leaves of *Crataegus* spp. or *Prunus spinosa*, making a brownish blotch. Has been bred from juniper[22]. Pupates in spinnings, or in a flimsy cocoon on the ground.

Teleiodes scriptella (Hübn.) Fig. 2

Wingspan 12–13 mm. Ground colour of forewings white, mixed with black and brown scaling. Black mark on costa from base to about one-fifth; a smaller costal spot at one-half and a larger patch beyond at three-fifths. Wings dorsally suffused with darker scaling, but the three black spots are clearly visible, with distinctly raised scales. Dark scaling often ends abruptly forming a transverse line at three-fifths. Some variation in ground colour.

Moth June. A local species with a predominantly south-eastern distribution.

Larva light green with black spots; head yellowish; thoracic plate yellowish edged black with two dark spots. Feeding August and September in a flat folded leaf of *Acer campestre*. *Pupa* overwinters in a light cocoon amongst surface rubbish.

Teleiodes decorella (Haw.) (*humeralis* (Zell.)) Figs. 3, 4

Wingspan 13–14 mm. A very variable species. The "white" form (fig. 3) usually has the base of the forewing white with a very distinct black costal mark from base to about one-fifth; costa white, sprinkled with black scales, sometimes forming darker spots. Dorsum black-scaled from one-fifth to about three-fifths with lesser scaling beyond. Head and thorax white. The black scaling is often intense, much more so than in *scriptella*. The "brown" form (fig. 4) has head, thorax and ground colour of wings brown. The black costal marks and two black bars are usually visible, but may be absent or difficult to distinguish in very dark, unicolorous forms.

Moth July, hibernating soon afterwards, but not often seen in the spring. Widely distributed, although local, in England, Scotland and Wales.

Larva light green with head and thoracic plate light brown. Feeding May and June in a folded leaf of *Quercus* spp. or *Swida*.

Teleiodes notatella (Hübn.) Fig. 5

Wingspan 12–15 mm. Ground colour of forewings varying from light grey to dark brown-grey; sometimes paler in apex beyond an indistinct angular fascia at four-fifths. Markings on wing in streaks and indistinct. Often a difficult species to characterise, and worn specimens require examination of the genitalia. Note that the male genitalia figured in Pierce and Metcalfe[17] under this species are those of *Teleiodes wagae*.

Moth May and June. Widely distributed and reasonably common.

Larva pale grey-green with black spots; head and thoracic plate black. Feeding August and September on parenchyma under the down on the underside, or between two leaves of *Salix caprea*. *Pupa* overwinters in a light cocoon on the ground.

Teleiodes wagae (Nowicki) Fig. 6

Wingspan 12–14 mm. Forewings grey-brown, lighter near apex, with small black spots: three in a line across wing at one-fifth, rather indistinct on costa but distinct in cell and fold. Four dots at two-fifths: one on costa, two in cell and one in fold. Pair of dots at end of cell. Fresh specimens are reasonably distinctive but worn examples require genitalia examination. In the past this species has been confused with both *notatella* and *paripunctella*.

Moth April and May. A recently discovered[4,5] and presumably resident species known at present from only four widely dispersed localities (Western Ireland, Hampshire, Kent and Yorkshire).

Larva pale green; head light brown; thoracic plate greenish yellow. Feeding in August and September between spun flat or occasionally folded leaves of *Corylus*, making irregular blotches at first, then holes. *Pupa* overwinters in a flimsy silken cocoon on the ground.

Teleiodes proximella (Hübn.) Fig. 7

Wingspan 13–16 mm. Ground colour of forewings varying from white to grey with diffuse black scaling. Discal and plical spots dark and elongate. A series of black dots around apex and termen.

Moth May and June, widely distributed and reasonably common in England, Scotland and Wales.

Larva pale green, often reddish tinged, with black spots; head yellowish. Feeding August and September in a folded leaf of *Betula* spp. or *Alnus glutinosa*. *Pupa* overwinters in a flimsy cocoon on the ground.

Teleiodes alburnella (Zell.) Figs. 8, 9

Wingspan 12–14 mm. Rather variable. The typical form with ground colour of forewings white. One or two small black spots on costa at base with varying amount of black scaling on costa leading to a well defined costal blotch at three-fifths (fig. 9). Individual specimens, and some localised colonies throughout its range show considerable variation in the degree of black scaling (fig. 8) which may extend from the base to around three-fifths. Although the costal blotch is present, it is confluent with the background scaling. Some forms superficially resemble *proximella* and others could be confused with the white form of *decorella*. However the dorsum is predominantly white in *alburnella* whereas the costa is mainly white in *decorella*.

Moth late June to August, widely distributed and locally common.

Larva light green with black spots; head and thoracic plate yellow. Feeding in May and June between a spun or folded leaf of *Betula* spp. Probably overwinters in the egg.

Teleiodes fugitivella (Zell.) (*fumosella* (Douglas)) Fig. 10

Wingspan 12–15 mm. Ground colour of forewings grey with varying amounts of black scaling extending from base to around three-fifths, with reduced scaling beyond. Dark streak on costa at base, blackish streak along fold. Superficial colour may be light grey, dark grey or occasionally with a faint reddish-brown hue.

Moth June and July. Widely distributed and locally common.

Larva light green, tinged with pink above, with black spots; head and thoracic plate light brown. Feeding in May in a folded or spun leaf of *Ulmus* spp. readily dropping from a silken thread when disturbed.

Teleiodes paripunctella (Thunb.) (*triparella* (Zell.)) Fig. 11

Wingspan 11–12 mm. Ground colour of forewings varies considerably. Usually yellow-brown tending towards grey-brown, particularly in specimens bred from *Myrica*. Three pairs of distinct spots at one-, two- and three-fifths. Six or seven spots at the apex. Usually a distinctive species, although worn, dark specimens could be confused with *wagae*. The pattern of the black spots readily distinguishes the two species.

Moth May and June, widely distributed.

Larva yellowish-green, occasionally pink tinged, with black spots; head pale brown. Feeding August and September between, and skeletonising leaves of *Quercus* spp. or *Myrica*. There appear to be two ecologically distinct populations: a woodland form on *Quercus* and an open moorland form on *Myrica*. *Pupa* overwinters amongst surface debris[23].

Teleiodes luculella (Hübn.) Fig. 12

Wingspan 10–12 mm. A very distinctive species not given to significant variation. The semi-circular white costal blotch is characteristic.

Moth May and June. Widely distributed in oak woodlands of England and Wales.

Larva whitish green with black spots; head yellow brown; thoracic plate yellow brown with black marks. Feeding in September between spun leaves of *Quercus* spp. *Pupa* overwinters in a loose cocoon on the ground.

Teleiodes sequax (Haw.) Fig. 13

Wingspan 11–14 mm. Ground colour of forewings white with dense red-brown or black scaling. Angular fascia at one-third and another at three-quarters: sometimes two black dashes beyond. Little variation, although some worn individuals could be confused with *Recurvaria nanella*.

Moth July, widely distributed in England, Scotland and Wales.

Larva whitish tinged with dull green; spots grey; head and thoracic plate brown. Feeding May and June between spun shoots, often drawn together in a "ball" of *Helianthemum chamaecistus* (common rockrose) or *H.canum* (hoary rockrose). *Pupates* amongst surface litter in a flimsy cocoon.

Teleiopsis diffinis (Haw.) Fig. 14

Wingspan 14–16 mm. Ground colour of forewings grey-brown, often tinged with violet. Very little variation and the angular, oblique fascia at one quarter is characteristic.

Moth May and June with a partial second brood in September and October.

Larva green, tinged brown with red markings; head and thoracic plate yellow brown. Feeding August to April (occasionally July and August as well) in a silken gallery amongst roots or occasionally along the stem and in seeds of *Rumex acetosella*.

There is slender evidence[24] that a few individuals of the second brood may hibernate, but most overwinter as a larva.

ACKNOWLEDGEMENTS

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DIPTERA

HEMIPTERA

HYMENOPTERA

LEPIDOPTERA

ODONATA

ORTHOPTERA

NEUROPTERA

ARACHNIDA

OTHER CREATURES

PLANTS, FUNGI ETC.

OTHER PABULA AND HABITATS

SELECTED TOPICS

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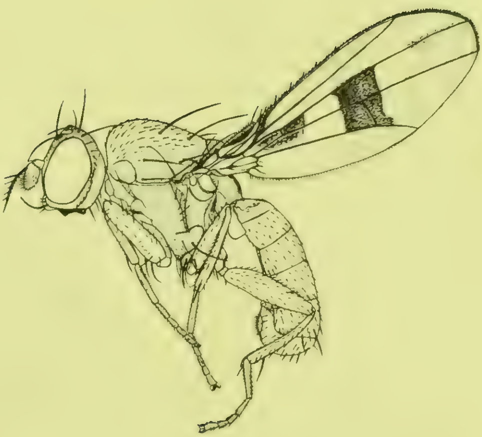
/EMBER 1986 Vol. 19, Parts 1/4

Proceedings and Transactions of The British Entomological and Natural History Society



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Vol. 19
1986

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EDITORIAL

Is anybody out there?

Editing this journal has been like working in an anechoic chamber: nothing seems to provoke a response from the members. The silence is at first perplexing, then frustrating and finally demoralising.

We get the odd faulty copy returned. Occasionally a member objects to a typographical error. The recapture rate in these mark and release experiments is very low.

In the November 1985 issue we published the proceedings of a discussion meeting on how we should approach growing opposition to collecting butterflies. Although this could profoundly affect the activities of many members interested in butterfly varieties, I had but one member express an opinion.

This issue is several months late, yet I personally have received only one enquiry about this. I am led to doubt whether most members value the publication in its present form.

Editorial policy

The Proceedings content of this journal has for many years set out to document the factual natural history content of our meetings and other non-ephemeral business. We are trying to be more effective in conveying the content of the many fascinating lectures enjoyed by members able to attend the meetings at South Audley Street. Many lectures are copiously illustrated and difficult to precis in words.

The Transactions, to be of interest to the membership, should reflect the fruits of members' researches. Unfortunately, the papers received have not been very representative and have been so few that it has not been possible to exert a clear editorial policy by selection.

Without the generous support of Council members, the contents would be even less representative. Only the annual exhibition report would indicate the long-standing and increasing role that Society members play in studying microlepidoptera. The five papers published on micros in the last five years have comprised three presidential addresses, one paper by a Council member and one co-authored by the Editor.

In April 1984 I led a discussion meeting on the role that our publication should play in the affairs of the Society. I described how the Proceedings was started to record original work read at meetings and was heavily subsidised out of the pockets of members of Council until it became accepted as a proper reason for expenditure. This aspect developed very slowly, in part because lectures tend to be chosen for the speaker's ability to entertain the members with prior-published knowledge. There was also a long period when the editor of the Proceedings was the same person as the editor of the Entomologist's Record. This probably polarized the contents of the two publications.

For the past twenty-five years, successive councils and editors have done all they could to promote the journal as an important service to the whole membership. The Transactions now publish much original work, but some of our most gifted and productive amateurs eschew publication in it, even when there are long publication delays elsewhere.

One myth is that the editorial standard is too high for members' work to be acceptable. Simple but accurate observations are of just as much merit as work of a bulk and complexity that is beyond the time and resources of the amateur. You should find that you get the best presentation of your knowledge by negotiation with a strong, but sympathetic editor of a journal of repute. He will not let you make a fool of yourself, like the editor of a lesser publication. He may point out a really new aspect of your observations and encourage you to add to it before your publish.

Professionals complain that amateurs do not record for public benefit what they know from long experience. Such knowledge forms the starting point for quantitative investigation. I have heard amateurs berating professionals for investigating what is already known when it is not to be found in the literature.

A new outlook

The 1984 discussion meeting on the future of the Proceedings and Transactions did not visibly update my working brief. I have lost the conviction that the use made of the publication in its present form by members justifies our spending more on it than on any other single activity.

Council has accepted that it must agree objectives for our regular publication and that their implementation must be a collective responsibility. A new editor will be appointed for this phase. If Council decides upon substantial re-orientation, I hope that the new editor will find as much stimulus in creating a new image as I did in getting as much as I could out of the traditional style.

Editing a journal is tantamount to running a small technical business, with additional requirements such as an appreciation of design. It is a rare editor who has all the qualities required. The teamwork with which his assistants supplement his skills is important. We use only a small editorial panel and this editor is certainly indebted to them for their support. The next editor will need to call upon a different blend of skills. I shall see that he does not have to start from cold.

R. W. J. Uffen

LETTER TO THE EDITOR

Butterfly-Collecting Policy

The presentation by Alan Stubbs in the Proceedings is very well and clearly done. I notice that the purpose is to protect members against legislators, etc., rather than to protect butterflies against collectors.

If butterflies are to be protected, as no doubt they should be, why not burnet moths? If burnets, why not other moths? Should not UV lamps and traps be made illegal? Those nocturnal encounters with the police, so often recounted by collectors, might henceforth have less happy endings.

If I were going to have to have a licence to take (say) five green-veined whites for breeding every year or two, it might not be long before nets had to be licensed by the police.

If there is to be a policy that is in any respect one of principle, should it not extend to collecting outside the U.K.? Should the exhibition of dead specimens be prohibited?

It is difficult to keep a reasonably logical sense of proportion. It might be that I could be fined for catching a meadow brown, but could safely plough up a paddock killing 500 of the larvae. The same difficulty has arisen in respect of flowering plants.

My conclusion would be that legislation must be avoided, except in respect of the most vulnerable insects and (?) some commercial activities. For myself, I soon gave up "collecting", and don't see why others go on with it.—S.R. Bowden

EMERGENCE AND FLIGHT PERIODS OF SOME BUTTERFLIES AT FRESHWATER, I.O.W. IN 1984

by S. A. KNILL-JONES

Roundstone, School Green Road, Freshwater, Isle of Wight, PO40 9AL

Following a late mild autumn, 1984 had the mildest winter for nine years and the earliest spring since 1949. There was the driest April since 1938. I can report the effects on the emergence and flight periods of the butterflies at Freshwater, Isle of Wight.

March was a wet though mild month with 75.4 mm of rainfall and only two days gave the conditions for butterflies. On March 30th I saw five species, which included a dark male Small White (*Pieris rapae*) and the four major hibernating species.

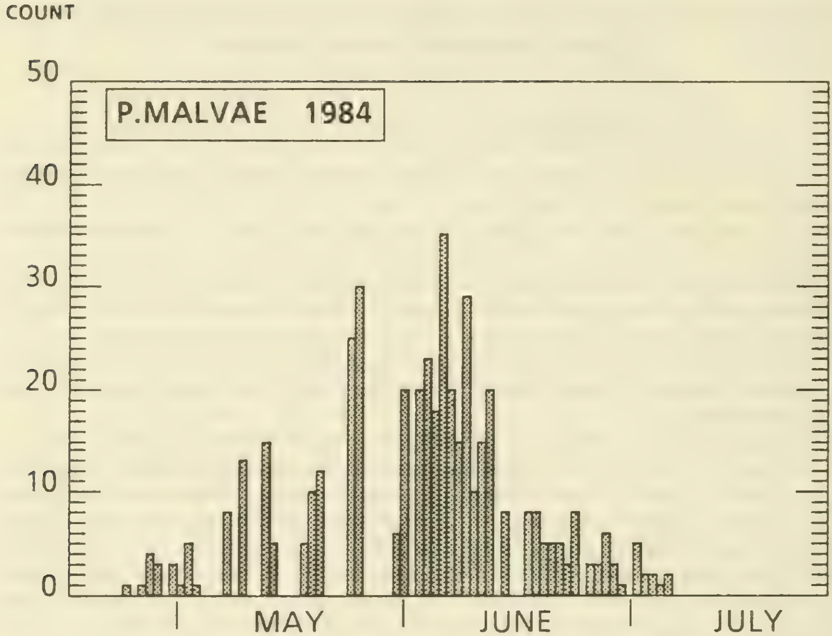
April began with snow showers early on the first and it was not until 5th April that the weather pattern changed, which resulted in one of the warmest and sunniest Aprils this century.

The numbers of butterflies recorded include a two-hour period from 11 a.m. to 1 p.m. Each butterfly seen was recorded during that time. The species of butterflies (*Pyrgus malvae*, *Erynnis tages*, *Melanargia galathea* and *Lysandra coridon*) that were only recorded on the downs had a shorter time of an hour whereas the vanessids and satyrids were recorded for the whole period including the afternoons which were spent in the garden. The distance covered was a little over a mile from the centre of Freshwater via Spinfish to Middleton and then to the foot of Tennyson Down. Spinfish is a footpath which runs close to a stream where there is luxuriant vegetation which leads to a meadow next to a farm at Middleton. The area worked on Tennyson Down consists of open downland with three chalkpits with small areas of woodland and shrub.

By the end of the third week of April the Small Tortoiseshell (*Aglais urticae*) and the Peacock (*Inachis io*) were the mainstay of the population and it was not until the 28th that the Speckled Wood (*Pararge aegeria*) became far more frequent as more spring species started to emerge. The flight period for these two hibernating species was nine months for *urticae* and two months for its first brood, whereas it was nine to ten months for *io* with peaks on May 4th and April 26th respectively. Examples of *io* were seen up to the middle of June and these were mostly spent females that had a lazy flight and liked to bask in the sun. Likewise examples of *urticae* were seen up to the middle of June when the first brood began to emerge and these reached a peak on June 27th when there were plenty of wild flowers out.

The temperature rose to 22°C on April 22nd and the first male Holly Blue (*Celastrina argiolus*) and the Speckled Wood (*Pararge aegeria*) were seen on the 21st April. By the end of the month *Pararge aegeria* was the most frequent butterfly. It was not until the 17th May that I witnessed the first female *Celastrina argiolus*, which was over three weeks since the first emergent in a population of over fifty males. This was not the case with the second brood, when both sexes were out together in the first few days.

The first Grizzled Skipper (*Pyrgus malvae*) was recorded on the early date of 24th April on Tennyson Down and over a dozen were observed by the end of the month, although the Dingy Skipper (*Erynnis tages*) were not seen until 7th May, after the first rain for several weeks. The second half of May was quite wet with 86.5 mm rainfall for the month. Whilst the population of *malvae* built up steadily in its first two weeks of flight this season *tages* built up to a peak in ten days after sightings of only two or three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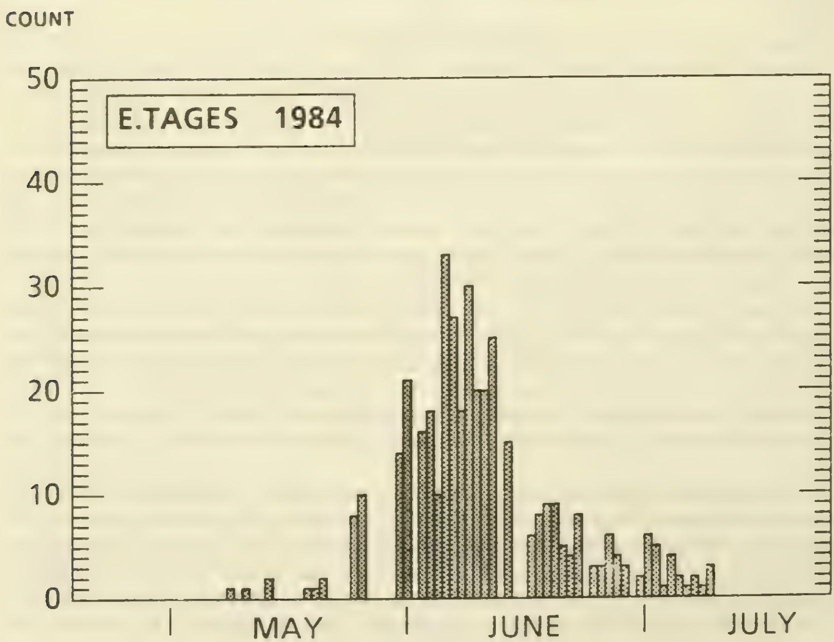
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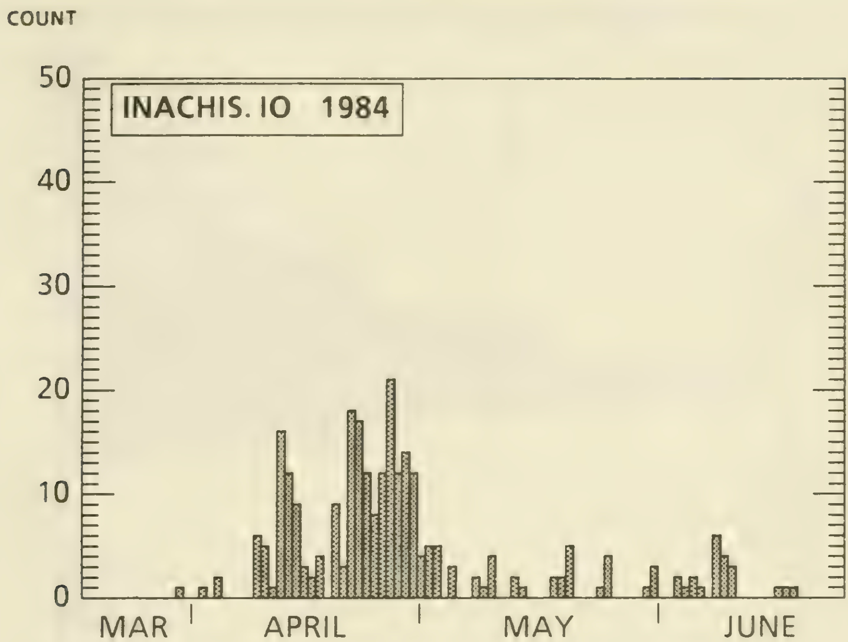
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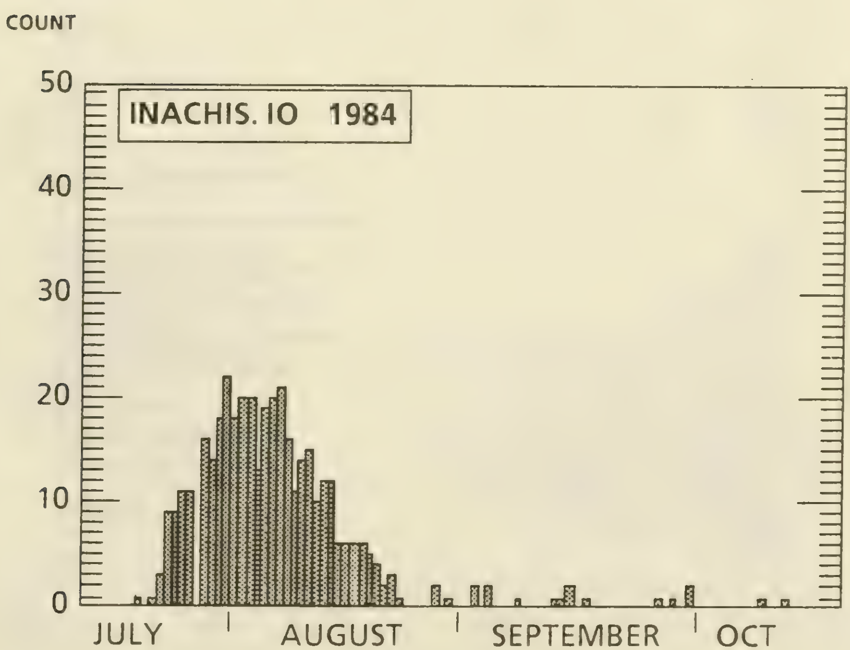
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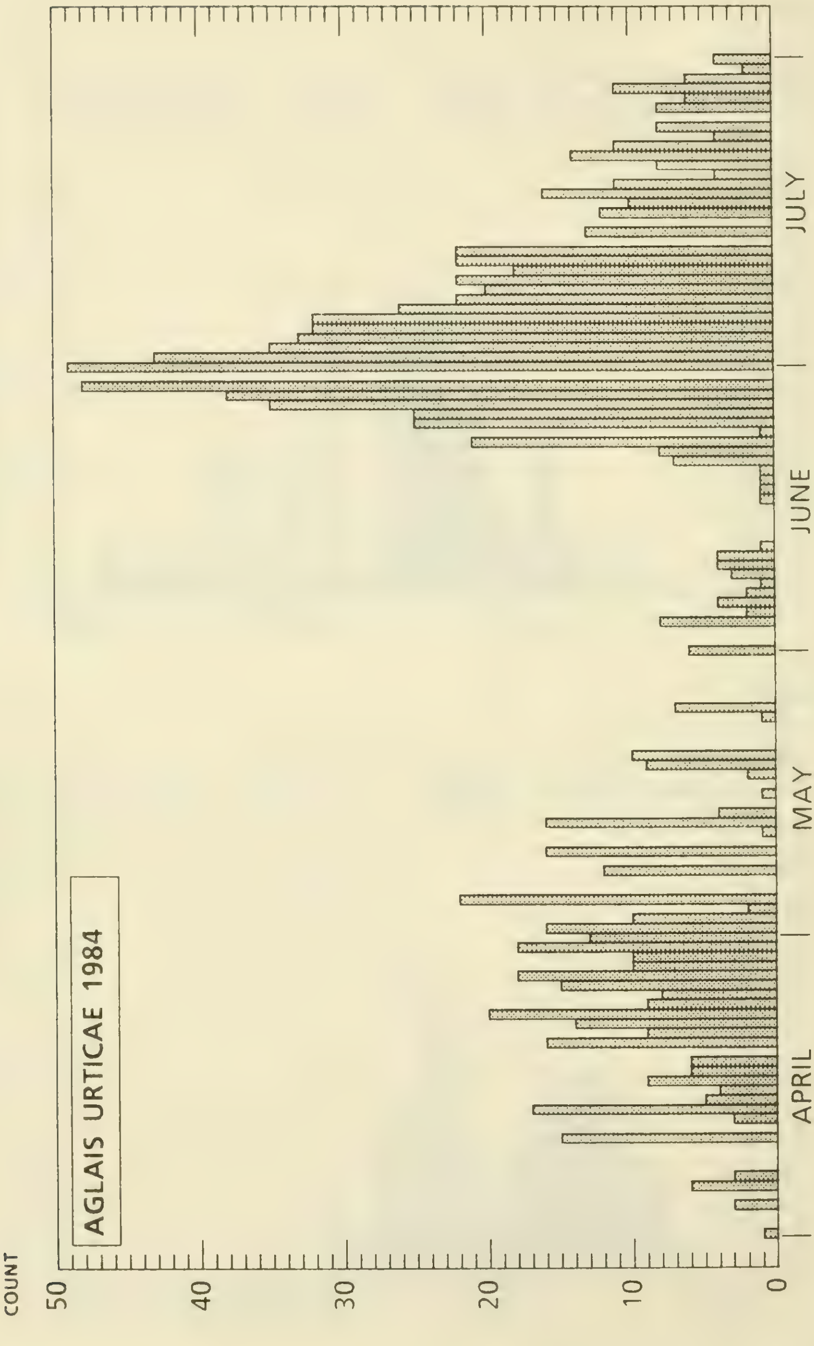
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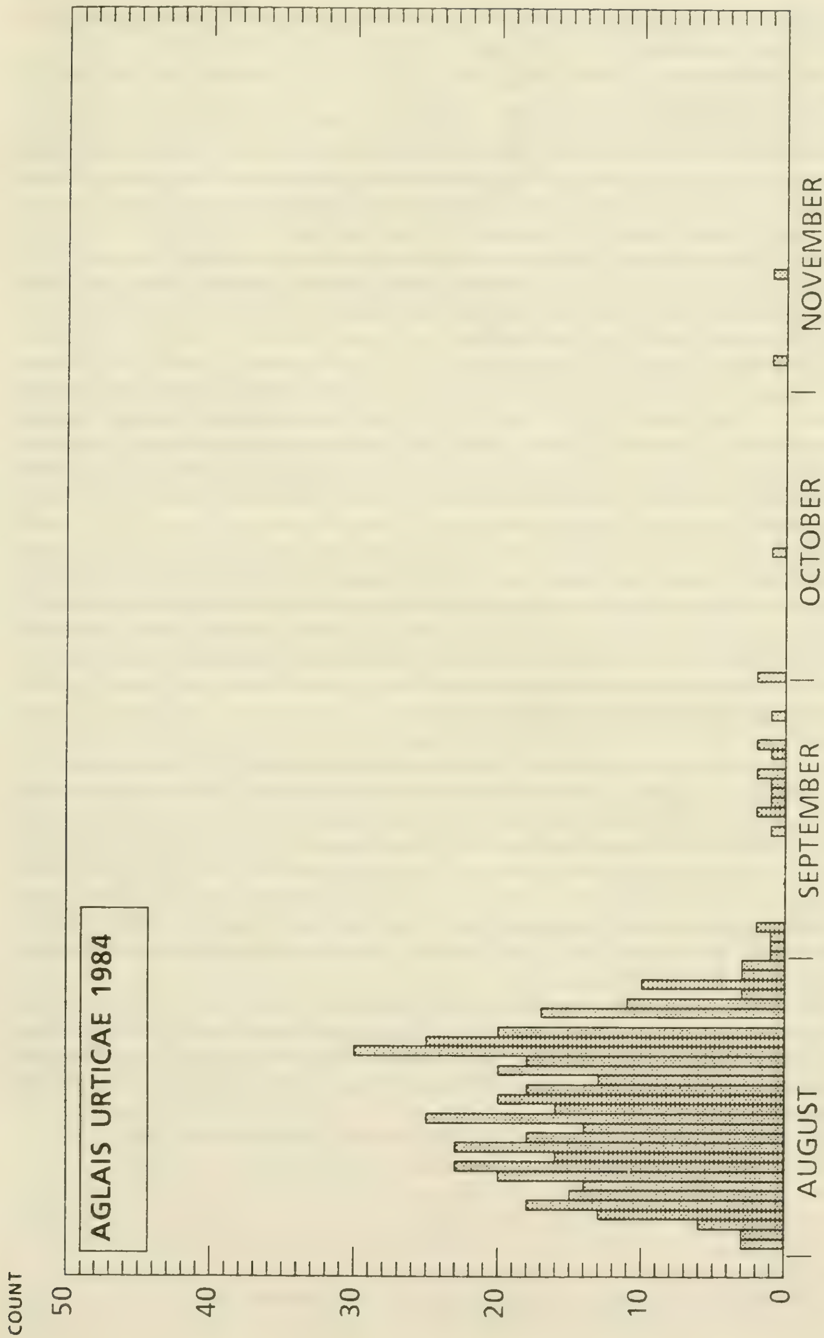
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individuals for a fortnight. The total flight periods of the species were 62 days for *tages* and 72 days for *malvae*.

The summer was very warm and sunny, similar to 1983 although there were not the extremes of temperature.

The Marbled White (*Melanargia galathea*) was first seen on June 29th and there were over fifty in the locality by the end of the first week of July. It was interesting to watch the males flying close to the ground waiting for the females to emerge. On one occasion I noted that mating had taken place before the female had time to dry her wings and that the same pair were in copula for one hour forty minutes.

The White Admiral (*Ladoga camilla*) seems to be extending its range in the western part of the island as there is now a small colony at the foot of Tennyson Down in the wooded area. I also saw two in the garden and it is quite possible that they are breeding on cultivated land in the village.

The second brood of the Common Blue (*Polyommatus icarus*) was far more numerous than the first and there was a gap of two weeks clearly separating the broods. A much smaller 'race' was present which was especially noticed amongst second brood specimens. These insects were 12 mm expanse compared to 25 mm found in the majority. I observed that these small specimens selected mates of a similar size. The Chalk Hill Blue (*Lysandra coridon*) was plentiful and I was fortunate in netting some fine ab. *obsoleta* here.

South states that a partial second brood of the Dingy and Grizzled Skippers may occasionally be met with during the middle of August. Shortly before noon on August 16th I observed a fine dark example of *Erynnis tages* at rest on the side of the chalk pit. In spite of continuing fine and sunny weather no other specimens were seen and I conclude that this is indeed a rare occurence which still takes place along the south coast in isolated areas which are protected from severe weather and experience those conditions which long dry summers provide.

The butterfly which has made a marked decline during this last decade has been the Wall (*Lasiommata megera*). As a boy I can remember that it was as plentiful as *Pararge aegeria*. I only saw six examples during the year and if hot and dry summers are in any way a part cause for their decrease in numbers, these last two years like 1975–76 will be a further set-back for this butterfly and it will be interesting to monitor its progress over the next few years.

Compared to 1983 this was a poor year for migratory butterflies. The Red Admiral (*Vanessa atalanta*) did not appear until June 4th and I saw only three Clouded Yellows (*Colias croceus*) and two Painted Ladies (*Cynthia cardui*), all during the third week of September.

The autumn was far wetter than the previous year's and nine species were seen after October 1st. *Inachis io* was seen basking in the late autumnal sunshine. There were some remarkably mild and sunny days in November and on the first I saw *Polygonia c-album*, *Aglais urticae* and *Vanessa atalanta* all within the space of half an hour at ivy blossom.

The Red Admiral was the last butterfly to be seen on November 15th.

Mr P. Lucas kindly supplied the weather data used above.

SOURCES

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THE BRITISH SPECIES OF *DIASTATA* MEIGEN AND *CAMPICHOETA* MACQUART (DIPTERA: DROSOPHILOIDEA)

by PETER J. CHANDLER

Weston Research Laboratories, 644 Bath Road, Taplow, Maidenhead, Berks. SL6 0PA

The Drosophiloidea as constituted by Hennig (1958) and Griffiths (1972) include two large, well defined families, the Drosophilidae and Ephydridae and several rather isolated genera of uncertain relationships to these prolific taxa but classified in the families Camillidae, Curtonotidae and Diastatidae by most recent authors.

The Diastatidae have been taken to comprise three genera. However, Chandler (in press) has accepted the view of Griffiths (1972) that the genera *Campichoeta* Macquart (4 species in Europe, 2 in Britain) and *Euthychaeta* Loew (one species in southern Europe) should be placed in a separate family, Campichoetidae, while retaining the family Diastatidae for *Diastata* Meigen (9 species in Europe, 6 in Britain), which Griffiths proposed to include in the Ephydridae on the basis of synapomorphy in the genital structure.

Although superficially resembling Drosophilidae, *Diastata* and *Campichoeta* are readily distinguished from them by the anterior of the reclinate (upswept) fronto-orbital setae being inset from and anterior to the strong proclinate (downswept) bristle, by the angular cross-vein closing the anal cell and by the presence of distinct spinules on the costa beyond the tip of vein R1.

Species of both genera have a grey or brown dusted thorax, usually darker more shining abdomen, more or less yellow legs and head often partly yellow. The wings are often strongly marked with simple specific patterns. Apart from characters indicated in the key below, the chaetotaxy is very similar in both genera, even to the extent of a series of anteroventral spinules on the apical half of the fore femur of both sexes. *Diastata* also has a similar series of posteroventral spinules on the apical half of the middle femur, present only in the male.

The wing venation is similar in the two genera, except that *Diastata* has two distinct costal breaks, while *Campichoeta* lacks the humeral break. This difference has been overlooked in family keys, which have always indicated two distinct costal breaks for the Diastatidae, although a single costal break was clearly stated for *Campichoeta* by McAlpine (1962) in his revision of the world species of that genus and was cited for the whole family by Griffiths (1972).

The recognition of separate families for these genera is, however, based principally on characters in the genital structure of both sexes. This was initially based on the female structure. *Campichoeta* has a simple unmodified ovipositor and paired spermathecae, while *Diastata* shares with the Ephydridae the atrophy of the spermathecae, of which the common duct is sclerotised as a U-shaped ventral receptacle; in *Diastata* it is enclosed within a ring-shaped sixth segment, the tergite and sternite being fused, a character which Griffiths only mentioned in the unrelated Notomyzidae. There are specific differences within *Diastata* in the sclerotisation of the seventh segment, which may be a complete ring like the sixth or with a distinct sternite, which is of a specific form in each species examined.

The male genitalia also differ markedly. *Campichoeta* has simple claspers (gonostyli or "surstyli"), either articulating with or fused to the "epandrium" (periandrium of Griffiths) and in one species (*C. obscuripennis* (Meigen)) claspers are absent; they are also barely separated in *Euthychaeta*. *Diastata*, on the other hand, always has two pairs of articulating claspers, the outer accessory pair being usually smaller with long bristles. All *Diastata* species examined (at least 34 in the world) have a distinctive specific shape to these structures.

Although a small group of fairly distinctive flies, there has been much confusion as to the correct nomenclature in the genus *Diastata*. A revision of European species included in Chandler (in press) has established that at least four additional species have been confused with one or other of the five species of *Diastata* Meigen recognised in the most recent revision by Duda (1934) and one of these, *D. ornata* Meigen, is here added to the British list.

The British Check List (Kloet & Hincks, 1976) follows Duda's usage of names but also cites ? *adusta* Meigen, which should have followed *unipunctata* Zetterstedt as a possible synonym. The few references to the family in British literature (e.g. Collin, 1911; Basden & Collin, 1958), however, use different names for some species. This and the absence of a key to our species in English has led to persistent confusion over nomenclature. Colyer & Hammond (1951, 1968) cited *vagans* Loew as a common species, 'which may be swept from dead leaves in woods' but *vagans* is a decidedly local, mainly Scottish species and the reference was clearly to the species called *inornata* Loew by Duda (*op. cit.*) and *fuscula* Fallén by Collin (1911) and in the present work; the error evidently stemmed from use of Séguy's (1934) key, in which *vagans* is said to be clear winged and examination of Séguy's material has shown that both his *inornata* and *vagans* were *fuscula*.

Chandler (*op. cit.*) explains the revised nomenclature adopted here, so only synonymy affecting the British list is cited below.

The adults of both *Diastata* and *Campichoeta* have a long flight period and most species may be found commonly by sweeping over leaf litter or amongst herbaceous vegetation in woodland, marsh or bog. The patterned wings are possibly used for specific recognition in courtship displays as in some other acalypterate groups but little has been recorded of their habits. The larval biology is surprisingly still unsubstantiated for both genera, although there are records of a possible association of *Campichoeta* with rotten wood (Hennig, 1952, describes a larva of uncertain origin, but refers to Séguy (1934) who mentioned *C. punctum* being associated with a rot hole of an 'Acacia', presumably *Robinia*). The normal association of *Campichoeta* with marsh vegetation in carr woodland, however, suggests that this is unlikely to be the regular habitat and one wonders whether the confused usage of the name *tristis* Fallén, correctly belonging in *Drosophila*, has led to an error in attribution of the record. An association with decaying vegetation or leaf litter seems more likely in both *Campichoeta* and *Diastata*.

Key to British Genera

1. Arista short-plumose, at least half as deep as the third antennal segment, which is relatively short, not nearly reaching mouth margin and bearing long pubescence. Anepisternum (mesopleuron) with short bristles scattered on upper and posterior part, strongest on hind margin. Anterior reclinate inner fronto-orbital bristle strong, set in front of strong proclinate outer fronto-orbital. Costa broken twice, near h and near tip of Sc. Posterior cross-vein (dm-cu) about its length from wing margin. . . . . *Diastata* Meigen

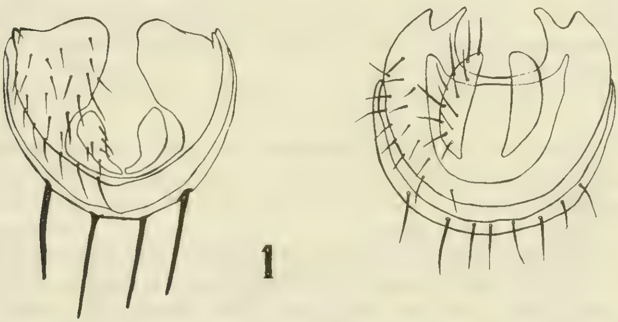
– Arista and third antennal segment with only short pubescence; third antennal segment elongate, almost reaching mouth margin in male, a little shorter in female. Anepisternum bare. Anterior reclinate inner fronto-orbital short and weak but posterior reclinate bristle strong, the strong outer proclinate bristle set at a level between the two. Costa broken once only, near tip of Sc. Cross-vein dm-cu about twice its length from wing margin . . . . *Campichoeta* Macquart

GENUS *CAMPICHOETA* MACQUART

McAlpine (1962) recognised seven species, four occurring in Europe. Chandler (in press) provided a revised key to the European species as the external characters cited by McAlpine to separate the south European *grandiloba* McAlpine from *C. punctum* have not proved constant and reliance can presently be placed only on the male genitalia. *Campichoeta* are smaller, more delicate flies than are *Diastata*, their wing length in the range 2.6 to 2.9 mm.

Key to British species

1. Head entirely grey dusted. Antennae dark brown and palpi blackish. Thorax uniform brownish grey. Abdomen darker brown, more or less shining apically. Wings light brown, a little darker in radial sector. Male tergite 7 grey, with 2 pairs strong black setae. . . . . *.obscuripennis* (Meigen)
– Head with face, fore margin of frons, basal antennal segments and palpi yellow; frons dark brown behind. Abdomen grey-brown, often yellowish on tergites 2–3. Wings light brown, darker in cell r1 and anterior half of cell r2+3; a more or less clearly defined clear hyaline area of membrane extending from radial sector distal to cross-vein dm-cu. Male genitalia yellow, tergite 7 with weak bristles only . . . . *.punctum* (Meigen)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Figs. 1–2. Male genitalia of *Campichoeta* species, posterior view, including tergite 7, but omitting hypandrial complex. 1. *C. obscuripennis* (Meigen). 2. *C. punctum* (Meigen).

***Campichoeta obscuripennis* (Meigen)** (Fig. 1)
Diastata obscuripennis Meigen, 1830
Common in southern Engiand, north to Norfolk and Yorkshire (Ashberry Pastures). Also seen from Wales (Powys, Dyfed, Glamorgan), Ireland (Down, Antrim, Clare, Sligo) and Channel Is. (Jersey). Wooded marshes, carr and alderwoods. iv–x.

***Campichoeta punctum* (Meigen)** (Fig. 2)
? *Diastata basalis* Meigen, 1830
Diastata punctum Meigen, 1830
The name *basalis*, which has page priority, has often been used for this species but as the type of *basalis* is lost and Meigen's figure (Morge, 1975) does not fit *punctum* very well, it is regarded as a nomen dubium by Chandler (in press).

C. punctum is frequent in marshy woodland in the south and there are scattered records throughout Britain north to Inverness (Glen Affric); it is widespread in Ireland (Mayo, Down, Laois, Monaghan). vi–xi; also 1 ♂, 3 ♀ from grass tussocks on 31.xii. at Conisbrough, S. Yorks. (P. Skidmore).

GENUS *DIASTATA* MEIGEN

Chandler (in press) recognised 19 species from the Palaearctic region and Nepal, 9 of them occurring in Europe, and figured male genitalia for all species and the ovipositors for most, including all the European species. Apart from the key characters cited below for the six British speices, all *Diastata* are very similar externally. The face has a silvery or greyish sheen. The frons and antennae are yellow in contrast to the face and the mainly grey dusted occiput. The third antennal segment may be darkened dorsally and apically (*fuscula*, *nebulosa*, *ornata*) or largely brownish (*adusta*). The palpi are whitish dusted on a yellow ground. The thorax is thickly grey dusted with darker shades in *adusta*, and indistinct brownish stripes in *nebulosa* and *ornata*. Legs are pale yellow, with darker shades in some species (*nebulosa*, *ornata*) or entirely brownish (*adusta*).

Key to British species

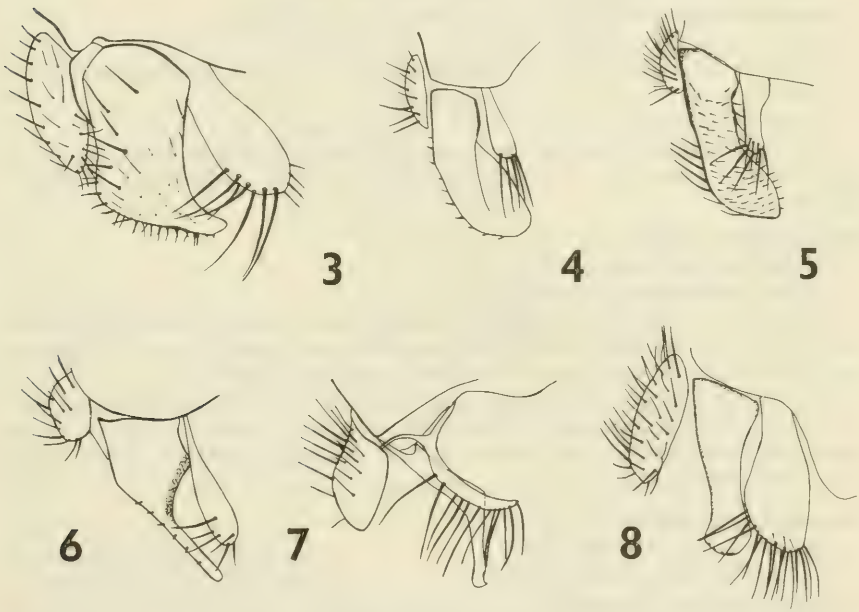
1. Wing intensely marked, with two broad dark brown patches over cross-veins r-m and dm-cu, extending at least from R4+5 to CuA1; area between them and a patch beyond outer one white. Most of second costal cell (c) and base of cell rl also dark brown, membrane otherwise light brown, sometimes a pale area basal to spot over r-m. 2
– Wing with any dark markings more restricted and r-m without any dark marking. 3
2. Cross-vein r-m more distal, well beyond level of tip of R1. White area beyond r-m angular and shorter than spot over dm-cu. White patch basal to r-m usually distinct, reaching from R2+3 to CuA1. Costal setulae reaching tip of R4+5. ♂ wing 2.8–3.2 mm, ♀ 3.2–3.4 mm. . . . .*nebulosa* (Fallén)
– Cross-vein r-m only a little beyond level of tip of R1 (as in other species below). White area beyond more straight-edged and usually as long as or longer than brown marking over posterior cross-vein. White basal patch usually small or absent. Costal setulae stopping short of tip of R4+5. ♂ wing 2.1–2.6 mm, ♀ 2.3–3.0 mm. . . . .*ornata* (Meigen)
3. A well-marked brown patch over cross-vein dm-cu. 4
– At most a vague shade on cross-vein dm-cu. 5
4. Radial cells (r1, r2+3) faintly brown-tinged but no discrete dark marking on costa beyond tip of R1. Spot on dm-cu larger, broadly extending forwards into cell r4+5. Third antennal segment strongly brownish. Legs brownish, tibiae usually lighter. ♂ wing 2.6–2.9 mm, ♀ 3.1–3.2 mm. . . . . .*adusta* Meigen
– A continuous brown band along costa from R1 to tip of R4+5. Third antennal segment only faintly brownish; legs pale yellow. ♂ wing 2.8 mm, ♀ 3.1–3.3 mm. . . . . *vagans* Loew
5. A brown band along costa from R1 to tip of R2+3. Cell c strongly dark brown except at base. Cross-veins completely clear. Antennae pale yellow, third antennal segment at most faintly brownish. ♂ wing 2.5–2.6 mm, ♀ 2.6–2.9 mm. . . . .*costata* Meigen
– Costal margin only light greyish except for vague shade apically on margin of second costal cell and extreme base of cell r1. Slight dark shade often present on dm-cu. Third antennal segment with brown shade dorsally. ♂ wing 2.8–3.4 mm, ♀ 3.2–4.0 mm. . . . .*fuscula* (Fallén)

***Diastata nebulosa* (Fallén)** (Fig. 3)

Geomyza nebulosa Fallén, 1823

Diastata nebulosa (Fallén); Meigen, 1830

Most material under *nebulosa* in collections belongs here. It is locally abundant in marshy woodland, carr and bog on acid soils. It is widespread in the Scottish Highlands (north to Sutherland, seen from Rhum) but more local in the south: common in the New Forest, also Surrey (Chobham Common, Cosford Mill), Sussex (Ambersham Common, Inholm's Copse, Rogate), Hants (Buckler's Hard), Hereford (Tarrington, Haugh Wood, Golden Well) and Gwynedd (Coed Maentwrog). The record from Glengarriff, Co. Cork (Yerbury, 1902) can be confirmed as the specimen is in Collin's collection (Hope Department). Beirne (1943) recorded it from Killarney and I have seen it from Offaly, Clara Bog, 3.vii.1984 (M. deCourcy Williams). iii–x, xii.



Figs. 3–8 Male genitalia of *Diastata* species, lateral view of right cerci and claspers, the outer bristly accessory claspers in antero-external position. 3. *D. nebulosa* (Fallén). 4. *D. ornata* Meigen. 5. *D. adusta* Meigen. 6. *D. vagans* Loew. 7. *D. costata* Meigen. 8. *D. fuscula* (Fallén).

***Diastata ornata* Meigen** (Figs. 4, 9)

Diastata ornata Meigen, 1830

This was first recognised as a good species on material from Chobham Common, but has since been found mixed with *nebulosa* in most collections examined. Most authors have placed *ornata* as a synonym of *nebulosa* but Meigen's figures (Morge, 1975) clearly indicate the specific differences in wing markings. Like *nebulosa* it appears to be confined to bog, marsh and carr on acid soils. iv–ix.

Material examined:

INVERNESS: Loch Garten, RSPB Reserve, shore of Loch Mallachy, 16.vi.1982, ♂ (Irwin); Abernethy, 14.vi.1982, ♀ moor pools (Cole); Rothiemurchus, 14.vi.1982, 2 ♂ (McLean); Aviemore, 24.vi.1908, ♂ (King, Glasgow Univ.), 1.vi.1913, ♂ (Yerbury, BMNH), 25.v.1913, ♀ (Collin, Hope Dept.), 20.v.–10. vi.1934, ♂ ♀ (Lamb, Camb. Mus.), 11.ix.1945, ♂ (Harwood, Hope Dept.); Nethy Bridge, vi.1905, 2 ♂ (Lamb, Camb. Mus.), 24.vii.1905, ♂ (Yerbury, Collin collection, Hope Dept.), 10–11.viii.1906, ♂, 3♀ (King, Glasgow Univ.), vi.1908, ♂ (Sharp, Camb. Mus.), 24.v.1911, ♀ (King, BMNH); Glenmore, 11.vi.1904, ♀ (Yerbury, BMNH); Tullochgruie, 13.vi.1979, ♂ (P. Withers).

ROSS: Pitmaduthy Moss, 15.vi.1976, ♂ ♀ (Irwin), ♀ (Chandler); Dingwall, 16.viii.1909, ♂ (King, Glasgow Univ.).

NAIRN: Nairn, 4.vii.1904, ♂ (Yerbury, BMNH).

MORAY: Forres, 22.vii.1904, ♂ (King, Glasgow Univ.).

ABERDEEN: Balmoral Forest, 1–4.viii.1937, ♂ (Coe, BMNH).

ARGYLL: Arisaig, top lake, 30.vi.1981, ♂ (P. Skidmore).

GWYNEDD: Capel Garmon, Garthmyn Bog, 27.vi.1978, 2 ♂, 1 ♀ (Skidmore).

YORKS: Langsett, 13.vii.1968, ♀ (Skidmore).

NORFOLK: Dersingham Bog, 29.i.1982, ♂ ♀ (Irwin).

SURREY: Chobham Common, birch carr by Long Arm stream, 30.iv.1966, 2 ♀; 23.iv.1967, ♂ (taken with 2 ♂ *nebulosa*); 27.iv.1968, ♂; iv.1984, ♀; 5.vii.1984, ♂ (Chandler).

***Diastata adusta* Meigen** (Fig. 5)

Diastata adusta Meigen, 1830

Diastata unipunctata Zetterstedt, 1847

Several authors have cited *adusta* as a possible earlier name for *unipunctata* but the synonymy is now accepted on the basis both of Meigen's figure (Morge, 1975) and the specimen under the name *adusta* in Meigen's collection (MNHN).

D. adusta is common in acid and neutral marshes and at pond and lake margins, principally in wooded districts but occurring throughout Britain north to Caithness. Also seen from Barra, Lundy Island and Irish localities in Wicklow, Kerry, Clare, Mayo and Dublin. iv–x.

***Diastata fuscula* (Fallén)** (Fig. 8)

Drosophila fuscula Fallén, 1823

Diastata fulvifrons Haliday, 1837

Diastata inornata Loew, 1864

As indicated above the interpretation of synonymy first proposed by Collin (1911) was re-established by Chandler (in press).

Common throughout the British Isles in more or less dry woodland, often swept over leaf litter, from herbaceous vegetation or occasionally from tree branches or foliage. North to Sutherland. Irish material seen from Wicklow, Kerry and Down in addition to Haliday's specimens under *fulvifrons*. vi–vii, ix–x.

***Diastata costata* Meigen** (Fig. 7)

Diastata costata Meigen, 1830

Diastata fuscula: Duda, 1934 nec (Fallén, 1823)

The name *fuscula* (Fallén) was suggested to be synonymous with *costata* by Zetterstedt and recent authors have followed Duda (1934) in applying the name to this species. Fallén did not mention the wings in his description, which could apply to either species, but his types were said to have been received from Zetterstedt, who later (1838) described *costata* as *marginella*. Loew (1854) did not recognise *fuscula* but used *costata* for that species and described the species here called *fuscula* as *inornata*. Collin (1911) first suggested the present interpretation of the name *fuscula* and this has been confirmed by examination of types (Chandler, in press).

D. costata is widespread in both dry woodland and wetter wooded and fen habitats, throughout Britain but most records from the south. Only two Irish examples have been examined: Wicklow, Lough Dan, 30.ix.1909, ♀ (J. N. Halbert) and Down, Holywood, ♂ (A. H. Haliday; under *Campichoeta obscuripennis*) (both National Museum, Dublin).

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Fig. 9. *Diastata ornata* Meigen, lateral view of male.

Diastata vagans Loew (Fig. 6)

Diastata vagans Loew, 1864

Collin (1911) first recorded this as British on a female taken at Nairn by Yerbury. It has proved to be widespread but very local in the Scottish Highlands, occurring both in woodland and on boggy lake margins. A recent record from oak forest in the south is surprising but the habitat resembles some of the Scottish localities. Late v–viii.

Material examined:

Ross: Pitmaduthy Moss; Monadh More.
Moray: Grantown, pinewood by Spey.
Inverness: Aviemore; Loch Alvie.
Aberdeen: Dinnet oakwood NNR.
Argyll: Glen Nant.
Perthshire: Loch Tummel.
Hants: Alice Holt Forest, 22.vi.1982, ♂ (Chandler).

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THE *ASAPHIDION* (COL.: CARABIDAE) SPECIES OCCURRING IN GREAT BRITAIN AND IRELAND

by MARTIN C.D. SPEIGHT[1], MICHEL MARTINEZ[2] AND MARTIN L. LUFF[3]

Turin (1981) lists 10 species of *Asaphidion* as occurring in Europe. Most of these are primarily southern European, but five of them reach as far north as northern France and three—*A. curtum* (Heyden), *A. flavipes* (L.) and *A. pallipes* (Duftschmid)—are known from Scandinavia. The latter two species are the only ones generally recognised as occurring in Great Britain and Ireland, both of them supposedly being found in both islands. However, Focarile (1964) recorded *A. stierlini* (Heyden) from Great Britain, re-affirming, at the same time, the presence there of *A. flavipes*. On re-examining all British and Irish '*A. flavipes*' available to us we have found that *A. curtum* is widely scattered in Ireland and England. *A. stierlini* is seemingly confined (as suggested by Focarile) to southern England and *A. flavipes* is present in both Ireland and Great Britain. We can also re-confirm the presence of *A. pallipes* in both islands but have not come across any specimens of the closely related

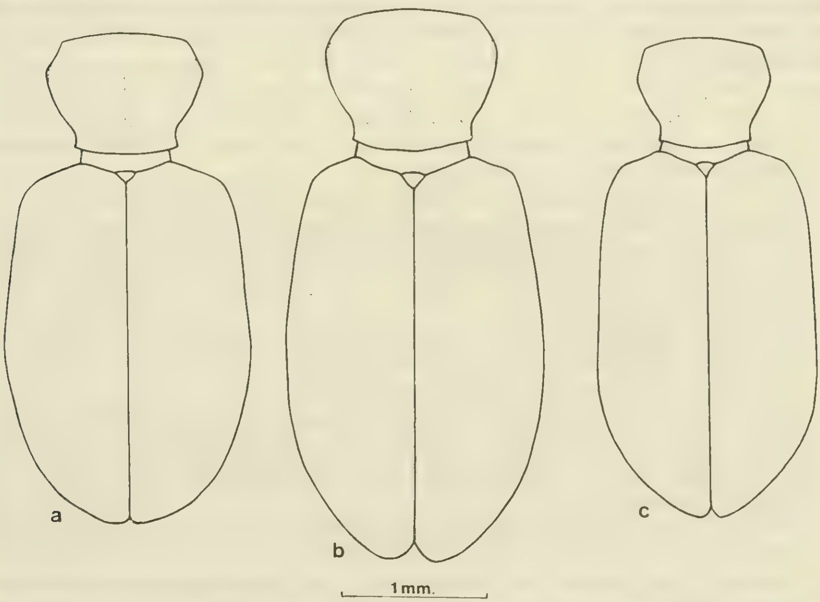

Fig. 1 *Asaphidion* species, thorax and elytra, dorsal view; a - *A. curtum*; b - *A. flavipes*; c - *A. stierlini*.

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A. caraboides (Schrank), which might be expected to occur in the British Isles because it is known from continental Europe as far north as the Netherlands. *A. caraboides* occurs in sandy places by rivers and lakes, especially in mountainous country.

The five species mentioned above are keyed out below and figures are provided of their aedeagi. The aedeagus of *A. caraboides* var. *nebulosum* Rossi is also figured (Fig. 2f). This taxon is regarded by some authors as a separate species. The key we have constructed is based in part upon existing keys but also incorporates new features, which we have tested using both British Isles and continental specimens of all the species involved.

A. curtum and *A. flavipes* are sufficiently similar that it can be very difficult to distinguish females of these species from one another, although apparent differences in spermathecal characters are figured by Focarile (*loc.cit.*) and Jørum and Mahler (1985). In the males aedeagal shape and size provide valuable features for segregating all five of these *Asaphidion* species from one another, but the shape of the proximal end (on the left in the accompanying figures) of the aedeagus should not be regarded as diagnostic. Internal aedeagal structures are also useful in fully cleared and mounted preparations. Alternative illustrations of the aedeagi of these species may be found in Focarile (*loc. cit.*), Jørum and Mahler (*loc. cit.*), Lohse (1983) and Schweiger (1975).

KEY

1. Prosterna with short, sparse hairs, anterior to fore coxae; head distinctly wider than prothorax; length less than 5 mm 2
— prosterna bare; head hardly wider than prothorax; length 5 mm or more . . .4
2. Antennal segments all pale or progressively but gradually darkening from segment 5 on, at least segments 1 to 4 all yellow; legs usually all pale; pronotum typically more sharply angled at lateral seta (Fig. 1a); aedeagal length 0.65–0.85 mm; aedeagal shape see Fig. 2a. . . . . *curtum* (Heyden)
— Antennal segments abruptly darker brown from segment five (inclusive) on, segments 1 to 4 yellow or with brown tips; at least femoro-tibial joint of legs darkened; pronotum more rounded laterally (Figs. 1b, c) 3
3. Sub-apical (largest) segment of maxillary palps dark brown or black dorsally; femero-tibial joints and tarsi of all legs darkened (almost black) and metallic; elytra rather long and parallel-sided (Fig. 1c); aedeagal length 0.75-8.0 mm; aedeagal shape see Fig 2c. . . . . *stierlini* (Heyden)
— Sub-apical segment of maxillary palps usually uniformly yellow (may be vaguely brownish) dorsally; fore legs (at least) normally uniformly brownish yellow (femero-tibial joint may be brownish and slightly metallic); elytra typically less parallel-sided (Fig. 1b); aedeagal length 0.85–0.95 mm; aedeagal shape see Fig. 2b. . . . . *flavipes* (L)
4. Segment 1 (and often also segment 2) of antennae noticably darker (almost black) and more metallic than segments 3 to 5 (which are at least partly yellow-brown); tibiae and parts of tarsi (at least) yellow-brown and scarcely at all metallic (femora varying from yellow-brown to very dark brown and when brown also somewhat metallic); femero-tibial joints metallic; aedeagal length 1.10 mm; aedeagal shape see Fig. 2d. . . . . *pallipes* (Duftschmid)
— Antennae almost black throughout (no contrast in colour between segments 1 + 2 and succeeding segments); segments 1-3 metallic, succeeding segments duller; all

leg segments highly polished, metallic, and usually almost black, but tibiae may be yellow-brown except apically; aedeagal length 1.10-1.15 mm; aedeagal shape see Fig. 2e. *caraboides* (Schrank)

A. curtum (Heyden, 1870)

In addition to the features mentioned in the key, *A. curtum* is generally a slightly smaller, more rounded insect that *A. flavipes*; the elytra are on average broader in proportion to their length (measured from tip of scutellum to apex — mean ratio 1.43) and the antennae are slightly shorter (mean length 1.86 mm). *A. curtum* has fully-developed wings (1.5 times as long as the elytra) which Focarile argues should be regarded as functional. The apparent body colour differences between *A. curtum* and *A. flavipes* cited by Jørum and Mahler may be clear in fresh specimens, but were not distinct in our museum material. Published records of *A. curtum* suggest that in continental Europe it is nearing the northern limit of its range in north Denmark. It becomes more frequent in the Mediterranean basin, including North Africa. Available records are: ENGLAND—Cambridgeshire, Cheshire, Devon, Dorset, Essex, Gloucestershire, Hampshire, Hertfordshire, Huntingdonshire, Isle of Wight, Kent, Lancashire, London, Norfolk, Northamptonshire, Suffolk, Surrey, Worcestershire; IRELAND—Carlow, Cork, Dublin, Kerry, Limerick, Westmeath. We have not seen any specimens from Wales or Scotland, despite having examined all material in the British Museum (Natural History) and the Welsh and Scottish National Museums. *A. curtum* occurs typically on open ground on heavy soils, including farmland.

A. flavipes (Linnaeus, 1761)

Typical *A. flavipes* are more elongate than *A. curtum*; the mean elytral length to breadth ratio being 1.46 and the antennal length 1.96 mm. The wings are shorter (only just longer than the elytra) and the upper surface is sometimes more strongly punctured. Reliable continental records demonstrate that the species extends from Siberia southwards to the Mediterranean, but it becomes increasingly montane towards the southern end of its range. There are no North African records and its southern extreme is Corsica and Turkey. The British and Irish distributions of *A. flavipes* obviously now require re-appraisal. Available records are: ENGLAND—Berkshire, Buckinghamshire, Cheshire, Cumberland, Dorset, Essex, Gloucestershire, Hampshire, Herefordshire, Isle of Wight, Kent, Norfolk, Northumberland, Nottinghamshire, Somerset, Surrey, Sussex, Worcestershire, Yorkshire; WALES—Glamorgan, Monmouth; SCOTLAND—Dumfries-shire, Inverness-shire; IRELAND—Kerry. It is generally found near water.

A. pallipes (Duftschmid, 1812)

Many British records of *A. pallipes* are from Scotland but there are also scattered English and Welsh localities (Luff, 1982). Specimens from the English south coast (Dorset, Lyme Regis to Weymouth) and from south Wales (Glamorgan, Porthcawl) were found by us to have darker legs than are typical for this species, approaching the condition seen in *A. caraboides*. However, the middle antennal segments of these southern *A. pallipes* are partly pale as in the more typical form and their aedeagi confirm their identity as *A. pallipes*. Available data on the distribution of *A. pallipes* require no re-assessment unless *A. caraboides* is at some date recorded in the British Isles. Both species occur in sandy places beside rivers and lakes in mountainous country on the continent.

Fig. 2. *Asaphidion* species, aedeagus, a-c showing internal structures, a and c also showing larger paramere; a - *A. curtum*; b - *A. flavipes*; c - *A. stierlini*; d - *A. pallipes*; e - *A. caraboides*; f - *A. caraboides* v. *nebulosum*.

A. stierlini (Heyden, 1880)

This species is darker and more slender than the commoner *A. flavipes* and *A. curtum*. The elytra are longer in proportion to their breadth (mean ratio 1.55) and the antennae are shorter than in both the previous species (mean length 1.70 mm). In addition to the small size of the slender aedeagus, the species differs in the less angular shape of the larger paramere (Fig. 2c) which has four setae (three in the previous species). On the Continent, *A. stierlini* is most frequent in the Mediterranean basin, occurring from Spain through Italy to Turkey and round into North Africa. Available British records are: ENGLAND—Cambridge, Dorset, Essex, Hampshire, Isle of Wight, Kent, Somerset, Surrey. It occurs on open ground on light soils including suburban gardens and chalk pits. However the habitat preferences of *A. curtum* and *A. stierlini* are not always so different as these notes may suggest.

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The Spiders of Great Britain and Ireland, (Volumes 1 and 3), by Michael J. Roberts. Harley Books, 1985. Vol. 1, 229 pp, £45, ISBN 0 946589 05 4 (hb): Vol. 3, 256 pp, £55, ISBN 0 946 589 07 0 (hb). Both volumes together cost £85.

Volume 1 contains the Introduction, Key to Families and descriptions of all the species in the families Atypidae to Theridiosomatidae found in Britain. The key to families with the accompanying drawings, mainly of carapaces and spinners of the various families and genera, are easy to use.

The identification of spiders ultimately depends on their genitalia. The author has examined large numbers of specimens when making the drawings of male palps and female epigynes and so he has been able to take considerable account of the variability found in some species. The drawings are of high quality, and a major advance on those previously available for British spiders. Their accuracy and artistry have made them much easier to use for the identification of most species, though there are some groups where ventral views of male palps in addition to the side views given, would have made identification of males considerably easier. Descriptions of species are brief, limited to information to assist in distinguishing the species.

The 237 colour plates forming Volume 3 were all painted by the author. 307 representative species are illustrated, in some cases as both sexes, showing the appearance of the spiders in alcohol. The plates are large format and of excellent quality. They will be of great help to beginners and non-specialists using the book.

Volume 2, to be published at the end of 1986, will describe and illustrate the genitalia of the Linyphiidae, give a check list of British spiders and include corrections, changes of nomenclature and subsequent new species. The genitalia drawings of the Linyphiidae should prove to be an important aid to identification of these spiders.

Interest in spiders has been limited in the past by the lack of generally available literature particularly for their identification. The two volumes 'British Spiders' by G. H. Locket and A. F. Millidge with its third volume in collaboration with P. Merrett provided the first comprehensive work to fill this gap, but is difficult for beginners to use. The Country Life Guide to the Spiders of Britain and Northern Europe by Dick Jones now admirably provides for the field identification of over half the British spiders using the colour photographs and accompanying descriptions, and at a price low enough to encourage widespread interest. The new volumes by Mike Roberts are a major work supplementing and complementing these other publications.

Although the price of the volumes is high for the individual, the quality of the publication justifies the price. The work will no doubt become a valuable set for collectors in the future.

P.R. HARVEY

SOME OBSERVATIONS ON COLLECTING INSECTS IN SAUDI ARABIA

by D. H. WALKER

The Kingdom of Saudi Arabia covers nearly 900,000 square miles which is over nine times the size of the United Kingdom. It straddles the Tropic of Cancer and is bounded on the west by the Red Sea and on the east by the Arabian Gulf. The annual rainfall over most of the country is sparse and for the greater part of the year it is non-existent. February, March and April is the coolest time of the year and this is the usual time for rain. The capital is Riyadh which is situated in the centre of the country where the average rainfall is 25 mm. It is not unusual for a year to occur when no rain falls and I have witnessed heavy rain falling from the clouds and the water evaporating before reaching the ground. There are no permanent rivers and only one sizable permanent lake. Exceptionally high temperatures occur: 49°C in Riyadh is not uncommon, but it is also possible to experience frost and hailstorms. Most of the terrain is very arid but is immensely rich in minerals and has a great potential for modern farming and industry. In the west the small area of the Azir has mountain peaks of 10,000 feet with lush valleys, and this is reputed to be the original home of the coffee plant.

This lecture is limited to my experiences in central and eastern Saudi Arabia. The vast part of the country is a plateau of rock or sand desert, rock escarpments and isolated oases of date palms. Water is pumped in many places from an aquifer, the extent of which is unknown. The level of this underground source has fallen due to the demands of modern life but huge new desalination plants are now in operation and purify sea water which is pumped hundreds of miles across the desert to Riyadh.

The population of Saudi Arabia is approximately 8 million people. They are Moslems with a strict code of behaviour, who are proud of their country and their beliefs. Although many of them now live in the cities, most of them love the desert and have Bedouin origins. Their hospitality in the desert is exceptional. However, tourists are not permitted and it is generally necessary to obtain a work permit to gain a visa. It is also necessary to have a sponsor, a Saudi Arabian national who will be responsible for your behaviour. Travel within the country is not encouraged unless it concerns your work. I am by profession a civil engineer and my sponsor was Prince Abdullah who is a nephew of the present king. He was aware of my interest in entomology and my desire to record the findings in a book, consequently he assisted me in my endeavours. I do not speak Arabic so he wrote a letter in Arabic which I could produce if the necessity arose. In 3½ years I only felt the need to produce this letter on one occasion. I was alone sitting under a Sodom's Apple Tree which gave the only available shade, eating my lunch when an Arab arrived. He was a big man with a revolver and looked very serious. We shook hands and made the customary greetings "Salam a lecum"; "Valacum Salam". I offered him water and fruit which he accepted. I then showed him my net and some boxed insects. He was obviously not at ease so I showed him my letter which he pondered for some time. Then he rose, smiled, we shook hands and he left. I also relaxed and smiled because he "read" my letter, upside down. Normally I found the local people very friendly and even though they could not speak English they would not leave until they had seen that I had water and I was not lost.

In certain areas life did not appear to exist and people were a great rarity. This was the case in Wadi Dawasir on the edge of the Rub Al Khali known to the world as "the

Empty Quarter". Over 200,000 square miles, it is probably the largest unexplored area in the world.

It soon became apparent to me that if I was to gain the maximum enjoyment from my exciting new environment then I must expand my interests to encompass all forms of life and especially all orders of insects. The weekend in Saudi is our Thursday and Friday, days that I earmarked for expeditions. Living the monastic life of "single status" in Riyadh I had every evening free to study the other insect orders and to set my specimens. Fortunately I had the use of a powerful American car and to begin with limited my efforts to exploring Riyadh and Wadi Hanifah, where I collected everything. I soon became familiar with the local insects and even though I had no idea what the names were of the individual species I did recognize a species if I had encountered it previously and so avoided unnecessary duplication.

I also explored the Riyadh River. Riyadh, with a population of approximately 750,000 people, uses a lot of water and the excess after treatment runs out across the desert for about 20 miles. Its course is marked by a 10 to 30 foot width of vegetation that has grown up on either bank which is a haven for all forms of life. Insects are in great abundance including cicadas, preying mantids, dragonflies and butterflies. It is a stopping off place for birds on a migratory route and many exciting birds turn up such as Blackwinged Stilts, Bee Eaters and Egrets. Resident Marsh Harriers, Steppe Eagles and Lesser Kestrels enjoy an abundance of prey. Feral dogs hunt in packs and I once saw a lone Arabian Wolf. Snakes and lizards are present and several species of scorpions and spiders.

With such a variety of interest I always carried in the car a butterfly net and a fishing net. I used pill boxes because I prefer to transport live captures, these being less liable to damage in transit. I also carried a killing jar and relaxing boxes (packed with laurel leaves brought from Britain). I always left binoculars out of their case and ready for use. Likewise an automatic 35 mm camera with 400 mm lens and rifle butt holder already set up for immediate use. I carried wide-angle lens for landscape photography and tubes for close-ups, plus a spare film and spare camera batteries. I used to use Ektachrome film but found it gave too much blue so I changed to Kodachrome 64. (I always took slides.)

When I came home on leave I met Tony Pittaway who was now living in Britain after spending several years in Arabia. We agreed to pool our knowledge and to write a book on the insects of Central and Eastern Arabia. I sent him my collection of insects for identification with the assistance of the British Museum staff. My son Allan illustrated the book. It describes 367 species in 11 orders and we hope it will act as a useful introduction to the insects of this exciting land. Many of the slides which you will see are photographs from some of the plates in the book.

During the first year of collecting I learnt some very important rules which dictated my actions during the later years and saved me from the dangerous and even fatal errors that had caused the death of two Britons whilst I was in Riyadh. The first rule is never, ever, to leave the villas without water, a compass and a penknife even if only going to Riyadh. The second rule is to tell someone where you are going, even if only going into Riyadh. Opportunities and problems occur suddenly and can escalate. Our catering manager had a car accident in Riyadh and spent the next week in jail. This is a common procedure for drivers and witnesses until insurance claims are agreed. The car should always contain a first aid kit, matches, spare wheel, shovel, timbers for soft sand, tools, jump leads, jerry can of spare petrol, jerry can of spare water and a fire extinguisher is mandatory. It was my experience that clothing should be loose and comfortable and cover as much of the body as possible, especially the back of the neck. I have seen some severe cases of heat stroke and sunburn and one of my colleagues suffered from a skin cancer. I also found that the local people were embarrassed by some Europeans who wore too few clothes and in the case of women this could lead to their arrest. Stout desert boots were most important to protect the feet and strengthen the ankles, but knock them out before putting them on in case they harbour a scorpion! The main hazards on a trip out are getting lost, motoring on to soft sand, intrusion on the privacy of other people including the military, sunstroke and bilharzia. All of these hazards must be considered before a trip is started; it is too late to do much later. I also came to the opinion that a companion was usually an asset, because the driving could be shared, problems discussed and a second pair of eyes assisted in the detection of hidden interests. However, the old maxim was also true that "two is company and three is not". Most of my colleagues were Americans and spent their spare time by the swimming pool, but I was never short of volunteers who wanted to venture out into the midday sun with the mad dogs and the Englishman.

A lot of the time was spent in the valleys and on the limestone escarpments of the Tuwayq Mountains. During the summer this country was generally barren with a few leafless acacias and the heat in the Box Canyons stifling, like an oven. In the spring fierce thunderstorms brought rain and within days the whole area would be a delight of wild flowers with hundreds of insects in attendance. The glorious scent of the yellow acacia bloom welcomed a dozen different species of wasps and bees but the sharp thorns could rip your net to pieces. Desert Foxes and hedgehogs were quite a common sight here and occasionally a hare, while up in the bright blue sky Egyptian Vultures would soar effortlessly.

Pools of water formed which attracted a variety of insects, birds and animals as well as hundreds of tiny frogs. I discovered fifteen of these pools which I visited regularly and I never ceased to be amazed at the variety of aquatic life that they contained because only four of the pools could be termed permanent. The remainder became dust bowls, rock hard and devoid of any sign of life after about 2 months. However, during their brief existence they supported mosquito larvae, tadpoles, fairy shrimps and the crustacean *Triop granarius* as well as dragonfly larvae, water boatmen, water scorpions and many different species of water beetles. *Triop* is parthenogenetic and lays eggs which can survive for years in the mud. Only one pool at En Heet contained fish. This pool was in a cavern 60m below the escarpment. I only once found the pool dry and I suspect that it was linked to the aquifers. Two specimens of the water beetle *Prodaticus pictus* were of great interest as there were only three known specimens in existence and none from Arabia. The pool I caught them in was now dry and I returned the following year but found no sign of the beetle. I returned during the third year and although the pool had many water beetles there was no sign of it. Despondent, I climbed high up the escarpment where I found another deep but tiny pool, the size of a bath. Here I caught another specimen and after handling it I had great delight in returning it to the water.

Layla Lakes are the only permanent lakes that I know of in Arabia. They are a sight for sore eyes in a rock desert. The water is bright blue, cold and the depth is unknown. Shoals of fish attract Purple Herons and I found it a good place to collect dragonflies. The colours of dragonflies soon fade after death, so I always took close-up photos of the captured insects. The species *Enallagma varsomeri* had not been recorded in Arabia before and so we gave this race the English name of Layla Damselfly. It is tempting to relax by swimming but most unwise as there have been reports of bilharzia, a debilitating disease caused by flatworm parasites that can enter the skin and live in the intestine. The life cycle alternates between man and certain species of freshwater pulmonate snails.

Another one of my favourite collecting grounds I called the vulture site, a remote valley in the hills where Gryphon Vultures had nested. It was a great place for hover-flies. Here I captured a species of fruit fly new to science, *Rhopalia gyps* Bowden. One could often travel for hours without seeing any sign of life, either plant or animal. I soon discovered that any sign of death was worth investigating, consequently I always stopped where there was a carcass of a dead sheep or camel, then making sure that I was upwind I would turn the body over. If the death was recent the smell was quite appalling but the amount of life was unbelievable, mostly Diptera and Coleoptera in various stages of development and my harvest was invariably rich. I made a practice of washing my hands with Dettol after my investigations and I never suffered any ill consequences, although my American colleagues would lock themselves in the car with the airconditioner on full blast. My other tactic was to stop and investigate any tree or plant that was either new to me or the area and this invariably yielded a new wasp or fly and sometimes Hemiptera. I also used to take random sweeps of flower and seed heads which I boxed and investigated later by using a magnifying glass.

The other main source of material was the farms, these were quite small areas perhaps 3–4 acres of ground and referred to by the Saudis as gardens. The places were little heavens, generally isolated from the desert by a ring of tamarisk trees; a cool haven of palm trees, pomegranates, figs, oranges, grapes and many other exotic plants. The whole garden hummed with the sound of life, grasshoppers, locusts, huge black bees, frogs and birds. The call of the Bulbul ringing through the trees and the distant thump of the diesel pump recall memories of many hours of effortlss and exciting collecting. Tiny channels directed the pumped water to fields of sweet smelling alphalpha, radish and mint. The number of Clouded Yellow butterflies in one of these fields was so great that I could not fail to collect at least twenty specimens with each sweep of the net. I generally kept a low profile, taking care not to cause any offense. I was often invited to join the farmer for Chi — a very sweet tea usually strongly flavoured with mint, but conversation was generally limited to sign language. On one such occasion I had shown my host my binoculars to view a Hoopoe and then turned it up in Heinzel to show him the illustration. Now, as a true bird watcher, he smiled broadly and disappeared into his house, then returned with his pride and joy, a shotgun.

Two other hazards are worthy of mention. The first is sandstorms: they do not occur often. I experienced a total of three. The best policy is to remain in the car and wait for it to abate and I found that after an hour or two it was possible to drive slowly but with headlights on, the main danger being from other traffic or camels. Camels haven't got headlights but they all have owners, and a dead camel can prove expensive. The second hazard is flash floods. Dry wadis are often used as roads. I talked to two Surveyors who were motoring on a bright cloudless day in a mountain area up a wadi. They heard a roar like thunder, drove up the bank of the wadi to obtain a better view. They could not believe their eyes. A 15 foot wall of water was approaching driving huge boulders in front of it. I only experienced water a foot deep also on a hot sunny day but it could have immobilised the car. On searching the horizon I spotted a few clouds over the hills at least 10 miles away. That is the reason why nobody ever camps in a wadi.

I hope that this discussion of some of my experiences may be of assistance to other Entomologists on future trips. To conclude for myself, I wish to thank the people of

Saudi Arabia for their hospitality and allowing me to savour some of the joys and problems of their beautiful country.

A RECORD OF *EANA RASTRATA* (MEYRICK) (LEPIDOPTERA: TORTRICIDAE) FROM ANDORRA

by KEVIN R. TUCK

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During the Third BMNH/BENHS Microlepidoptera Workshop, Mr Norman Hall drew my attention to a male specimen of an *Eana* species which he had collected in Andorra. I suspected it to be *Eana rastrata* (Meyrick) and subsequent dissection confirmed this. The record is of interest because, as far as I am aware, *rastrata* has not been recorded since its original description by Meyrick (1910).

Meyrick's examples came from Saas Fee, Switzerland, at an altitude of 1800–2100m, in August. He stated that he had collected seven specimens, of both sexes, 'from rough vegetation growing amongst rocks; the species was common, occurring in company with a large and very white form of *Cnephasia bellana*, which it equals in size, though conspicuously different in colour and markings'.

Mr Hall's specimen was collected at Coll de la Botella (altitude 2100m), about 8km northwest of Andorra la Vella. He ran a Tilley lantern and mercury vapour light traps on the night of 24.viii.1985, but he cannot now recall to which light the moth came. The lights were run from shortly before dusk until about 1.30 a.m. and they overlooked a steep east-facing slope with a very rich calcareous flora. The night was warm with a light westerly breeze, and high cloud had spread from the west.

The life-history of *rastrata* apparently is unknown but the adult and genitalia have been figured by Razowski (1965). I am indebted to Mr Hall for presenting his specimen to the BMNH; the genitalia of the specimen are on slide no. 24001.

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The national Bees Wasps & Ants Recording Scheme (BWARS), initiated some eight years ago, has recently been rejuvenated with the intention of renewing interest in the scheme and recruiting fresh talent. BWARS has been run almost single-handed by George Else (B.M.N.H.) until May of this year when its organisation was restructured, and it is now steered by a team of hymenopterists liaising with the Biological Records Centre and the Nature Conservancy Council.

Changes include: a greater emphasis on training and education; more field meetings to support this work; and the compilation of an "information pack" containing notes on identification, data collection, distribution maps and general observations.

Requests for further information and enquiries should be addressed to the BWARS General Secretary, J. Field, Dept. of Zoology, University of Cambridge, Downing St., Cambridge CB2 3EJ.

THE INHERITANCE OF THREE COMMON FORMS OF *ACRONICTA ACERIS* (L.) (LEPIDOPTERA: NOCTUIDAE)

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The typical form of *Acronicta aceris* (L.) has the forewings grey. The form *intermedia* Tutt is distinguished from the f. *typica* in being generally darker and having a more yellow or ochreous tint with the lines and stigmata more distinct. This form seems to be intermediate between f. *typica* and a melanic form, f. *candelisequa* Esper (syn. f. *infuscata* Haworth). F. *candelisequa* has forewings dark ash-grey, almost unicolorous, being somewhat paler only towards the outer margin. Kettlewell (1973) notes this form to be an ancient melanic that has become commonly industrial in London and elsewhere. Here I present data from a series of crosses involving these three forms which show them to be controlled by a single triallelic gene locus with an ascending dominance hierachy correlated to the increase in melanism.

The stock used originated from larvae taken on sycamore in Surrey during 1979. The resultant imagines were used to produce five broods in 1980, and a further eighteen F_2 crosses were made in 1981 from the subsequent progeny. Two of these produced no progeny, but the remaining 16 resulted in imagines in 1982. Some variation within each form class was noted. This was particularly so when examining trap-caught specimens, and in these the three forms, particularly f. *typica* and f. *intermedia*, could not always be categorically differentiated. However in fresh, bred specimens, the generally paler colour of the forewing in f. *typica* could be used to distinguish it from f. *intermedia*. The dusting of whitish scales on the outer costa in f. *intermedia* distinguished this form from f. *candelisequa*. There was some variation in the expression of the forms between broods, but within families the differentiations into forms and the segregations were quite clear cut.

The results of the 21 broods are given in Table 1.

From the data it is obvious that f. *typica* (*typ*) must be recessive to f. *intermedia* (*int*) as brood 2, a cross between these two forms, produced only *int* progeny. Similarly *typ* must be recessive to f. *candelisequa* (*cand*) for all the progeny of brood 23, a *typ* × *cand* cross, were *cand*. This deduction is supported by the results of two crosses (broods 1 and 19) in which both parents were typical, for in both cases only typical progeny resulted. The dominance relationship between *int* and *cand* is revealed by brood 21 in which a cross between these forms only produced *cand* imagines.

It is therefore suggested that the three forms are each controlled by a different allelomorph of the same gene, the *candelisequa* allele (M^C) being dominant to both the others, with the *intermedia* allele (M^I) dominant to the typical allele (M^T). If this is so *typ* × *typ* should always breed true (broods 1 and 19). *Int* × *int* should produce a 3:1 ratio of *int* : *typ* (broods 6, 7 & 8) or should breed true (not produced in any of these crosses). *Int* × *typ* should give a 1:1 ratio of the parentals (brood 16) or should give all *int* progeny (brood 2). *Typ* × *cand* crosses should give all *cand* (broods 17 & 23), or a 1:1 of *typ* : *cand* (broods 11, 12, 13 and 22) or if the *cand* parent is heterozygous for the *int* allele (i.e. M^C M^I), a 1:1 ratio of *int* : *cand* (brood 3). *Cand* × *int* crosses could produce 3 progenic ratios. If the *cand* parent is homozygous for the M^C allele, all progeny will be *cand* (brood 21). If the *cand* parent has the heterozygous genotype M^C M^I a 1:1 ratio of *cand* : *int* should be produced (brood 15). Were both the *cand* and *int* parents heterozygous for the M^T allele (i.e. M^C M^T and M^I M^T respectively) a 2:1:1 ratio of *cand* : *int* : *typ* should result (broods 4 and 10). Finally *cand* × *cand*

TABLE 1 Results of 21 broods reared to investigate the inheritance of f. *typica* (*typ*), f. *intermedia* (*int*) and f. *candelisequa* (*cand*) of *Acronicta aceris*.

Brood	*Phenotype and origin of parents:*		*Number of progeny*		
	Male	*Female*	*Typ*	*Int*	*Cand*
1	*typ* feral larva	*typ* feral larva	21		
2	*typ* feral larva	*int* feral larva		32	
3	*typ* feral larva	*cand* feral larva		16	12
4	*cand* feral larva	*int* feral larva	5	8	14
5	*cand* feral larva	*cand* feral larva	9		24
6	*int* ex 2	*int* ex 2	4	7	
7	*int* ex 2	*int* ex 2	14	51	
8	*int* ex 3	*int* ex 3	5	15	
9	*cand* ex 3	*cand* ex 3	21		55
10	*int* ex 3	*cand* ex 3	2	3	8
11	*typ* ex 4	*cand* ex 4	19		18
12	*typ* ex 4	*cand* ex 4	26		33
13	*cand* ex 4	*typ* ex 4	41		34
15	*cand* ex 4	*int* ex 4		29	24
16	*int* ex 4	*typ* ex 4	9	9	
17	*cand* ex 5	cand ex 5			34
18	*cand* ex 5	*cand* ex 5	10		41
19	*typ* ex 5	*typ* ex 5	9		
21	*cand* ex 5	*int* ex 4			29
22	*cand* ex 5	*typ* ex 1	12		10
23	*typ* ex 1	*cand* ex 5			19

crosses may give 3 progenic ratios. If either parent is homozygous for M^C all *cand* progeny will be expected (brood 17). If one parent is heterozygous for the M^I allele (i.e. M^C M^I) and the other for either M^I or M^T, a 3:1 ratio of *cand* to *int* should be produced (not applicable to any of these crosses). Similarly, if both parents are heterozygous for the M^T allele (i.e. M^C M^T) a 3:1 ratio of *cand* : *typ* is produced (broods 5, 9 & 18).

All the results obtained are thus consistent with this simple one gene locus, three allele model.

REFERENCE

Kettlewell, H.B.D. 1973 *The Evolution of Melanism*. Clarendon Press, Oxford.

Flight period of the dryad (*Minois dryas* (Scop.), Lep.: Satyridae) in northern Italy. Most recent authorities on Continental butterflies appear to be unanimous in citing the flight period of *Minois dryas* (Scop.) as restricted to July and August. However, up to the third week of September 1983 in the hills to the north and east of the northern end of Lake Garda (Trento to Alto Adigo) this satyrid was observed on the wing. It seems, therefore, that the normally accepted duration of this butterfly's activity in northern Italy could now be extended. The weather for the month in question was typical for that time of the year.—R.A. Lever, 51, Links Road, Ashtead, Surrey 21KT 2HL.

Microlepidoptera workshop 1985.—Following the success of a dissection workshop held at the British Museum (Natural History) in 1984 (*Proc. Trans. Br. ent. nat. Hist. Soc.* **17**:90–91) the staff of the microlepidoptera section announced at the Annual Exhibition in 1984 that a second workshop would be held at the museum on 23rd February 1985.

This workshop was attended by fourteen members of the Society, and concentrated on the identification of problematic groups of British microlepidoptera, in particular the genera *Scrobipalpa* (Gelechiidae), *Nemapogon* and *Tinea* (Tineidae). Emphasis was placed on the male and female genital characteristics. Each genus was introduced by a specialist, and members were able to watch a video recording of *Scrobipalpa* genitalia! Microscopes, specimens, prepared slides and diagnostic keys to British and European species were supplied and members were able to work with either their own or museum material, under the expert guidance of the BM staff. Using the excellent keys supplied, two species of *Scrobipalpa* new to Britain were noted during the day!

There were also opportunities for members to produce boxes of unidentified specimens for comment. There is no doubt that all those who attended found the day both interesting and rewarding. Our sincere thanks are due to the organisers, Dr K. Sattler and Dr G.S. Robinson and their expert back-up team, Mr M. Shaffer, Mrs L. Pitkin, Mr K.R.C. Tuck and Miss M.A. Tobin.

Paul Sokoloff

Small ecological project grants.—The British Ecological Society's small ecological project grants notified to us seem an ideal form of support for members undertaking local surveys and other ecological projects. The awards are made several times a year and are usually in the £200–£500 range. The same Society also has grants for more ambitious projects. Application forms are available from the British Ecological Society (SEPG), Burlington House, Piccadilly, London W1V 0LQ.

PRESIDENTIAL ADDRESS

by PETER J. BAKER

I. TOPICAL REMARKS

My year of office has seen no major dramas and has otherwise proceeded in a calm and orderly manner, thanks entirely to those who have given so much of their time to the organisation and running of the affairs of the Society. It may be invidious to pick out any particular person by name — though this I will risk later — I trust with sufficient cause. Let it be said that no less than thirty nine appointed individuals have managed particular aspects of the Society's affairs and another six have volunteered to organise and run certain of those events which are an essential part of our programme. We owe a deep debt of gratitude to these unstinting helpers, without whom the Society could not function.

Any President may think he has cause for concern when his term of office coincides with the change of so vital an officer as the Secretary. In my case any worries would have been completely groundless as the handover of duties from Mrs Murphy to Dr Muggleton has taken place without any trauma and I have had the advantage of good advice from each of them. I offer my heartfelt thanks to you both.

Mr Eric Bradford is retiring from the post of Curator this year and this position is being taken up by Mr Peter Chandler to whom we offer our thanks for his good services in the future. Our gratitude is also due to Mr William Parker who has agreed to continue as Assistant Curator.

Eric Bradford has served the Society in a variety of roles over the years — many of them ex-officio. Since he took up the duties of Curator in 1976 he has done much to collate, rationalise and improve the Society's collections. One of his most significant tasks commenced in 1982, when an outbreak of museum beetle was detected in part of the collection. This pest has now been brought under control and steps have been taken to prevent its re-occurrence. One needs only to close the eyes for a moment to conjure up a vision of Eric as a latter day St. George, with several *Anthrenus museorum* L. impaled on his sword in place of the hapless dragon. He has also found the time to continue his studies, primarily of the microlepidoptera, but also of a much wider range of our flora and fauna in recent years.

In recognition of his services to the Society and his contributions to entomology I have great pleasure in announcing that Council has agreed that he should become an Honorary Member of the Society.

On paper, the current membership is slightly down in numbers compared with that of a year ago. In fact the situation is now much more healthy than in March 1985 when, of 709 Members on the books, 61 were two years in arrears with subscriptions, 70 were unpaid for 1985 and a further 53 had paid too little for at least one year. This resulted in a total of only 519 fully paid up Members at that time. Mr Geoff Burton, our new Assistant Treasurer, has continued the work of his predecessors in the attempt to entice all delinquent payers back to the straight and narrow. His efforts have met with some success and many of the arrears have been collected. Chasing up errant subscriptions is expensive for the Society and entails many hours of work on the part of the Assistant Treasurer and others. Please help by paying your correct subscription on time. Members who underpay without good reason may not receive their copies of the Proceedings and other Society communications. Those who are two years in arrears with their subscriptions, without good reason, may lose their Membership of the Society. Only fully paid up Members are entitled to the privileges of Society Membership.

The first tentative steps have been taken which will ultimately result in the computerisation of many aspects of the Society's business affairs, including subscriptions. Once implemented, this technology will reduce the load on the Society's administrators and provide a better service to Members.

In the past year a new Membership List has been circulated to all Members. For the preparation of this we are once more indebted to the Rev. David Agassiz. Another Society publication, that on the hoverflies, has been very successful and by now is almost completely sold out. A second edition will be available in August this year. Further ahead, it is planned to produce a new volume — on the Heteroptera of the British Isles. Work on this is now underway and an issue date of October 1989 is anticipated. Thus there is a period of some three years without a Society publication. It may be possible to do something to fill this gap if anybody can come up with a feasible proposal. If you have any ideas on this, advise a Member of Council or the Publications Committee. The most useful suggestion will also include recommendations as to authorship and method of preparation of the proposed title.

I now ask you to spend a few minutes in remembrance of those of our fellow Members whose deaths have been reported during the past year.

A.H. Hayes, who joined the Society in 1980, died on 29th March at the age of 46. Born in East London, his early career included service with the RAMC in Germany and a period at New Scotland Yard as a fingerprint specialist. Most of his working life was spent at the British Museum (Natural History) where he specialised in the Sphingid group of the Macrolepidoptera. He also had an interest in exotic birds and judged these at competitions.

G.H.B. Oliver was a professional musician who played a variety of woodwind instruments during the Big Band era of the 1930s and continued, with music for films and the theatre, into the 1960s. He inherited an interest in the Lepidoptera from his well known father G.B. Oliver and in later years built up a reputation as a breeder of the Geometridae. He joined the Society in 1943 and attended many meetings including the Annual Exhibition held before he died on 7th February, aged 76.

A.E. Wright, who joined the Society in 1969, died in May 1984 in his 44th year. After leaving Cambridge he entered the Foreign Service. He then decided to read law and having qualified as a barrister was called to the Bar in 1967. After several years he went into teaching and became headmaster of his own school. He was widely travelled and formed a significant collection of exotic butterflies including many from Mount Kinabalu in Borneo, which he visited in 1980.

J.G. Gully, a Member of the Society since 1950 who died on December 28th 1984, was a man of the open air. After an early essay into poultry farming he took up dairy cattle and he owned the first attested herd in this country. He was a keen horticulturalist, with an exceptional garden in Lincolnshire. He formed an extensive collection of Lepidoptera, much of it from Africa.

F.D. Lawton, who died on 15th November 1983, was educated at Epsom College and became a solicitor in 1937. He entered the Civil Service and became Solicitor to the Department of Employment in 1967. He was Master of the Scriveners Livery Company in 1970/71 and was made a Companion of the Order of the Bath in 1972. On retirement he found more time for his hobbies which included music, orchid growing, gardening and entomology and he joined the Society in 1976.

A.M. McClure, who joined the Society in 1953, died in early 1983 aged 75 years. He was born in Entebbe, Uganda and educated at Dover College. On leaving school he spent several years overseas before he settled permanently in England and joined a firm associated with Lloyds as a broker. He subsequently became an underwriter. His recreations were mending and restoring clocks and collecting butterflies in Britain and Europe.

M.A. Walker was another member lost to the Society at a tragically early age. When he died in the 27th August he was 30. He had wide ranging interests in the field of natural history and will be remembered for his work on the Coleoptera. He translated from the German several keys in *Die käfer Mitteleuropas* (1965–83) by Freuse, Harde and Lohse. That on the genus *Quedius* appeared in the *Coleopterists' Newsletter* and it is hoped to publish others later. Other published articles are 'A pitfall trap study on Carabidae and Staphylinidae (Col.) in County Durham', *Entomologist's Monthly Magazine* 1985, **121**: 9–18 and, as a joint author with M.L. Luff and M.A. Walker, '*Triplax scutellaris* Charp (Col., Erotylidae) and other interesting Coleoptera recently found in Northumberland', *Entomologist's Monthly Magazine* **117**: 62.

P.J. Croft was born in Weybridge, Surrey, in 1901 and trained as an electrical engineer. He emigrated to Canada in 1920, where he established himself as a professional electrical engineer, taking up posts of increasing seniority over the years. He was a keen photographer, painter, carpenter and musician but his greatest passion was natural history. He was the author of several books on technical and photographic subjects and his last work *Nature Diary of a Quiet Pedestrian* will be published posthumously. He died on June 11th.

R. Lovell-Pank, who was born in London, was educated at Rugby then Wye College. Having obtained a degree in horticulture he took up a stage career. Together with his late wife Hannah, he performed in Britain and the United States, where this partnership was regularly given star billing. After the death of his wife he qualified as a guide and became active in tourism until his death on 12th September. As Chairman of the Guild of Guide Lecturers he did much to promote the interests of professional guides in his dealings with the GLC and Parliament. His interests included Persian cats and music but above all he had a profound love for the countryside and nature. He joined the Society and was interested in the Lepidoptera.

W.H.A. Harris, who died in the middle of the year, was a longstanding member of the Society, having joined in 1936. Over the years he formed a comprehensive collection of British Lepidoptera.

R.P. Demuth who was born in Birmingham, ultimately studied at Cambridge before qualifying as an architect, a profession he followed all his life. Besides moths he was also interested in travel, railways, birds, trees and flowers. He supported several organisations with a concern for conservation and was an active member of the Gloucester Trust for Nature Conservation. He published a number of articles over the years but his magnum opus will be his delightfully written 'Reminiscences of an Elderly Entomologist' which appeared in the four successive issues of the *Entomologist's Record* commencing with Vol. 96, November/December 1984. He was a happy man.

Dr L.G. Higgins took a medical degree at Cambridge before qualifying at St. Thomas's Hospital. During the first world war he served on HMS Revenge and peacetime saw him established in practice in Woking, Surrey. He later became Consultant Gynaecologist and Obstetrician for North West Surrey. He collected widely in Europe, North Africa, the Middle East, the Himalayas and North America and the large collection he formed is now with the British Museum (N.H.). He also amassed a superb entomological library which has been donated to the Hope Library in Oxford. He is most widely known for the volume produced in collaboration with the late N.D. Riley, *A Field Guide to the Butterflies of Britain and Europe*, which was published in 1970. Possibly more significant is his *Classification of European Butterflies* which was published in 1975. He joined the Society in 1960 and was appointed an Honorary Member in 1982. He died on October 9th 1984, aged 94 years.

As you have previously stood in memory of these gentlement I will not ask you to do so again.

We now come to that part of the evening's business which has given me most cause for thought. My pleasure in the pursuit of Lepidoptera has not been particularly scientific, though I have amassed a fund of 'field lore'. This did not make it difficult to choose a theme for my discussion — the problem was to keep matters within reasonable limits. The presentation as originally conceived ran to more than ten thousand words and, as such, would have strained the patience of my most sympathetic listener. As a result of the editing required to bring matters within bounds, some statements made are not supported by the level of proof required to satisfy the scientific purist. For this I apologise and offer to expand any particular feature of my thesis at a future date.

The slides you will see can be blamed on nobody but myself. During my attempts at taking the shots required to illustrate this lecture I consumed many rolls of film. I also developed a strong admiration towards those of our members who regularly entertain us with slides of such exceptional quality at our meetings.

PRESIDENTIAL ADDRESS PART II

CHANGES IN THE STATUS OF THE LEPIDOPTERA OF A NORTH WEST SURREY LOCALITY

by PETER J. BAKER

SUMMARY

This paper suggests possible reasons for changes observed in the status of resident species of Lepidoptera recorded from a site in the Thorpe/Virginia Water region of north west Surrey.

INTRODUCTION

Detailed records of the Lepidoptera seen in and about my garden in the Thorpe/Virginia Water area of north west Surrey have been kept since I took up residence there in 1969. This locality (map ref. TQ 008678) was chosen largely because of the richness of the resident Lepidoptera as reported by many observers over the years and especially by Bretherton (1955, 1965) in his comprehensive list for N.W. Surrey. The choice of site has been well vindicated as the total number of species of larger Lepidoptera recorded up to the end of 1985 stands at 467 with a further 6 species known to occur within a three quarter kilometer radius. This is a very high count for a semi-suburban area and the numbers are a substantial part of the total of 532 species, recorded as residents or annual migrants, by Bretherton, for the whole of N.W. Surrey. It is outside the scope of this discussion to suggest reasons for the observed high population diversity. The intention now is to show that the resident population has altered quite significantly over the review period as the result of a number of modifications to the environment.

At this stage it is necessary to define the insects which are the subject of this paper. These are all groups of the Macrolepidoptera or larger moths, together with the Papilionoidea, Cossidae, Zygaenidae, Sesiidae and Hepialidae.

Continuing observations suggest that the discussion which follows is equally valid if all groups of the Lepidoptera are considered. However, the detailed quantitative lists for the larger insects were not extended to include most of the microlepidoptera until recently.

Figure 1 shows the total number of species seen each year from 1970 to 1985. As often happens with records mainly achieved with the aid of persistent light trapping, the first year gave the highest numbers. This chart suggests that there has been a possible decline in the overall number of species seen over the years that records have been kept — this will be referred to again later.

Figure 2 shows the number of new records from the garden each year after 1970. As is to be expected, the earlier years gave higher figures due to initial under-recording but subsequent records tend to a much more steady situation. The records from later years indicate that, on average, one new, potentially resident, species enters the area each year. This tendency is emphasised in figure 3, which has been derived by eliminating vagrant species from figure 2 and is even more pronounced if the 1976/77 period — which will be discussed later — is ignored.

Vagrant species are defined as those well-known occasional migrants from the Continent and species not confirmed as breeding and for which the habitat does not seem suitable, within a radius of approximately 1.5 km from the garden.

Figure 4 shows the insects previously recorded, but which have not been seen since the year indicated. Once again this has been filtered to remove vagrants. This shows an increase in the number of absences in the most recent years, to some extent because of the less common species which exhibit a gap of several years between each appearance. However, some of this increase is due to an actual loss of species. On the positive side, a few new species have entered the area and are now an established part of the locally resident population.

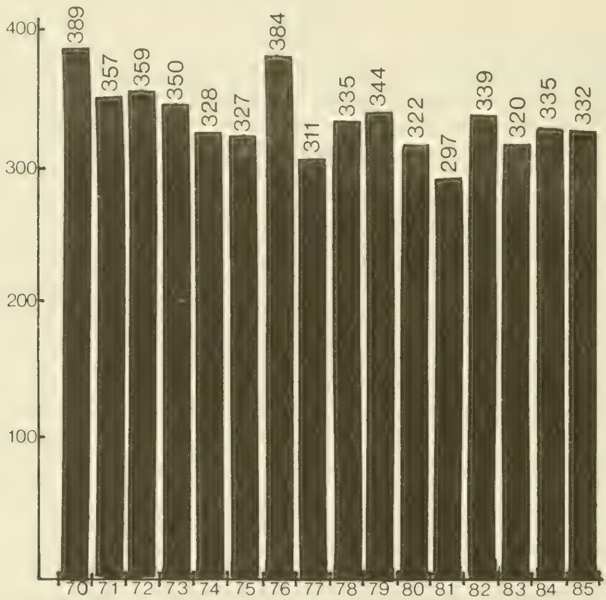

Fig. 1. Annual Species Count 1970–1985

The changes seen are undoubtedly caused by many factors — both natural and resulting from human interference. The latter has been dominant in most years as the intense development pressure felt throughout S.E. England is even more apparent in N.W. Surrey. A few examples of these pressures will now be cited as will their possible effect on the resident population of Lepidoptera.

DEMISE OF THE ELM

In 1969 various species of British elm were generally common along most paths and roadsides and occurred in one of three forms. Sadly, by 1975, all the magnificent specimens of mature trees, many of which reached 24 to 28 metres in height, had been killed by the Dutch elm disease which was first noted in the area in 1972. Elm saplings up to 6 metres tall were also very common as pure stands and in hedgerows. These were almost completely eradicated but, to some extent, they have now made a recovery though they are still liable to be killed by the Dutch elm fungus when the trunk diameter exceeds some 8 to 13 cm. The third category of elm is trimmed hedgerow (none including *Ulmus glabra* Hudson is known). This has largely remained unattacked by the disease to date and it is still common.

The Lepidoptera affected by the change in status of the elm are:- the three *Cosmia* species, *C. diffinis* L., *C. affinis* L. and *C. pyralina* D. & S., also *Xanthia gilvago* D. &

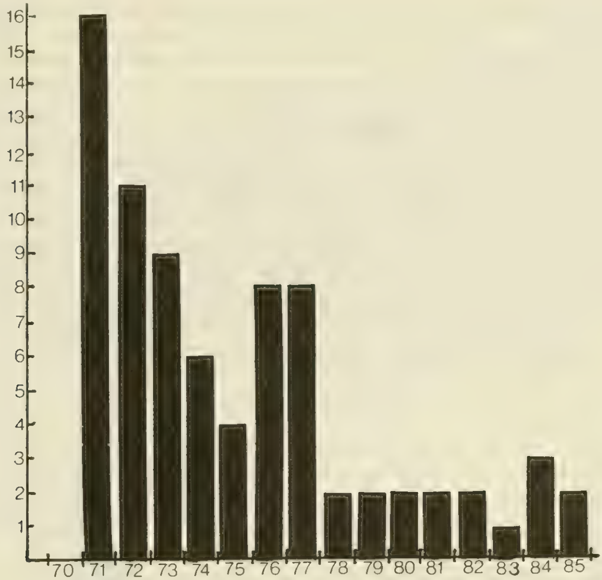

Fig. 2. New Species Records

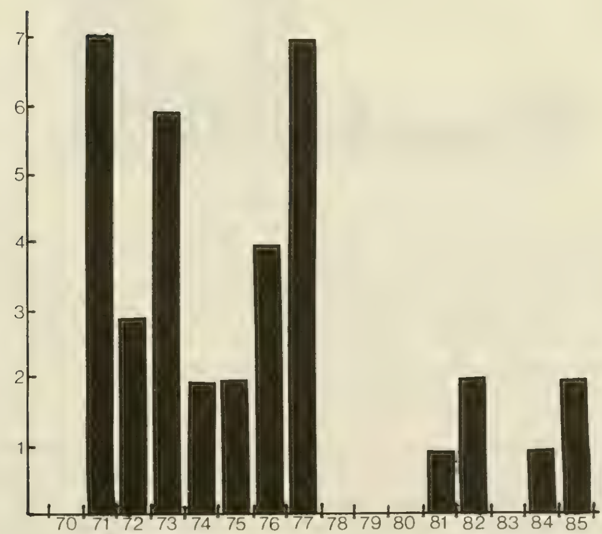

Fig. 3. New Species Records (filtered)

S., *Polygonia c-album* L. the Comma and *Strymonidia w-album* Knoch the White Letter Hairstreak.

C. diffinis larvae were located on one occasion only, when two were found between spun leaves at the top of a large elm which had recently been felled. This suggests that *diffinis* was possibly a feeder in the canopy of larger trees, the last of which was felled or killed by disease by 1975. Apart from a single specimen in 1978, this insect has not been recorded since 1975. *C. affinis* larvae were regularly found between spun leaves by looking up into saplings some 4 to 6 metres high. This moth vanished with the last sapling in 1979 and has not made a recovery as saplings have become re-established, though a single record in 1982 suggests that it might still be resident at very low density. *C. pyralina* was abundant as larvae between the spun leaves of both saplings and hedgerow elms. Larvae have not been found on any elm since 1975 though the moth, after a virtual absence between 1973 and 1979, is again common. It seems likely that it has re-established on one of its alternative foodplants.

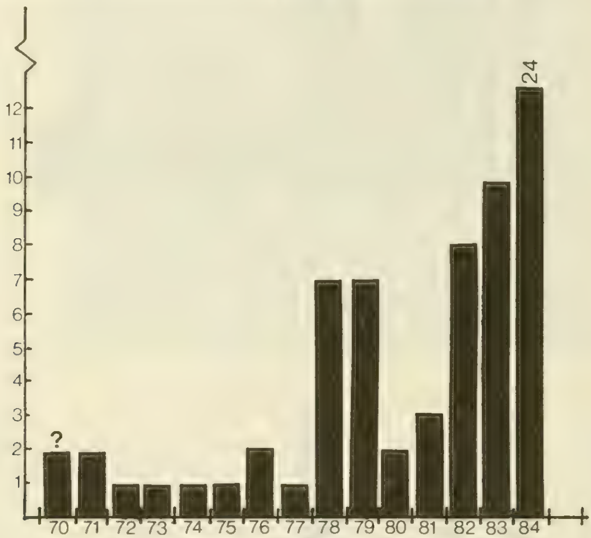

Fig. 4. Species not seen since (filtered)

It has been previously reported that, in N.W. Surrey, possibly the only pabulum for *P. c-album* larvae was the taller elm sapling or smaller tree (Baker 1977b). This butterfly has been common in the area since at least 1969 and apart from 1975 has always been evident in quite large numbers. The larvae are now generally found on gooseberry and blackcurrant — *Ribes uva-crispa* L. and *R. nigrum* L. — and in 1984 were found on stinging nettle *Urtica* spp. for the first time. This seems to suggest a successful behavioural change at a time when this insect is in an active phase of range extension.

S. w-album, which has probably always been scarce in N.W. Surrey, was recorded twice — in 1970 and 1972. The only *U. glabra* in the immediate vicinity was pollarded in 1974 and killed by disease a year later. However, another healthy stand of wych elm in full fruit was found about a kilometre away in 1985. This could act as the base for recolonisation by the White Letter Hairstreak, which may have remained in the area at extremely low density as has *X. gilvago* the Dusky Lemon Sallow. *A. circellaris* has always been abundant and larvae were found on wych elm fruits in 1985, though this insect probably exists primarily on alternative food-plants.

HORSE GRAZING

The next aspect of change is very obvious though its consequences are difficult to assess in the medium and long term.

N.W. Surrey is inhabited by many affluent families and popular pastimes for all ages are various activities which involve the horse. Consequently, the horse population is very high and grazing, being at a premium as evidenced by the many advertisements in the local press, can provide good returns to the owners of otherwise unproductive small fields. Large fields are also used for grazing. These are often divided into many small lots which are let at inflated rents to those horse owners who do not have their own grass.

On the slopes leading up to Surrey heaths there are still good dry pastures which are lightly grazed—usually by beef cattle—and which contain a rich flora and associated fauna. Generally these fields have been unaffected by horse grazing.

On the Thames Valley levels good meadows are also found. These have a very different flora as they tend to be damp for most of the year and are often flooded in winter. This region of the Thames Valley is in fact a catchment area for the river Bourne. The quality of the flora in these damper fields can be judged from the fact that one small area of some five hectares contains six species of *Orchis*. Many of these damper fields which are used to support the over-abundant horse population, are grazed at a density which may cause no permanent damage. In too many other instances the pressure of numbers is such that overgrazing is inevitable. At one location, up to seven horses are regularly kept for most of the year on a site which is under one hectare in extent. Not only can this result in severe, though possibly reversible, damage to the herb layer. All too often the malnourished horses supplement their diet by eating the bark of accessible trees. This often results in the death of the affected trees—usually *Betula*, *Crataegus*, *Salix* and *Alnus*—though *Quercus* is also chewed in extreme cases.

Up to five years ago one particularly rich field supported three species of *Orchis* and a wide range of trefoils and other plants characteristic of damp sites. Now, most of these have been grazed to extinction, though isolated plants remain in boundary ditches and hedges. This example, which is but one instance of a widespread situation, has definitely resulted in the elimination of colonies of *Zygaena lonicerae latomarginata* Tutt and *Comacla senex* Hbn.. It has also resulted in a reduction in numbers of *Hepialus humuli* L., *Eupithecia valerianata* Hbn., *Arctia villica* L., *Deilephila porcellus* L., *Polyommatus icarus* Rott., *Hipparchia semele* L. and possibly *Parage megera* L., though this last insect has become much scarcer over a wider area in the past few years for no generally obvious reason.

MOTORWAY CONSTRUCTION

In 1969 the only sign of the pending M3 motorway was a cleared swathe cut through woodland lying in its path. The ground exposed was rapidly colonised by many plants, the majority of which were grasses. Over the period 1969 to 1972 *Thymelicus lineola* Haw., the Essex Skipper, swarmed on the cleared areas but virtually disappeared when concrete was laid. Now, *T. sylvestris* Poda is by far the commonest skipper hereabout with *lineola* being practically restricted to one small site. This change in the relative status of these two species can, of course, be explained by the alteration in distribution of their respective food-plants but it is a good example of the profound and rapid modification wrought upon the area by the arrival of the M3 and later the M25 motorways.

The first phase of motorway construction included the realignment, straightening and widening of most of the secondary roads in the vicinity. Many attractive country lanes with rich hedgerows and bordering trees disappeared and were replaced by a more open aspect. The new, sterile, roadside verges which resulted have now been improved by the planting of much hawthorn and other hedgerow in the name of amenity and this is now becoming well established after seven years or so. It is the herb layer which has suffered most severely and this will take many more years to return to its former richness, though the current county policy of minimum verge cutting may accelerate the process. Amenity planting of trees has also taken place along motorway verges in an attempt to reduce noise levels. The trees employed are a strange mixture of mainly *Betula*, *Larix* and *Salix* species interspersed with a few exotics including conifers. Partly due to deliberate seeding but also as the result of natural spread, the herb layer on the motorway verges is now richer than in adjacent areas.

It was not only the country lanes which were processed to conform to the master plan. Many lush water courses, including brooks, streams and tributaries of the Bourne were straightened, ditched, encased in concrete and in some instances bridged over. The level of biological degradation due to these changes was increased in subsequent years when it was found that the faster water flow which resulted from the initial works increased the chance of blockage in unimproved reaches further downstream. This, together with reduced floodplain areas resulted in occasional serious flooding. To rectify this, further deepening and widening of water courses resulted in an even greater reduction of waterside and aquatic vegetation together with the associated fauna. Hopefully, this environmental damage will remedy itself over the next few years as the one or two water courses which remain undamaged can act as dispersal centres for the recolonisation of affected areas. There are signs that this is, in fact, taking place in spite of occasional setbacks caused by the well meaning efforts of bands of County Project Corps workers who tidy land and water with an excess of zeal but a lack of ecological sympathy.

Undoubtedly, the most serious damage done by motorway construction was the destruction of what was probably the richest area of wetland in N.W. Surrey. This marsh which was a riot of many of the plants characteristic of slightly acid southern wetlands, also included in the vicinity good plants such as *Epipactis helleborine* Cran., *Scirpus sylvaticus* L. and several others. It also contained a shallow stream which, by flooding most winters, helped maintain the marsh. The stream was ditched and run in a tunnel over which the M3 was constructed. The small remaining area of marsh dried out and reverted to birch scrub. *Plusia festucae* L., the larvae of which used to be found on *Iris pseudacorus* L., vanished and has not been seen since, though the yellow iris and possible alternative food-plants are still common a short distance away. *Lygephila pastinum* Treits., abundant here, was eliminated but remained in low density nearby until 1976. *Xanthorhoe biriviata* Bork. swarmed until the last of its foodplant dried and disappeared in 1973. It was not recorded again until 1977 since when one or two are seen each year, probably from foodplant established at low density along a couple of stream edges and in a nearby, somewhat drier area of preserved marshland. *Earis clorana* L. occurred on osiers at the side of the marsh but has only been seen three times after 1971 though much other seemingly suitable *Salix* spp. occurs nearby. *Argynnis selene* D. & S., the Small Pearl Bordered Fritillary, seen here in 1970, has not been noted since. Though its previous status is uncertain an elderly neighbour advised that "small brown and black butterflies used to be everywhere about the wet ground".

There was some benefit from the initial stages of motorway workings, which were rapidly, though briefly, covered in coarse vegetation including *Artemisia absinthium* L.. The larvae of *Cucullia absinthii* L. were very common for a few years from 1974, though the imago was always very much less in evidence. *Tyria jacobaeae* L. was present in incredible quantity and it was sometimes difficult to see how it survived as one stripped stem of *Senecio* often appeared to be the only sustenance for a dozen or so half grown larvae.

The biggest gain, however, was a lake and surrounding ground which was created by the need to excavate material for nearby M25 embankments. The lake currently enjoys something of a protected status as it is the venue of a windsurfing club. A rich flora has rapidly developed from nearby relict species as there is an undisturbed stream and a good hedgerow along one side. This spot supports the only local colony of *Zygaena filipendulae stephensi* Dupont and also other unexpected moths such as *Callistege mi* Clerck. Many of the more generally occurring species have become abundant and hopefully, will enjoy a secure future as the isolated situation of this site would seem to make further development difficult.

One other, continuing aspect of the motorway is worthy of consideration. The M3/M25 intersection is a sea of the orange light produced by high pressure sodium vapour lamps. In spite of many assurances to the contrary I am of the opinion that high levels of sodium lighting act as a flight suppressant to nocturnal Lepidoptera. When driving along an unlit road on a warm summer night many moths are seen in the vehicle headlamps. Little or nothing may be noted in flight when an area, illuminated to Grade A standards by sodium lighting, is entered. On the other hand, I well remember one BENHS field meeting at Swanage in the 1970s. On this occasion two *Mormo maura* L. were seen battering themselves on one of the isolated high pressure sodium lamps situated at the Swanage end of the Durlston Road.

CLIMATIC INFLUENCES

The last phenomena to be considered are a couple of aspects of that standby of all raconteurs, the weather. Inevitably, memories of past climatic interludes revolve around gentle winters, soft springs and golden summers. However, it is possible to consider reality, by reference to diaries kept since 1959. These show that a signifcant change in the prevailing weather has taken place in recent years. This new pattern first became evident in 1973 and has, with minor variations, become established as a permanent feature since.

Before 1973 the general situation was a fairly mild winter, with several colder intervals. March winds gave way to April showers which lead into an often wet, changeable summer including a couple of fine weeks—sometimes. Autumn was often wet and windy, though Indian summers were quite frequent, and leaves were off the trees by mid-October. Significantly, winds from the south west predominated for most of the year.

Since 1973 the weather has tended to be more often affected by high pressure zones over Central Europe and Scandinavia and less by Atlantic conditions. Anticyclonic phases have resulted in long periods with cold and dry winds from the north east. Frequently, winters, mild in the first part have given snow in February and March followed by a long, cold, dry spring. This has suddenly given way to summer which has produced much sunny weather. Wet westerlies have appeared some time after mid-August but, overall, the rainfall has been much lower than the long term annual average and spring, especially, has become a very dry season. Leaves can be found on certain trees until mid-November.

The sunnier weather has benefitted the resident butterflies, most species of which have become more widespread and common in the last few years. It has probably aided the increase of *Quercusia quercus* L., the Purple Hairstreak, which is now abundant. Though this insect can be inconspicuous as it tends to favour the tree canopy and feeds on the honeydew of tree-feeding aphids, the large numbers now seen could surely not have passed notice prior to the first record in 1982.

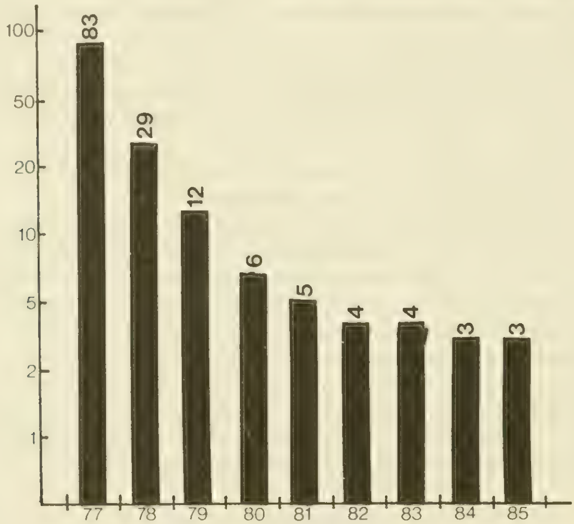

Fig. 5.

The anticyclonic weather pattern results in many cool clear nights which greatly reduce the efficiency of the mercury vapour light trap as a recording device. This has undoubtedly been the reason why certain of the scarcer species in the area are now recorded less often. However, I will speculate that a succession of cold, dry springs has greatly reduced the population levels of various autumn-flying species such as Geometridae and the sallow group of Noctuidae—*Conistra* spp. through to *Xanthia* spp. (Kloet & Hincks 1972). The late spring reduces the pabulum available to newly hatched larvae which later find it difficult to pupate in the hard ground and dry litter layer.

Bird predation is also a significant factor which assumes even greater importance if spring is particularly cold and late or gets off to a false start. 1985 gave a classic example of this latter situation when broods of Great and Blue Tits, *Parus major* and *P. caeruleus*, hatched in the warmer interlude between two very cold spells. The parent birds seemed to spend all daylight hours working the buds of apple, pear, plum and certain wild trees for larvae of geometrid species. As a result, the leaves of these trees remained almost undamaged through the summer—a unique event. In the autumn the imagines of such usually abundant species as *Epirrita dilutata* D. & S., *E. autumnata* Bork. and *E. christyi* Allen could be counted on one hand. Only five of that usually plague species *Operophtera brumata* L. and a single *O. fagata* Scharf. were recorded.

Another aspect of this same situation was the loss of certain soft fruits as the result of Great Tit predation. These birds damaged blackcurrants by pecking the stems to extract larvae of *Synanthedon salmachus* L., the Currant Clearwig. This pecking killed or weakened the stems of the bushes resulting in a greatly reduced fruit crop and the complete absence of what is normally a quite common insect.

That long hot summer of 1976, which remember was preceeded by a cold dry spring, gave many warm nights which encouraged high levels of flight activity, as evidenced by the large numbers of moths found in light traps over the period (Baker 1977a). But for many of the resident insects this season was a disaster. It resulted in population crashes for most species in 1977 and the local extinction of many, some of which have still not reappeared in the area. Figure 5 shows the number of species listed in 1976 which were not seen in subsequent years. Note that in 1977 83 species, or some 18% of the local list, were not recorded. This was not only due to poor weather conditions inhibiting flight activity and trap records: larvae were also in very low numbers or absent. Many lost species recolonised in the next few years but some took much longer and three have possibly vanished permanently, with several remaining at very low levels.

On the positive side the high level of flight activity in 1976 led to extensive dispersal which resulted in a significant increase in the number of new species recorded in 1976 and 1977. Figure 2 shows that sixteen new species were noted in these two years, seven of which appeared for up to five following years and another four which seem to have become a permanent part of the local population.

Probable losses due to 1976 weather conditions are: *Cerapteryx graminis* L., *Celaena leucostigma* Hbn. and *Lygephila pastinum* Treits.. Possible gains are: *Eupithecia dodoneata* Guen., *Dicycla oo* L., *Rhyacia simulans* Hufn. and *Dichonia aprilina* L.

CONCLUSIONS

More species have been lost from the local recorded list since 1969 than have been added to it. Also, there has been an increase in the time between appearances of certain less common insects, due only in part to the effects of weather on light trap catches.

Several of those insects which have become much scarcer or which have vanished are, to a greater or lesser extent, associated with wetlands. Several of those which appear to have recently become established in the area are associated with trees—especially oak.

Some wetland has been destroyed and the lower average rainfall of the past few years, together with increased drainage associated with motorway construction, has resulted in the area becoming drier. In general, the water table has fallen some 30 to 45 cms. This can be verified if any of the older gravel workings in the vicinity are examined—when a miniature raised beach can be observed—this being indicative of the higher water table which existed up to about 1975. The drying out process has allowed scrub oak, birch and pine to become established in ground which was previously too waterlogged to permit successful colonisation by these species.

Until the end of the second world war, freely ranging pigs were commonly farmed locally, but all pig farms adopted modern farming methods by 1962 at the latest. This permitted acorns and seedlings—including species other than oak—previously eaten by the pigs, to survive and become established. Consequently, oak, birch and pine trees 30 to 40 years old are now evident in a number of places. The colonisation by oak-feeding species is continuing as several specimens of *Lymantria monacha* L. were added to the local list in 1985.

Hopefully, some of the wetland species will return, to achieve better than relict status, in the future. An isolated patch of *Impatiens capensis*, which appeared three years ago along a nearby stream, supported a thriving colony of *Xanthorhoe biriviata* in 1985, these being in addition to those mentioned earlier. Also, several larvae of *Nonagria typhae* Thun. and *Rhizedra lutosa* Hbn. were found in a spot where they had not been seen before.

Finally, I would ask Members to report on two once very common insects which have disappeared not only from the Thorpe area but also most other sites I have worked in recent years. What is the current status of *Cerapterix graminis* L. and *Agrochola helvola* L.?

APPENDIX

Species lost and gained in the Thorpe/Virginaia Water area since 1969. The first or last year of record is shown in parentheses. Uncertain status indicated (?).

Losses

Strymonidia w-album Knoch (1972), *Saturnia pavonia* L. (1971) (?), *Idaea fuscovenosa* Goeze (1978), *Eulithis testata* D. & S. (1978), *Horisme vitalbata* D. & S. (1979), *Triphosia dubitata* L. (1974), *Eupithecia satyrata* Hbn. (1977), *Abraxas grossulariata* L. (1973), *Cerura vinula* L. (1978), *Thumacla senex* Hbn. (1982), *Arctia villica* L. (1978), *Euxoa tritici* L. (1979), *Agrotis vestigialis* Hufn. (1978), *Spaelotis ravida* D. & S. (1980), *Hadena perplexa* D. & S. (1978), *Tholera cespitis* D. & S. (1979), *Mythimna pudorina* D. & S. (1981), *Agrochola helvola* L. (1979), *Cosmia affinis* L. (1982), *C. diffinis* L. (1978), *Celaena leucostigma* Hbn. (1976), *Earis clorana* L. (1979), *Plusia festucae* L. (1971), *Lygephila pastinum* Treit. (1976), *Schrankia costaestrigalis* Steph. (1979), *Boloria selene* D. & S. (1970) (?), *Abraxas sylvata* Scop. (1970) (?), *Cerapteryx graminis* L. (1976).

Gains

Quercusia quercus L. (1982), *Aphantopus hyperantus* L. (1973) (?), *Cymatophorima diluta* D. & S. (1973), *Thera variata* D. & S. (1982), *Eupithecia dodoneata* Guen. (1977), *Lymantria monacha* L. (1985((?), *Rhyacia simulans* Hufn. (1977), *Lithophane leautieri* Bois. (1981), *Dichonia aprilina* L. (1976), *Dicycla oo* L. (1977), *Abrostola trigemina* Wern. (1977), *Apocheima hispidaria* D. & S. (1972), *Hadena compta* D. & S. (1973), *Eremobia ochroleuca* D. & S. (1974).

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1985 ANNUAL EXHIBITION

Chelsea Old Town Hall—2nd November 1985

The following account has been compiled by Messrs A. S. Harmer (British butterflies), B. F. Skinner (British moths), J. M. Chalmers-Hunt (micro-moths), R. F. Bretherton (foreign Lepidoptera), A. E. Stubbs (Diptera), R. A. Jones (Coleoptera and Hemiptera), A. J. Halstead (other groups) and E. S. Bradford (illustrations).

BRITISH BUTTERFLIES

The coolest, wettest and windiest summer for many decades caused the reduced numbers of exhibits this year. Many of the regular exhibitors were absent from their usual haunts.

British Museum National Collection—three drawers of *Cynthia cardui* aberrations, including the striking and beautiful ab. *rogeri* Meilh. and ab. *varini* Meilh. One ab. *rogeri* was the specimen figured by Frohawk in *Natural History of British Butterflies*, pl.26 figs.15–16. (This same insect was later reproduced in his *Varieties of British Butterflies*, wrongly named as ab. *inornata* Brams.)

The strong influx of Painted Ladies in April unfortunately did not give rise to many progeny. Coincidentally, Frohawk commented that '. . . the great "*cardui* year" previous to 1903 also occurred in this country during the wettest summer on record, that of 1879'.

Also included in the drawer were two specimens of *C. virginiensis* and one *Vanessa indica indica.*

Barrington, R.D.G.—A strong exhibit of fine aberrant forms of *Maniola jurtina* taken in a north Dorset hay meadow during June/July 1985. Three ab. *antiaureolancea* Leeds showed the range of expression of this form which, according to the exhibitor, is always associated with ab. *postmultifidus* Lipscomb. A homeotic example had a large forewing area of orange reproduced on the underside of the hindwing.

Also included in the exhibit were: *M. galathea* female approaching ab. *nigricans* Cul.; female *L. coridon* ab. *inaequalis* Tutt, male *obsoleta* Tutt + ab. *postbrunnescens* B. & L.; three *A. urticae,* all from the same web of larvae in October 1984—ab. *seminigra* Froh., ab. *derennei* Cab., ab. *flavotesselata* Tayn.

Bretherton, R.F.—L. *coridon* ab. *semisyngrapha* Tutt, *L. bellargus* ab. *czekekii* Aign.

Brotheridge, D.—*C. cardui* transitional to ab. *ocellata* Rbl. taken in North Wilts.

Collins, G.A.—*A. urticae* ab. *semiichnusoides* Pronin, taken in South Croydon 27.ix.85.

Cribb, P.W.—A selection including *E. aurinia* bred in stock since 1955 and some *C. tullia* Müll, from Cumbria.

Harmer, A.S.—(1) female forms of *C. croceus* bred Nov/Dec 1984: ab. *pseudomas* Cock., ab. *punctifera* Braun, ab. *dentata* Carvel.

(2) *P. icarus* F_2 progeny from a Purbeck female ab. *transiens* Tutt. One specimen approached the form of the parent. This gene seems variable in its expression.

(3) Variations in *L. coridon* ab. *tithonus* Meigen: ab. *tithonus* + *lavendula* B. & L., ab. *tithonus* + *punctata* Tutt, ab. *tithonus* + *inframarginata* B. & L. These and two female ab. *fowleri* South, two male *ultrafowleri* B. & L. and two female ab. *tithonus* + *fowleri* were among the progeny from a captive pairing between a male carrying ab. *tithonus* and a female ab. *tithonus* + *fowleri.* The former was from R. Revels's stock and the latter bred by R. Barrington from stock supplied by R.S.

Tubbs in 1983. The *tithonus* gene has been kept going for 18 years now. The *fowleri* and *inframarginata* genes have also been deliberately introduced to the stock over the years.

(4) *B. euphrosyne* female ab. *stramineus* Frohawk, one of two taken in half an hour. Larvae have been obtained.

JONES, A.M.—An interesting exhibit including the following aberrations, nearly all taken in Surrey.

(1) Two male and one female *P. icarus* ab. *apicalis* Tutt bred April 1985 from a female captured in August 1984.

(2) Three male *L. phlaeas* ab. *extensa-conjuncta* Tutt bred September October 1985 from a female caught in August.

(3) A bilateral gynandromorph *C.argiolus* bred with nine typical butterflies in September 1985.

(4) a fine *A.urticae* ab. *semiichnusoides* captured in E. Sussex 23.vii.85.

KNILL-JONES, S.A.—A small male *C.croceus* thought by the exhibitor to be the first known British example of a third brood. Bred from a wild second brood Freshwater, I.o.W. female, it emerged on 17.xi.83. A female *M. jurtina* taken at Tennyson Down on 19.x.85, illustrating the delayed emergence of some species because of the appalling summer.

MIDDLETON, A.P.—three *L. sinapis* ab. *brunneomaculata* Staud. captured in July 1985 in Northants; three *M. cinxia* approaching ab. *wittei* Geest; *E.aurinia* bred from Dorset and Oxford colonies; a female *A.cardamines*, Leicester 30.v.85 with the discoidal spot extended towards the apex (similar to ab. *lunaextensa* B. & L. in *L. coridon*); a pathological specimen of *A. hyperantus* ab. *arete* Müller, Hants. 15.vii.85.

RUSSWURM, A.D.A. and MIDDLETON, H.G.M.—The splendid showing by *V.atalanta* in September and October was reflected in three butterflies caught in Mr Russwurm's garden: female ab. *fracta* Tutt, ab. *angustfasciata* Lempke and a specimen with the red bands reduced to greyish-pink.

Other aberrations: *A. urticae* ab. *derennei* female Boldre, Hants., 10.viii.85; two female *P. tithonus*, one ab. *obscurior* Schultz, Brockenhurst, one with enlarged orange areas on the hindwings, taken near Wool, Dorset, August 1985; a female *M. galathea* ab. *flavescens* Goetghebuer, Portland 7.viii.85.

SCANES, J.T.—A splendid female *T.acteon* ab. *alba* Bolton taken near Wool, Dorset 6.viii.85. This is probably the only one taken since Bolton's type from Swanage in 1950.

STACEY, I.F.—(1) F_2 progeny from a typical female *A. cardamines* taken on 31.v.83: a male ab. *macula-punctata* Frohawk, a similar male but incorporating ab. *umbrosa* Culot (having black scaling on the inner edges of the orange apical blotches), four female ab. *caulotosticta* Williams + *maculata-punctata*, two female ab. *ochrea* Tutt, one of them also being ab. *minora* Selys.

(2) Some perineural forms resulting from pairing between *E.aurinia* ssp. *anglicana* (W.Sussex) and ssp. *scotica* (Mull). Also a *glabrous* + *obscura* female. Large losses of larvae were reported by the exhibitor, mainly during the third and fourth moults or at pupation and all five females had abnormally long and heavy abdomens and lacked the normal responses in feeding and mating. Such results would suggest a chromosomal imbalance. It is considered doubtful by some whether Scottish butterflies merit a subspecific status, because most cannot be separated from English ones, there being no constant character. More breeding along these lines may help to clarify the situation.

(3) four *L.dispar batavus* Oberthür with additional basal spotting on forewings and a male with an extra spot on the left upperside forewing.

(4) Scale defect forms: male *Q. quercus* with pale ground colour and very pale purple (this specimen also has the underside orange markings reduced to ochreous yellow; male and female *A.iris* with mottled ground colour on forewings and hindwing basal areas; a female underside of the same form with a wide flush of lilac at the wing margins.

Stokes, D.—An impressive male *A.iris* ab. *iolata* Cab. from Northants and *S. pruni* ab. *caudatanulla* B. + L., a tailess form, from Oxfordshire.

Trembath, D.A.—Aberrations of butterflies taken in the Dorking area: *A.agestis* ab. *pallidior* Oberthür, *L. bellargus* ab. *krodeli* Gillm. and *L. coridon* ab. *parisiensis* Gerhard = *arcuata* Courv.

Tremewan, W.G.—a male *P.tithonus* ab. *excessa* Tutt, an aberration which Mr Stacey also showed a female of.

Wild, E.H.—a female of the rare migrant *L.boeticus*, caught in a one-inch tube whilst sunning itself on a hedge below some ivy blossom at Highcliffe, near Christchurch, Dorset 21.x.85.

Young, L.D.—An interesting exhibit of bred aberrations of *P.icarus*. (1) F_1 and F_2 specimens bred from a female ab. *transiens* Tutt captured in Surrey, June 1985. This produced a fine female combination form *antico-striata* + *apicojuncta* Tutt in the F_2 generation, emerging on 29.ix.85.

(2) F_1 and F_2 examples from a female taken in Hampshire 25.viii.84, with extended basal spotting (referable to ab. *elongata* Tutt). Both generations produced 50% aberrations. An F_2 female paired with a wild, typical male from Surrey similarly produced 50% aberrations in the F_1 and F_2. The most extreme example emerged in the F_2 generation in September 1985.

BRITISH MACROLEPIDOPTERA

Agassiz, Rev. D.J.L.—The British races of *Luperina nickerlii* Frey, together with examples of the nominate subspecies from Bohemia and the race from Halle, East Germany.

Baker, B.R.—A specimen of *Lampropteryx otregiata* Metc. bred from a wild larva taken in North Hampshire by Col. G.G. Eastwick-Field in 1985. This species was first discovered in North Hampshire in 1983 by Col. Eastwick-Field and constituted a new vice-county record. It has also turned up this year for the first time in Berkshire.

Baker, P.J.—Interesting records from the garden light trap at Thorpe, Surrey included the first specimens of *Euproctis chrysorrhoea* L. on 14.vii.1983 and *Euphyia biangulata* Haw. on 1.viii. 1985.

Banner, Dr J.V.—A selection of *Alcis repandata* L. taken from various localities between 1952 & 1985. Aberrations included an unusual form of *Chloroclysta truncata* Hufn. taken in Kent in 1985.

Bretherton, R.F.—Noteworthy specimens taken from the garden light trap during 1985 were two *Euphyia biangulata* Haw. on 5th and 10th August; two *Rhodometra sacraria* L. on 22nd September and single examples of *Hyles lineata livornica* Esp. on 11th April and *Catocala nupta* L. ab *nigrata* Lempke on 25th August.

British Museum (Natural History)—From the National Collection of British Lepidoptera (RCK) were two drawers of recently curated material of *Tyria jacobaeae* L. and one drawer of forms of *Deilephila elpenor* L.

Brotheridge, D.—A small selection of resident and immigrant Lepidoptera taken at Wroughton, North Wiltshire included *Hyles lineata livornica* Esp. on 6.iv.1985;

Spodoptera exigua Hbn. on 3.iv.1985 and *Thera juniperata* L. on 16.x.1985.

CHALMERS-HUNT, J.M.—A male *Agriopis aurantiaria* Hbn. ab. *fumipennaria* Hellwejer taken at Mitcham Common, Surrey in November 1984.

CRONIN, A.R.—Moths bred 1983–85.

DAVEY, P.A.—Two specimens of *Hyles lineata livornica* Esp.; one from Rushmoor, Surrey on 2/3.iv.1985, the other from Swanage, Dorset on 16/17.iv.1985.

EMMET, Lt Col A.M.—A small series of *Apamea anceps* D. & S. from north-west Essex showing minor variation and an example of *Lithophane leautieri* Boisd. being one of several specimens taken at Saffron Walden, Essex.

FAIRCLOUGH, R.—A specimen of *Abraxas grossulariata* L. conforming to f. *subviolacea* Raynor from Leigh, Surrey on 20.viii.1985.

FOSTER, A.P.—A specimen of *Spodoptera exigua* Hbn. taken flying in sunshine on Rosemullion Head, Cornwall on 17.iv.1985 and a male *Apoda limacodes* Hufn. taken at light at Castor Hanglands, Cambridgeshire on 25.vii.1985.

HALL, N.M.—Examples of a second brood of *Acronicta menyanthidis* Esp. bred from a female from Scotland; the entire progeny were female. (This phenomenon has occurred before on at least two occasions with this species—B.S.) Also of interest was a record of *Euproctis chrysorrhoea* L. from Berkshire and specimens of *Saturnia pavonia* L. showing the reversal of the ground colour of the fore- and hindwings when comparing the upper and undersides.

HARMER, A.S.—A sexual mosaic specimen of *Saturnia pavonia* L., mostly female having the antennae chiefly male and the right forewing streaked with male coloration.

HART, C.—A series of *Hadena luteago barrettii* Doubleday bred from wild pupae from the Lizard Peninsula, Cornwall together with prints of the locality and a distribution map of the species.

HAYWARD, R.—A selection of 28 specimens of *Mimas tiliae* L. showing a wide range of variation in colour and markings.

JORDAN, M.J.R.—Specimens of *Mesapamea secalis* L. and the recently discovered *M. secalella* Remm together with genitalia photographs and text highlighting the features of major importance. This exhibit is part of a larger study as a thesis for the University of London. The exhibit also included some locally scarce species from North Hampshire; the most noteworthy of these were four *Noctua orbona* Hufn. from a total of five taken at Weyhill during 1984/5; and a male *Euproctis chrysorrhoea* L. from a total of four taken at Bransbury Common on 25.vii.1985.

KNILL-JONES, S.A.—A selection of moths taken at light at Freshwater, Isle of Wight; of special interest were single specimens of *Macroglossum stellatarum* L. on 13.vii.1985; *Heliothis viriplaca* Hufn. on 27.vii.1985; *Euproctis chrysorrhoea* L. in 1985 and *Eupithecia phoeniceata* Ramb. on 8.ix.1985.

LANGMAID, Dr J.R.—A melanistic *Melanthia procellata* D. & S. from Petersfield, Hampshire on 6.vii. 1985 and an aberrant *Autographa gamma* L. with an exaggerated gamma mark from Southsea, Hampshire on 24.ix.1985.

LEAR, N.W.—A display of some of the more interesting aberrations from the City of Bristol Museum and Art Gallery Collections. The most outstanding of these, all from the C. Bartlett collection were a melanic *Mythimna litoralis* Curt., Hartlepool 1903, J. Robson; a melanic *Semiothisa wauaria* L. bred 3.iv.1922 and an extreme form of *Agrotis ripae* Hbn. from N.Cornwall.

McCORMICK, R.F. & PENNEY, C.C.—Some interesting species recorded at BENHS field meetings between 1979 & 1985. Of special note were *Eilema sororcula* Hufn., *Eupithecia plumbeolata* Haw. and *Herminia strigilata* L. from Pamber Forest, Hampshire on 12.vi.1982; *Noctua orbona* Hufn., *Xestia rhomboidea* Esp. and *Eurois* *occulta* Clerck from Tuddenham Heath, Suffolk on 31.vii.1982; *Euxoa tritici* L. and *Apamea oblonga* Haw. from Kings Forest, Suffolk on 15.viii.1981 and *Euphyia unangulata* Haw., *Eupithecia egenaria* H.-S. and *Abraxas sylvata* Scop. from Swaffham, Norfolk on 4.vi.1983.

Myers, Dr A.A.—A male *Agrotis crassa* Hbn. taken at Fountaintown, Co.Cork on 24.viii.1984. The first Irish record and the first confirmed record for the British Isles although it is known to be resident in the Channel Islands.

MacNulty, Dr B.J.—A selection of moths from the Gower Penninsula, Glamorgan included specimens of *Discoloxia blomeri* Curt., *Semiothisa alternaria* Hbn. and *Autographa bractea* D. & S.

Parsons, M.—Moths taken at Ninfield, Sussex in 1985 included examples of *Enargia paleacea* Esp. on 14th July; *Rhyacia simulans* Hufn. on 18th September; *Idaea vulpinaria* Lempke on 6th August and an extreme aberration of *Xestia c-nigrum* L. on 5th October.

Pickles, A.J. & C.T.—A specimen of *Hyles lineata livornica* Esp. from Lymington, Hampshire on 6.iv.1985; a series of *Eupithecia venosata* F. bred from larvae from the Ardnamurchan Peninsula, Inverness-shire (a form slightly darker than that found in southern England); and a bred series of *Conistra rubiginea* D. & S. from the New Forest, Hampshire.

Pittis, Rev. S.C.—Local and immigrant species and aberrant forms caught or bred in 1984/5 included *Acronicta alni* L. ab. *suffusa* Tutt bred ex female from Worcestershire and a single example of *Mythimna albipuncta* D. & S. from the Lizard, Cornwall on 23.viii.1985.

Plant, C.W.—A halved gynandromorph of *Agrotis puta* Hbn. having the left side female, taken at East Ham, Essex on 29.viii.1985.

Platts, J.—A male *Scopula emutaria* Hbn. bred from wild larva found feeding on sea beet (*Beta vulgaris* ssp. *maritima*) at Faversham, Kent in October 1984. This is probably the first time the larva have been taken in the wild and the foodplant recorded in this country. Two larvae beaten from sea beet from the same locality on 8.ix and 12.x.1985.

Pratt, C.R.—The second Sussex record of *Photedes extrema* Hbn. taken at Rye on 4.vii.1985. On behalf of S. Curson the first British record of *Proserpinus prosepina* Pallas taken at Newhaven, Sussex on 25.v.1985.

Rothschild, Dr Miriam—An extreme example of *Tyria jacobaeae* L. ab. *nigrana* Cabeau taken at Ashton Wold, Northamptonshire in 1985.

Russwurm, A.D.A. & Middleton, H.G.M.—A female *Hyles lineata livornica* Esp. taken at light at Brockenhurst, Hampshire on 3.iv.1985. Aberrant moths captured at Brockenhurst included two examples of *Sphinx ligustri* L. on 24.vi.1976 and 23.vi.1985; two examples of *Acronicta aceris* L. with the hindwings heavily veined and banded with black and one specimen of *Opisthograptis luteolata* L. ab. *quadrilineata* Nordstrom, a form in which the markings on all the wings are enlarged.

Scanes, J.T.—A new aberration of *Opisthograptis luteolata* L. taken at light at Tolworth, Surrey on 2.ix.1985.

Skinner, B.—A bred series of *Eupithecia abietaria* Goeze from Northumberland. Immigrants taken from Pagham, Sussex in 1985 were *Heliothis armigera* Hbn. on 9th October and *Trigonophora flammea* Esp. on 10th October. Aberrations included a male *Spilosoma luteum* Hufn. with dark brown fringes and thorax from Norfolk; a melanistic female *Eilema deplana* Esp. from Hamstreet, Kent and a male *Thumatha senex* Hbn. with banded forewings from Stodmarsh, Kent.

Softly, R.A.—A specimen of *Noctua comes* Hbn. ab. *sagittifer* Cockayne from Hampstead, Middlesex on 22.ix.1985.

SOKOLOFF, P.A.—A melanic example of *Ennomos alniaria* L. taken at Stodmarsh, Kent on 27.viii.1985.

STERLING, P.H.—An example of *Antichloris viridis* Druce bred from a pupa in bananas obtained in Newhaven, Sussex.

TREMBATH, D.A.—A variable bred series of *Rhodometra sacraria* L. bred from a female taken in the Dorking area, Surrey in September 1983.

TWEEDIE, M.W.F.—New records for garden light trap at Playden, Sussex in 1985 were *Hyles lineata livornica* Esp. on 17th April; *Simyra albovenosa* Goeze on 22nd August; *Ochropleura praecox* L. on 9th August and *Mythimna l-album* on 7th October. Also an aberration of *Ochropleura plecta* L. lacking the pale costal streak.

WALTERS, J.M.—A notebook of illustrations covering over 100 species of moths from live specimens caught mainly on Hayling Island, Hampshire during 1985.

WARING, P.M.—Specimens of *Pyrrhia umbra* Hufn. reared from larvae found feeding on young hazel coppice in Waterperry Wood, Oxfordshire.

WEST, B.K.—The most spectacular specimen in a small selection on aberrations from Kent was a male *Euproctis similis* Fuess. ab. *nigrostriata* Cockayne.

WILD, E.H.—A male *Lymantria dispar* L. taken at light at Highcliffe, nr Christchurch, Dorset (V.C.11) on 29.viii.1985 and an example of *Chrysodeixis chalcites* Esp. also at light at Highcliffe on 9.ix.1985.

WILSON, D.E.—A male *Trigonophora flammea* Esp. taken at Dungeness, Kent on 5.x.1985 and a male *Athetis pallustris* Hbn. from Lincolnshire in June 1985.

YOUDEN, G.H.—A specimen of *Hypena obsitalis* Hbn. taken at light at Dover, Kent on 18.viii.1985 being the ninth specimen noted in the British Isles and the first record for Kent.

FOREIGN MACROLEPIDOPTERA

CHALMERS-HUNT, J.M.—High altitude *Erebia* spp.: *E.christi* Rätzer, Laquintal, Switzerland, July 1985; *E.flavofasciata* Heyne, Campolungo, Switzerland, July 1985.

CRIBB, P.W.—Examples of butterfly species taken in the Swiss Engadine, Austria and France between 22.vii and 3.viii.1985, including *Erebia flavofasciata* from a locality previously unrecorded. Examples of butterflies bred in captivity in 1985, including spring and summer forms of *Papilio machaon hippocrates* from Japan.

CRONIN, D.R.—A tray of butterflies and moths taken in the front garden of a house in San Pablo, Philippines Islands, September 1985.

GREATOREX-DAVIES, J.N.—Butterflies collected in Switzerland, canton Valais, 1–13.vii.1985. In all nearly 100 species were recorded, including *Boloria aquilonaris* Stichel above Saas Grund, *Colias palaeno* L. at Riffelalp, near Zermatt, *Fabriciana niobe* L. of an interesting silver-spotted form, from Zennegan, *Hyponephele lycaon* Kühn from Zennegan and Lalden, near Visp.

HALL, D.—Aberrations of three European butterflies and their normal forms: (1) *Tomares ballus* F.—Provence Hairstreak, female having normal orange ground replaced by pale primrose yellow. Tangier, Morocco, 5.iv.1983. (2) *Colias palaeno europome* Esp.—Moorland Clouded Yellow, female albino, all black markings absent and replaced by pale pinkish silver. Bernina Pass, Switzerland, 17.viii.1984. (3) *Colias phicomene* Esp.—Mountain Clouded Yellow, female lacking discoidal black spot on forewing, Col du Tourmalet, French Pyrenees, 7.viii.1985.

Specimens of *Archon apollinus* Herbst—False Apollo, from the Greek island of Lesbos, common in old olive groves on Mt. Rhoditis near Plomari, 2.iv.1984.

HALL, N.M.—A selection of Macrolepidoptera obtained in France and Spain, which have occurred in the British Isles or are very similar to species found here; *Cucullia bubaçeki* and *C. achilleae*, both endemic to Spain.

LUCKENS, Dr C.J.—Selected butterfly species collected in northern France, Cote d'Or, Drôme, Valais, Ticino, north Italy and Sardinia. These included *Papilio alexanor* Esp. and *P.hospiton* Gené, both bred, *Hypodryas maturna* L. *Mellicta aurelia* Nickl., *Erebia flavofasciata* Heyne from Campolungo, and *Erebia christi.*

PAINTER, S.A.A.—*Melitaea didyma meridionalis* Stgdr. ab. *nigra+striata* Skala male, shown with two typical males and two females obtained by A. Hinitt and M. Somes at Encamp, Andorra, 1977 to 1979.

MORRIS, M.G.—*Delias* butterflies collected in New Guinea. The main localities in Irian Jaya (the Indonesian western half) were the Arfat Mountains (few only), the Ibele valley, Modio in the Paniae (= Wissell) Lakes region, Oksibil and Admisibil in the Star Mountains. In Papua New Guinea a few butterflies were from Mt. Kaindi near Wau, Morobe Province, and a few from the Bulolo area in 1981. Dr Morris's formal work was to assess the potential for butterfly utilisation, particularly by farming. This could contribute both to the welfare of the very poor Papuan people of Irian Jaya and to focus attention on the conservation of the New Guinea rain forest.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON, and B.M. (NAT.HIST.). Butterflies taken in Sulawesi (Celebes) on the R.E.S. "Project Wallace" expedition. This included a very fine show of *Graphium*, *Charaxes* and *Papilio.*

TORSTENIUS, S. and ASHBY, G.B.—Short series of 30 species recently received from Norway, Sweden and Swedish Lapland, as additions to the Society's Torstenius collection.

TREMBATH, D.A.—Lepidoptera collected in Kenya, December 1984 to January 1985, the more interesting or local being Pieridae: *Colotis hildebrandti, C.halimede, C.eris, C. incretus, C.vestalis, C.ione* in differing forms, *Belenois crawshayi, B.subeida;* Nymphalidae: *Euphaedra paradoxa, Ariadne pagenstecheri;* Acraeidae: *Acraea servona, A. disjuncta, A. uvui;* Satyridae: *Bicyclus mandanes;* Papilionidae: *Graphium kirbyi; Lycaenidae: Baliochiyla latimarginata, Larinopoda tera, Abisaria neavei.*

TREMEWAN, W.G.—*Zygaena* collected in the High Atlas Mountains, Morocco, June to August 1985: *Z.moroccana irhris* Wiegel, *Z.alluaudi lamprotes* Dujardin, *Z.persephone* Zerny and *Z. aurata tachdirtica* Reiss.

WALKER, D.H.—Insects from Hong Kong, collected during February 1985 in poor weather until two sunny days prompted mass emergence: *Pieris canidia* males and females, *Eurema* ? species, *E.hecabe, Catopsilia pomona, Papilio polytes, P.helenus, Zizeeria knysna* males and females, *Amatidae* ? species, *Danaus gillippus, Mycalesis horsfeldii.* Also *Melanitis phedima*, a giant brown butterfly which flew most evenings under trees as dusk fell.

WHEELER, A.S.—Two drawers of Lepidoptera collected in Australia, December 1982–June 1983, during a long and serious drought. These included several familiar migrants to Europe or their close relatives.

COLEOPTERA

The Coleoptera exhibits were particularly fine this year. Both the interest of the specimens (and photographs) and the careful and varied displays continue the high standard. 1985 also saw more beetle exhibits than any other BENHS annual exhibition in the last ten years. There were some spectacularly rare and interesting species shown.

One of the most eye-catching specimens was a colourful variety (usually the province of lepidopterists) of *Cicindela campestris*, the common green tiger beetle, exhibited by Dr I. M'CLENAGHAN. Two extremely rare and pretty species made their return after many years: *Lebia crux-minor* from Ditchling Common, Sussex (Mr N. J.

HEAL) and *Diaperis boleti* from Holme Fen, Huntingdonshire (Mr R. KEY).

The greatest number of species in an exhibit was 72 Dorset weevils shown by Dr M. G. MORRIS; these included many new to the county and included both rarities like *Larinus planus* and some common species which had been missed before. Mr P. HYMAN showed 36 species, including the two beautiful species *Ampedus cardinalis* and *Bytiscus betulae*.

Mr P. J. HODGE showed various beetles including some new to Sussex; one of these was the unusual Silphid *Aclypea opaca*, very similar to the common *Thanatophilus sinuatus*. Mr D. APPLETON showed some very local insects from the neighbouring Hampshire including *Anitys rubens*. Other interesting species shown included *Osphya bipunctata* from Cambridgeshire and *Cetonia cuprea* bred from a *Formica* nest in Speyside (Mr A. FOSTER); *Agrilus sinuatus* from Gloucestershire (Mr I. CARTER) *Leptura sexguttata* from the New Forest and *Acanthocinus aedilis* from Speyside (Dr D. SHIRT). *Acanthocinus* from the same occasion also appeared in Prof J. A. OWEN'S exhibit, and both exhibitors showed photographs of this fine insect. Numbers of this beetle had been attracted to freshly cut wood—quite a spectacular sight, especially when on the wing.

Prof OWEN must take the prize for the smallest specimen in the entire hall—the ¾ mm *Ptinolium schwarzi*; the prize for the largest (heaviest) perhaps going to Mr A. R. CRONIN for an unidentified scarabaeid from the Philippines. The most unconventional exhibit was the giant flea-beetle embedded in plastic and made into a key-ring, a souvenir of Malaysia (Mr R. D. HAWKINS). The most unpronounceable name for a beetle must be *Bagous czwalinai* a very rare weevil shown by Mr D. PORTER. Perhaps I could claim for myself the largest exhibit of Coleoptera; which, boosted by a number of photographs, hid the fact that I had not been as active in 1985 as others.

Interest in the Coleoptera continues to grow, and more exhibits in 1986 may mean the other 'other orders' being relegated to the second table at Chelsea Old Town Hall!

APPLETON, D.—Coleoptera from Hampshire, 1985. three *Notiophilus quadrimaculatus* Dejan from a colony at the roots of grass on a dry bank at Bucklers Hard, 24.ix.85. Two *Oxyporus rufus* (L.) from fungi on beech stump, Micheldever, 27.ix.85. These are the first specimens that the exhibitor had taken for 20 years, so this species is evidently scarce in Hampshire. Four *Deleaster dichrous* (Gravenhorst) found in fair numbers in rotten leaves on a river bank, New Forest, 14.viii.85. *Anitys rubens* (Hoffman), one of several found in red-rotten oak, New Forest, 16.vi.85. *Triplax lacordairii* Crotch, one of a number found at two New Forest woods in this year. The exhibited specimen was from fresh *Pleurotus* on beech, 21.ix.85.

CARTER, I.—Some rare and interesting beetles new to Gloucestershire. *Myrmechixenus vaporariorum* (Guerin-M.), 19.viii.85, Cranham wood; *Plegaderus vulneratus* (Panzer), 14.viii.85, Crickley Hill Park; *Ptenidium gressneri* (Erichson), 14.viii.85, Crickley Hill Park; *Epurea angustula* (Sturm), 13.viii.85, Crickley Hill Park; *Caenoscelis subdeplanata* (Brisout), 14.viii.85, Crickley Hill Park; *Liocyrtusa minuta* (Ahrens), 31.vii.84, Hailey wood; *Prionocyphon serricornis* (Muller), 31.vii.84, Hailey wood; *Ptenidium intermedium* (Wankowicz), 17.vii.85, Hasfield Ham; *Hapalarea pygmaea* (Paykull), 17.vii.85, Hasfield Ham; *Manda mandibularis* (Gyllenhal), 30.vi.85, Hasfield Ham; *Procraerus tibialis* (Boisduval), 30.vi.85, Hasfield Ham; *Axinotarsus ruficollis* (Olivier), 30.vi.85, Whitcliff Park; *Prionychus melanarius* (Germar), 30.vi.85, Lower Apperley; *Agrilus sinuatus* (Olivier), 29.vii.85, Leckhampton Hill; *Lissodema cursor* (Gyllenhal), 30.vii.85, Leckhampton Hill; *Abdera biflexuosa* (Curtis), 30.vii.85, Leckhampton Hill.

FOSTER, A.P.—A selection of noteworthy species taken from Foulden Common, Norfolk, during the past twelve months. *Odacantha melanura* (L.), 11.vi.85, one by sweeping; *Haliplus variegatus* Sturm, 14.vii.85 one; *Hydrochus brevis* Herbst), 8.xii.84, one; *Hydraena palustris* Erichson, 8.xii.84, one.

Two scarce aquatic species from Orton Mere, Peterborough. *Hydrochus carinatus* Germar., 16.v.85 one; *Dryops similaris*, 16.v.85, one (This species has not yet been formally added to the British list.)

Asaphidion pallipes (Duftschmidt) examples from two coastal localities in Norfolk; Overstrand cliffs, 9.vii.85; Happisburgh, 10.vii.85.

Selatosomus bipustulatus (L.), one specimen swept under lime trees in Burghley Park, Northamptonshire.

Two noteworthy species from Castor Hanglands NNR, Cambridgeshire; *Osphya bipunctata* (F.) one female beaten from hawthorn blossom 2.v.85; *Leiodes cinnamomea* (Panzer) one male at m.v.light, 3.x.85.

Cetonia cuprea, single adult bred through from a larva collected from the Loch Garten RSPB reserve in Speyside; in a *Formica* nest on 4.vii.85.

HEAL, N.F.—*Lebia crux-minor* (L.) Ditchling, Sussex, 19.v.84 and 30.v.85; *Cryptocephalus parvulus* (Müller), Elsted Common, Surrey, 8.vii.85; *C. punctiger* (Payk.), Horsell Common, Surrey 14.v.85 (bred).

Kentish beetles (mostly 1985): *Endomychus coccineus* (L.), Stodmarsh, 27.viii; *Platycis minutus* (F.), Goudhurst, 7.ix; *Chrysolina brunsvicensis* (Grav.), Goundhurst, 7.ix; *Strangalia quadrifasciata* (L.), Stodmarsh, 27.viii; *Apion pallipes* (Kirby), Newnham, 26.x; *A.intermedium* (Eppelsheim), St Margaret's-at-Cliffe, 24.ix; *Curculio rubidus* (Gyll.), Littlebourne, 27.viii; *Tychius tibialis* (Boheman), Deal, 10.viii; *Gymnetron collinum* (Gyll.), Gillingham, 30.viii. (bred); *Cercyon laminatus* (Sharp), Sittingbourne, 16.vii.84, MV light; *Meligethes solidus* (Kugelann), Gillingham, 28.vi; *Rhynchaenus populi* (F.), Stodmarsh, 14.x.84; *Mecinus janthinus* (Germar), Sittingbourne, 2.vi.84, 23.vi.85; *Drilus flavescens* (Fourcroy), Gillingham, 27.vi, 4.vii; *Oodes helopioides* (F.), Westbere, 4.v.; *Amara montivaga* (Sturm), Lydden Hill, 20.vii; *Adrastus rachifer* (Fourcroy), Ham Fen, 10.viii; *Micrambe villosus* (Heer), St Margarets-at-Cliffe, 24.ix; *Odacantha melanura* (L.), Westbere, 4.v; *Mordellistena neuwaldeggiana* (Panzer), Deal, 10.viii; *Omaloplia ruricola* (F.), Stockbury, 16.vi.

HODGE, P.J.—Four species new to Sussex: *Aclypea opaca* (L.), Wilmington, on *Rumex acetosella* near rabbit warren, 19.v.85. (*Thanatophilus sinuatus*, a similar species, but more frequent, was exhibited for comparison.) *Bledius subniger* Schneider, Thorny Island, on sandy shore, 11.vii.85. *Lissodema cursor* (Gyll.), Ringmer, sweeping beneath old ash tree, 24.vii.85. *Phylan gibbus* (F.), East Head Dunes, 9.vii.85.

Other species: *Dyschirius angustatus* (Ahrens), Rye Harbour, East Sussex, Sandy pond bank, 24.v.85. *Tachys parvulus* Dejean, Uckfield, East Sussex, on concrete path in garden at roots of *Sagina procumbens*, 26,ix.85. *Tychobythnius glabratus* (Rye) Detling Downs, Kent, in moss, 20.iv.85. This very rare species is associated with the ant *Ponera coarctata*. *Aphanisticus pusillus* (Olivier), Detling Downs, Kent, in moss, 20.iv.85. *Dryophilus anoboides* (Chevrolat), Near Herringswell, Suffolk, on dead broom twigs, 14.vi. 85. *Malachius aeneus* (L.), South Gorley, Hampshire, 16.vi.85. *Meligethes solidus* (Kugelanm), Collyweston, Northamptonshire, on rockrose, 11.viii.85. *Halyzia sedecimuttata* (L.), Duncton Chalkpit, West Sussex, 1.vi.85. *Corticaria umbilicata* (Beck), Eridge, East Sussex, at roots of grass in heathy woodland clearing, 17.iv.85. *Phalacrus championi* (Guill.) Windsor Great Park, Berkshire, sweeping under old oak, 29.vi.85. *Strangalia nigra* (L.), Chailey

Common, East Sussex, 15.vi.85. *Mantura matthewsi* (Curtis) Lewes, East Sussex, on rockrose, 4.vii.85. *Pilemostoma fastuosa* (Schaller), Lewes, East Sussex, on *Inula conyza*, 27.v.85. *Anoplus roboris* Suffrian, Fairwarp, East Sussex, on alders, 16.v.85. *Bagous collignensis* (Herbst) Brockenhurst, Hampshire, in pond, 1.vi.85. *Ceutorhynchus mixtus* (Mulsant & Rey), Gorley Hill, Hampshire, on *Corydalis clavicula*, 16.vi.85. *Tychius parallelus* (Panzer), Barton Mills, Suffolk, on broom, 14.vi.85. *Gymnetron collinum* (Gyllenahl), Lewes, East Sussex, on *Linaria vulgaris*, 17.viii.85. *Mecinus collaris* Germar, Thorney Island, West Sussex, pupae in galls on stems of *Plantago maritima*, 11.vii.85.

HYMAN, P.S.—Interesting Coleoptera collected during 1985. *Bagous collingensis* (Herbst), in field, Pembrey Forest, Carmarthenshire, 6.viii.85; *B.glabrirostris* (Herbst), Ffrwd, Carmarthenshire, 6.viii.85; *Tychius parallelus* (Panzer), Forest Heath, Mildenhall, West Suffolk, 14.vi.85; *T.quinquepunctatus* (L.), Kenfig, Glamorganshire, 11.viii.85; *Apion astragali* (Payk.) Bedford Purlieus, Northamptonshire, 31.vii.85; *Acalles roboris* Curtis, Wychwood Forest, Oxfordshire, 28.vii.85; *A. misellus* Boheman, Wychwood Forest, Oxfordshire, 29.vi.85; *Hypera diversipunctata* (Schrank), Mouse Hall, Thetford, Norfolk, 21.viii.85; *Bytiscus betulae* (L.), Blackmoor Copse, Wiltshire, 2.vi.85; *Rhynchaenus pratensis* (Germar), Collyweston Quarry, Northamptonshire, 22.vii.85; *Ceutorhynchus pulvinatus* Gyll., Great Carr, Thetford, Norfolk, 21.viii.85; *C.rapae* Gyll., Forest Heath, Mildenhall, Suffolk, 7.vii.85; *C. viduatus* (Gyll.), Castlemorris, Western Cleddau, Pembrokeshire, 10.viii.85; *Ptinomorphus imperialis* (L.), Wychwood Forest, Oxfordshire, 15.vi.85; *Melasis buprestoides* (L.), Bentley Wood, Wiltshire, 2.vi.85; *Ampedus cardinalis* (Schiodte), Windsor Great Park, Berkshire, 8.vi.85; *Rhagonycha translucida* (Krynicki), Wychwood Forest, Oxfordshire, 29.vi.85; *Psylliodes luridipennis* Kuts, Lundy, 14.vii.85; *Phyllobrotica quadripunctata* (L.) Great Carr, Thetford, Norfolk, 21.viii.85; *Mantura chrysanthemi* (Koch), Lundy, 15.vii.85; *Chrysolina fastuosa* (Scop.), Castlemorris, Western Cleddau, Pembrokeshire, 10.viii.85; *Altica ericeti* (Allard), Mouse Hall, Thetford, Norfolk, 21.viii.85; *Orsodacne lineola* (Panzer) dark blue variety, Blackmorr Copse, Wiltshire, 2.vi.85; *Pseudocistela ceramboides* (L.), High Standing Hill, Windsor Forest, Berkshire, 8.vi.85; *Orchesia minor* Walker, Great Carr, Thetford, Norfolk, 21.viii.85; *Dryophilus anoboides* Chevrolat, Forest Heath, Mildenhall, Suffolk, 7.vii.85; *Synchita separanda* (Reitter), Windsor Great Park, Berkshire, 8.vi.85; *Molorchus minor* (L.), Wychwood Forest, Oxfordshire, 29.vi.85 collected by B. J. Tigar; also taken at Bentley Woods, Wiltshire, 2.vi.85; *Quedius ventralis* (Aragona), High Standing Hill, Windsor Forest, Berkshire, 8.vi.85; *Aleochara ruficornis* Grav., Waterperry Woods, Oxfordshire, 28.v.85; *Stenus fornicatus* Steph., Ludham Marsh, Norfolk, 17.viii.85; *Hydaticus transversalis* (Pontoppidan), Upton Fen, Norfolk, 17.viii.85; *Bidessus unistriatus* (Schrank), Home Mere and West Mere, Thetford, Norfolk, 11.x.85; *Hydrochus carinatus* Germar, Bagmore Pit, Thetford, Norfolk, 11.x.85.

JONES, R.A.—Some beetles associated with trees. Lurgashall, West Sussex, December 1984: a selection of beetles from a dead standing oak tree including *Pycnomerus fuliginosus* Erichson, discovered new to Britain in 1962 and now known from several localities in Sussex; *Thymalum limbatus* (F.); *Trox scaber* (L.), and others.

Windsor Forest, April 1985: *Dryopthorus corticalis* (Payk.), under bark of a log in runs of the ant *Lasius brunneus* (Latr.) (also exhibited); *Batrisodes delaporti* (Aube) in red birch wood also infested with *L.brunneus*. These two species of beetles were first discovered new to Britain in Windsor, by Donisthorpe in the 1920s. *Cicones* *undatus* (Guerin) under sycamore bark, discovered new to Britain in 1984, and exhibited along with the original British member of the genus *C. variegatus* (Hellwig). *Enicmus brevicornis* (Mannerheim) another rare beetle associated with sycamore, and also curious to find in this predominatly oak forest.

Hampstead Heath, May 1985: beetles found in wood mould and leaf litter from a large open hole in the side of an old poplar. *Quedius ventralis* (Aragona); *Leptinus testaceus* Müller (a blind species) and *Euophryum confine* (Broun). Closely related to *Euophryum* is *Pentarthrum huttoni* Wollaston. A specimen was shown from frass in a hole in a large ash, Willesden Green, London NW2.

Richmond Park, some beetles bred from spiders' webs: *Ctesias serra* (F.), *Anthrenus fuscus* Olivier and *Trinodes hirtus* (F.). All the larvae of these species have long stiff bristles, perhaps to protect them from the depredations of the spiders.

Along with the specimens in these exhibits, photographs of the adults, the larvae of the beetles from spiders' webs, and a selection of views of the localities were also shown.

KEY, R.—Recent notable Coleoptera.

Yorkshire: *Nebria livida* (L.), Cayton Bay, rediscovered after about thirty years; *Pterostichus macer* (Marsham), also Cayton Bay, very uncommon this far north; *Laemostenus terricola* (Herbst), Cockayne Moor, normally synanthropic; *Agonum livens* (Gyll.), Wheldrake Ings; *Licinus depressus* (Payk.), Wharram Chalk Quarry, only three recent northern records; *Lebia chlorocephala* (Hoffman), South Cave, second Yorkshire record in 30 years; *Omias mollinus* (Boheman), Wharram quarry, very rare species; *Meligethes subrugosus* (Gyll.), Kiplingcoates Quarry, uncommon species omitted in error from current checklist; *Scaphidema metallicum* (F.), Askham Bog and East Dale.

Cumbria: *Nebria nivalis* (Payk.), Scafell Summit, a survey of Cumbrian peaks over 3000 feet in 1985 failed to find additional localities.

Radnorshire: *Trichius fasciatus* (L.), Rhos Goch, common throughout the county; *Blethisa multipunctata* (L.), Rhos Goch, uncommon species, very abundant in short cropped fen vegetation during dry spell; *Elaphrus uliginosus* F., Aberithon Turbary, a single specimen among dozens of *E. cupreus; Cyanostolus aeneus* (Richter), Builth Wells, abundant under bark of driftwood oak in River Wye, normally very uncommon; *Philonthus rubripennis* Stephens, Presteigne Withy Beds, species common in vegetated shingle by most Radnor rivers; *Donacia obscura* Gyll., Aberithon Turbary.

Breconshire: *Pyrrhidium sanguineum* (L.) Llysdinam Park, extremely rare species regularly found only at Moccas. This specimen landed on the exhibitor's shoulder while he was drinking coffee! No source population found to date.

Huntingdonshire: *Diaperis boleti* (L.), very rare, this appears to be the first UK record since the 1950s and the first outside Hampshire since the turn of the century.

Anglesey: *Hypocaccus rugiceps* (Dufts.), Rhosneigr Dunes, usually very uncommon species, very abundant all over dunes; *Anthicus bimaculatus* Newborough Warren.

Northamptonshire: *Tanymecus palliatus* (F.), Great Morton Sale, very uncommon species, found on nettle in old quarry; *Trachys scrobiculatus* Kiesen., Great Byards Sale, local species, swept in woodland ride.

MCCLENAGHAN, I.—*Cicindela campestris* L., an aberration having yellow streaks on the middle of the elytra, Mark Ash Wood, New Forest, vi.1984. *Uleiota planata* (L.), 29.v.85, Epping Forest, S.Essex, taken jointly with David Nash, new to Essex. *Orsodacne lineola* (Panzer) and *O.lineata* var. *humeralis*, S.Thorndon Park, Essex, 4.vi.84. *O. cerasi* (L.) Rivenhall, Essex, TL8416. *Cossonus parallelepipedus*

(Herbst), S.Thorndon Park, vi.85, new to Essex. *Osphya bipunctata* (F.), S.Thorndon Park, 25.v.85, beaten from hawthorn: rarely taken outside the Huntingdon area and the first seen in Essex for many decades. *Quedius ventralis* (Aragona), in wet rot hole in chestnut, N.Thorndon Park, 15.iii.85, third Essex locality. *Malachius vulneratus* Abeille, Canewdon saltmarsh, Essex, 9.vii.77 and 30.vi.85, widespread in Essex, but rare elsewhere. *Megarthrus hemipterus* (Ill.), Epping Forest, 18.vii.82, new to Essex. *Mesosa nebulosa* (F.), Running Water Wood, S.Essex, TQ5682, 9.vi.85, not seen in Essex for many years. *Anommatus duodecimstriatus* (Müller), on root of dead *Choisia* in the exhibitor's garden, TQ6292, new to Essex. *Procraerus tibialis* (Bois), on hornbeam in a wood near N.Thorndon Park, 17.ii.80. *Athous campyloides* Newman, in moth trap in garden, TQ6292, vi.83. *Cionus tuberculosus* Scop., Running Water Wood, 9.vi.85, much rarer than *C. scrophulariae* in S.Essex.

Owen, Prof J.A.—A number of beetles from Scotland, including: *Thinobius praetor* Smetana and *Hydrosmectina subtillisima* Sharp, Glen Feshie, July 1985; *Atheta (Acrotona) sylvicola* (Kraatz) Aviemore, September 1985; *Lamprinodes saginatus* (Grav.), *Byrrhus arietinus* Steff, *Cryptophagus lapponicus* Gyll., *Atomaria contaminata* Erich., *Judolia sexmaculata* (L.) and *Leptura sanguinolenta* L. from Loch Garten, July 1985; and *Epuraea variegata* Herbst from Cannich, Inverness-shire, May 1985.

Porter, D.A.—*Axinotarsus marginalis* Laporte, Aston, Hertfordshire, 6.viii.78, sweeping herbage under trees by stream. Probably the first Hertfordshire record for this species which was first taken in Britain by D. Appleton in Hampshire in 1966. *Tachys micros* (Fischer von Waldheim) Eype, Dorset, 17.iv.79. Pleasing to note that this species is still thriving in this locality. It was also found in numbers in April 1981 at Charmouth, Dorset. *Bagous czwalinai* Seidlitz, Brockenhurst, Hants, 31.v.85. 11 were found in old sand/gravel pit containing *Juncus* spp. and *Potamogeton* spp. A single specimen was taken here by P. Hodge in 1983. Most records for this species are apparently singletons. *Triplax lacordairii* Crotch, Brockenhurst, Hants, 13/14.vii.85. Several specimens of this uncommon species were taken in company with *T. aenea* on fungus in the rot pocket at the base of the trunk of a holly tree. *Tachys parvulus* (Dejean), Waterford, Hertfordshire, 5.viii.78. Running on gravel near base of grass tussock in small pit. This was possibly the first Hertfordshire record. The same species was taken at Hailsham, East Sussex, 31.vii.85, running on a path by a lawn edge. It had possibly bred in the garden at roots of grass in this rather wet season! *Phloiotrya vaudoueri* Mulsant, Brockenhurst, Hants, 13/14.vii.85. Ten were found under dead bark of a small dead holly.

Shirt, Dr D.B.—Beetles of the ancient Caledonian pine forests. *Cetonia cuprea* F., Loch Garten, 4.vii.85; *Selatosomus impressus* (F.), Loch Garten, 4.vii.85; *Dictyoptera aurora* (Herbst), Loch Garten, 30.vi.85; *Zilora ferruginea* (Payk.), Loch an Eilein, 2.vii.85; *Asemum striatum* (L.), Speyside, 2.vii.85; *Rhagium inquisitor* (L.), Loch Garten, 30.vi.85; *Judolia sexmaculata* (L.), Loch Garten, 4.vii.85; *Acanthocinus aedilis* (L.), Speyside, 2.vii.85; *Donacia obscura* Gyll., near Loch Garten, 30.vi.85.

Some southern longhorn beetles: *Rhagium bifasciatum* F., New Forest, 3.vi.84, unusual colour variety; *Leptura rubra* F., Thetford, 15.viii.85; *Leptura sexguttata* F., New Forest, 2.vi.85; *Agapanthia villosoviridescens* (Deg.) Thetford, 14.vi.85.

HEMIPTERA

The Hemiptera exhibits for 1985 were slightly less exciting than in previous years, in that there were only four. Despite this, a number of interesting things appeared:

Mr D. Appleton showed the unusual *Velia saulii;* Mr D. Porter the graceful *Trigonotylus psammaecolor;* Mr P. Hodge the Mediterranean newcomer *Tuponia carayoni* and Messers P. Kirby and S.J.J. Lambert a fine selection of 31 species including the lovely *Corizus hyoscyami.*

Appleton, D.—*Deraeocoris scutellaris* (Fabricius), one swept from healthland, New forest, 6.vii.85; and *Velia saulii* Tamanini, two exhibited of several examples hibernating at roots of grass, Lower Test, 26.x.85, near where a dead specimen was found under loose bark on a log, 17.x.85; both species are new to Hampshire.

Hodge, P.J.—Three species new to Sussex: *Conastethus griseus* Douglas and Scott, Thorney Island, by sweeping salt-marsh, 11.vii.85; *Tuponia carayoni,* East Head Dunes, on Tamarisk, 11.vi.85, a mediterranean species first discovered in the Isle of Wight a few years ago. *Capsodes sulcatus* (Fieber), Chichester Harbour local nature reserve, 9.vii.85. A slight easterly extension of the known British range of this very local species.

Other species: *Lasiosomus enervis* (Herrich–Schaffer), Newhaven, East Sussex, at base of chalk cliffs, 21.iv.85. *Cymus obliquus* Horvath, near Uckfield, East Sussex, on *Scirpus sylvaticus,* 11.vi.85. *Hoplomachus thunbergi* (Fallén), near Nottingham, on *Pilosella officinasum,* 14.vii.85.

Kirby, P. & Lambert, S.J.J.—Heteroptera captured in 1985:

1. Characteristic species of the Norfolk and Suffolk Breckland: *Aulia acuminiata* (L.), *Eurygaster maura* (L.), *Legnotus picipes* (Fallen), *Odontoscelis dorsalis* (Fab.), *Arenocoris falleni* (Schilling), *Alydus calcaratus* (L.), *Rhopalus parumpunctatus* Schilling, *Peritrechus lundi* (Gmelin), *Graptopeltus lynceus* (Fab.), *Megalonotus praetextatus* (H.-S.), *Megalonotus sabulicola* (Thomson), *Coranus subapterus* (DeGeer), *Nabis pseudoferus* Remane, *Conostethus roseus* (Fallen), *Plinthisus brevipennis* (Latreille), *Polymerus unifasciatus* (Fab.)

2. Species from the coasts of Devon and Cornwall: *Arenocoris falleni* (Schilling), including a melanic specimen, *Dicranocephalus agilis* (Scopoli), *Henestaris laticeps* (Curtis), *Beosus maritimus* (Scopoli), *Nabis pseudoferus* Remane, *Corizus hyoscyami* (L.), *Rhyparochromus pini* (L.), *Megalonotus dilatatus* (H.-S.)

3. Species from Dungeness, Kent: *Tropistethus holosericeus* (Scholtz), *Pilophorus clavatus* (D. & S.)

4. Species from East Midlands woods and gravel pits: *Agnocoris reclairei* (Wagner), from Cambridgeshire gravel pits; *Acalypta carinata* (Panzer), *Scolopostethus grandis* Horvath and *Lygus wagneri* Remane from Morkery Wood, Lincs.; *Megalonotus antennatus* (Schilling) and *Acompus rufipes* (Wolff) from Bedford Purlieus, Cambs.

Porter, D.—*Trigonotylus psammaecolor* Reuter, Norfolk, Great Yarmouth, 23.viii.84. Four specimens of this species taken by sweeping two clumps of *Ammophila arenaria,* apparently new to the Norfolk list, the late date of capture is also of interest.

MICROLEPIDOPTERA

Agassiz, Rev. D.J.K.—*Acrolepiopsis betulella* Curtis, a series bred from *Allium ursinum* from Inverpolly NNR, West Ross: a specimen had been taken there by Dr M.R. Young in 1984; previous British specimens were taken at Castle Eden Dene, Co. Durham between 1837 and 1878 and one at Richmond, Yorks. *Scrobipalpa klimeschi* Povolny, a series taken at Chippenham Fen, Cambridgeshire, in June 1972 and 1973: identified at a BM(NH) workshop in February 1985.

BAKER, B.R.—*Pammene fasciana* L. f.*herrichiana* Hein., E. Berkshire, one, vi. 1985. *Dioryctria abietella* D. &. S. Larvae of a *Dioryctria* thought to be this species, found feeding in green cones of *Picea* in Unhill Woods, Berkshire, viii.1985; they are now overwintering except for one which produced a moth in ix.1985: *Picea* is not the usually recorded foodplant of *D.abietella* (See also Dr J.R. Langmaid's exhibit.)

BAKER, P.—*Alucita hexadactyla* L., Thorpe, Surrey, where it was common in a garden.

BEAUMONT, H.E.—*Nematopogon variella* (Brandt) A specimen taken in Wadworth Wood, South Yorks. (VC63) in 1904 by L. S. Brady and discovered in his collection at Doncaster Museum standing as *N. pilella* (D. & S.) The first English record. *Bankesia douglasii* (Stt.) Specimens taken on a sap-covered birch stump at Thorne Moors, South Yorks. (VC63) on 31.iii.1985 by Mr. M. Limbert. The first Yorkshire and north of England record. *Nemapogon ruricolella* (Stt.) A specimen taken at Denaby Ings, South Yorks. (VC63) on 28.vi.1984. Probably the first Yorkshire record, northern England records in MBGBI:2 are shown as unconfirmed. *Tinagma ocnerostomella* (Stt.) Reared in numbers from stems of *Echium* collected at Saltfleetby-Theddlethorpe Dunes NNR, Lincs. The most northerly British locality.

Pseudoswammerdamia combinella (Hbn.) Specimens taken at Denaby Ings, South Yorks. in 1984 and near Brodsworth, South Yorks. in 1985. The first VC63 records. *Scythropia crataegella* (L.) First recorded in Yorkshire at Old Rossington (VC63) in 1983. A larval web was found at the same locality in June 1985 and some of the moths reared exhibited. *Coleophora artemisicolella* Bruand Larval cases found on seeds of mugwort at Denaby Ings, South Yorks. (VC63) in September 1983 from which moths were reared in July 1984. The first Yorkshire record. *Aethes beatricella* (Wals.) A moth reared from a larva in a stem of *Conium* collected at Saltfleetby-Theddlethorpe Dunes NNR, Lincs. (VC54) in May 1985. The first Lincs. record? *Eucosmomorpha albersana* (Hbn.) A moth taken at Stainton Wood, South Yorks. (VC63) on 29.v.1985. The first VC63 record, otherwise known in Yorkshire only from the Scarborough area (VC62).

BLAND, Dr K.P.—*Nematopogon metaxella* Hbn., Milton of Drimmie Wood NNR, Perthshire (NO1650;VC 89), taken 23.vi.85: third Scottish record. *Caloptilia cuculipennella* Hbn., Arniston Engine, Midlothian (NT3361;VC 83), specimens beaten from overhanging vegetation, 2.iv.85: third Scottish record. *Acrolepiopsis betulella* Curtis, Roslin Glen LNR, Midlothian (NT2762;VC 83), two hibernating specimens beaten from overhanging vegetation, 2.iii.85: second Scottish locality. *Coleophora milvipennis* Zeller, Maggie Bowie's Glen, Midlothian (NT3960;VC 83), early case found on hazel, 22.vi.85: very under-recorded in Scotland. *C.paripennella* Zeller, Aberlady LNR, East Lothian (VC 82), reared from cases on *Cirsium arvense* collected 8.vi.85, moths emerged 4-11.viii.85. *Mompha miscella* D. & S., Fealar Gorge, Perthshire (NN9979;VC 89), reared from larvae mining leaves of *Helianthemum chamaecistus* collected 18.v.85, moth emerged 8.vii.85: second Scottish record. *Eana argentana* Clerck, Glen Tilt, Perthshire (NN9475;VC 89), rediscovered 18.viii.85: last seen there by F.G. Whittle, 20.vii.1920. *Acleris logiana* Clerck, Petersmuir Wood, East Lothian (NT48866;VC 82), hibernating specimen beaten 17.iii.85: substantiates old S.E. Scotland record. *Parapoynx stratiotata* L., Black Loches SSSI, Argyllshire (NM9231;VC 98), reared from pupa in case under water lily leaf collected 6.vii.85, moth emerged 13—25.vii.85: new to Scotland.

BRADFORD, E.S.—A selection taken or bred in 1985, including *Aethes margaritana* Haw., Faversham, Kent, series bred from yarrow.

BRETHERTON, R.F.—*Ostrinia nubilalis* Hbn., Bramley, Surrey, 3/4.x.85; thought to be immigrant.

BROTHERIDGE, D.—A small selection of the more interesting 1985 specimens from north Wiltshire, and some queries.

CHALMERS-HUNT, J.M.—The following taken or bred in 1985. *Acleris maccana* Treitschke, Trinafour, Perthshire, bred September from a larva on *Myrica gale*. *A. literana* L., one at light, Dungeness, Kent, 18.ix. *Cochylis flaviciliana* Westwood, Otford, Kent, bred August from larvae taken in 1984 on *Knautia arvensis*. *Acleris permutana* Duponchel, Dungeness, Kent, 18.ix. *Epinotia brunnichana* L. f.*brunneana* Sheldon, Rannoch, Perthshire, 19.viii.

CORLEY, M.F.V.—*Caloptilia hemidactylella* D. & S., Wychwood Forest, Oxfordshire, 17.x.85; the third British locality. *Depressaria badiella brunneella* Ragonot, Dungeness, Kent, 29.viii.85 and *D.badiella badiella* Hbn., Isle of Rhum, Inner Hebrides, 5.viii.84. *Anarsia lineatella* Zeller, reared from an apricot imported from Spain. *Pyralis* species taken in farm buildings, Faringdon, Oxfordshire, 1985: *P.lienigialis* Zeller, six males, four females; *P.farinalis* L., two males, two females.

DOBSON, A. H.—Microlepidoptera from North Hampshire (VC 12).

EMMET, Lt. Col. A.M.—*Stigmella samiatella* (Zell.) Barham, east Kent, 9.ix.85. New to VC 15. Although the most common oak-feeding nepticulid on the Continent, it is very local in Britain and mainly submaritime in the south-eastern counties. *Monopis weaverella* (Scott), Thorpness, east Suffolk, 3.ix.85. Confirms the open-circle record shown for VC 25 in *MBGBI* **2**: map 62 (p.187). *Caloptilia rufipennella* (Hbn.), St Margaret's Bay, east Kent, from larvae collected on 10.ix.85. New to east Kent; probably a recent colonisation from the Continent, since the site is well separated from other British localities. *Phyllonorycter roboris* (Zell.), Boxted (VC 19), 28.vii.85. New to Essex. *Ocnerostoma friesei* Svensson, Shapwick (VC 6), reared 13.xi.84. New to Somerset and the first British record of the 3rd generation (*Entomologist's Rec.J.Var.* **97**:175). *Phaulernis dentella* (Zell.), Grays Chalk Quarry, 29.vi.85 and Ashdon, 30.vi.85, new to Essex (VCs 18, 19).

Coleophora prunifoliae (Toll), Kewstoke and Lympsham, north Somerset (VC 6), reared 6-9.vi.85. New to Somerset. *Coleophora aestuariella* Bradley, St Osyth, reared 12-23.vii.85: a second locality from north Essex (VC 19). *Coleophora tamesis* Waters, High Wood, Duddenhoe End (VC 19), 8.vii.82. Recognised after larvae had been found in the same locality in September, 1985. The earliest Essex record. *Metzneria neuropterella* (Zell.), Lewes (VC 14), 18.viii.85. Confirmed records are needed for this species since many early records are likely to refer to *M. aprilella* (Herrich-Schäffer). *Anarsia lineatella* Zell. Reared from a larva in an imported peach by Mr K.G.W. Evans.

Phalonidia luridana (Gregson), Lewes, east Sussex, 18.viii.85. A rare species. *Adoxophyes orana* (F. v R.), Barham, east Kent, 9.ix.85. Still a rare species in Britain. *Pammene fasciana* (L.), Boxted (VC 19), 28.vii.85. Rare or under-recorded in north Essex, this being only the second record this century. *Anania verbascalis* (D. & S.) Only the second certain record for this species in VC 19 in the last 50 years.

FAIRCLOUGH, R. & A. J. (a) Singletons or short series of species taken or bred in 1985. *Lampronia fuscatella* Tengst., bred Surrey, with gall and pupa case. *Narycia inconspicuella* Stainton, bred Sussex. *Bacotia sepium* Speyer, bred Surrey. *Monopis imella* Hbn., Greatstone, Kent. *Phyllonorycter insignitella* Zeller, bred Kent with N.F. Heal; new county record. *Depressaria olerella* Zeller, bred Hants. *Agonopterix carduella* Hbn., bred Kent, *Centaurea nigra*. *Monochroa niphognatha* Gozmany, netted Stodmarsh, Kent. (b) A cushion cover, done in cross-stitch by R.F's granddaughter Janet (aged 10), depicting a totally unknown form of *Acleris cristana* D. & S. A note on the moth's numbers this year accompanies this.

HALL, N. M.—(a) A selection including: *Euchromius ocellea* Haw., Portland Bill, Dorset, taken at light, 21-11.ix.85. *Aethes beatricella* Wlgm., Portland Bill, bred from stems of *Smyrnium*. *Stigmella suberivora* Stt. bred from *Quercus ilex*; new to VC 22. *Triaxomera fulvimitrella* Sodoffsky, Bucklebury Common, Berks., bred fungus.

(b) A selection of microlepidoptera obtained in 1985 from the Vendée (France) and Huesca Province (Spain) including several species which are rare immigrants to the U.K.

HARPER, Dr M. and SIMPSON, Dr A.—*Stigmella* sp. new to Britain. Old mines found on *Sorbus torminalis* in 1981, in Herefordshire. Later, tenanted mines were found both on this and on *S.aria*. The species is unnamed so far. The first moths were reared in 1984. The species is bivoltine, the larvae appearing in July and September, the moths in May and June.

Agonopterix astrantiae Hein., bred from Gloucestershire and Herefordshire from *Sanicula europaeus* in 1984 and 1985: new species to the latter county and a rediscovery in the former. *Nematopogon pilella* D. &. S., moths taken flying over *Vaccinium myrtillus* in Herefordshire in 1977 and 1985; confirmed by genitalia examination.

HEAL, N.F.—*Phyllonorycter insignitella* Zeller, Herne Bay, Kent, bred 29.i/21.ii.85 ex mines in *Trifolium pratense* and *T.repens* collected 6.x.84; new to Kent. *Diplodoma herminata* Geoffroy, Darland Bank, Gillingham, Kent, 27.vi.85. *Psyche betulina* Zeller = *eppingella* Tutt, larval case, Oxshott, Surrey, 24.iv.85. *Solenobia inconspicuella* Stainton, Tilgate Forest, Sussex, bred 17/18.iii.85; Blean Wood, Kent, 24.iv.85. *Cosmopterix orichalcea* Stainton, Sellindge, Kent, 6.vii.85; later found to be breeding there on *Anthoxanthum odoratum*, Sweet Vernal Grass; new to Kent. *Lampronia fuscatella* Tengst., Brotherhood Wood, Dunkirk, Kent, bred 23.iv.85; Tilgate Forest, Sussex, bred 28.iii.85. *Caloptilia rufipennella* Hbn., St. Margarets-at-Cliffe, Kent, bred 26.ix/2.x.85 ex larvae 15.ix.85. *Bohemannia quadrimaculella* Boheman, Ham Fen, Kent, 10.viii.85; Stodmarsh, Kent, 27.viii.85. *Gelechia turpella* D. & S., Bexley, Kent, 17/25.vii.85. *Esperia oliviella* F., Winterbourne Wood, Dunkirk, Kent, 21.vii.85. *Coleophora* sp., Herne Bay, Kent, cases on *Cirsium* 15.ix.84, not bred, but size of case max. 16.25 mm. is extraordinary. *Coleophora machinella* Bradley, Milton Creek, Sittingbourne, Kent, bred 22.vii/8.viii.85. *Epinotia fraternana* Haworth, Lyminge Forest, Kent, 5.vii.85; new to Kent. *Cydia strobilella* L., Bedgebury, Kent, bred 25.iv/3.vi.85 ex fallen cones of *Picea abies* and *P.omorika*. *Microthrix similella* Zincken, Ebernoe, Sussex, at light, 11.vii.85. *Commophila aeneana* Hbn., Leysdown-on-Sea, Kent, 18.vi.85.

HECKFORD, R.J.—*Trifurcula griseella* Wolff, Branscombe, Devon, ex pupa amongst *Helianthemum* (almost certainly not the foodplant), 12.v.85; Branscombe, Devon, 1.vii.85. *Nemapogon wolffiella* Karsh. & Niel., Hembury Woods, nr. Buckfastleigh, Devon, 26.viii.85—a late date. *Phyllonorycter nigrescentella* Logan, Hembury Woods, Devon, ex larva 22.ix.85 on *Lathyrus montanus*, a previously unrecorded foodplant in this country. *Coleophora sylvaticella* Wood, Steps Bridge, Devon, ex pupa 30.iv.85-2.v.85, *Luzula sylvatica*. *Coleophora maritimella* Newman, Braunton Burrows, Devon, 23.vii.85; new to VC 4. *Elachista triseriatella* Stt. (gen. det, RJH), Brixham, Devon, 9.vi.84; new to Devon. *E. dispunctella* Dup., exhibited for comparison with *E.triseriatella*. *Oecophora bractella* L., Spitchwick, Devon, ex larva 2.v.85 dead birch stump; new to Devon. *Metzneria lappella* L., East Budleigh Common, Devon, ex larva 24-27.v.85 *Arctium* sp.: new to Devon. *Stenolechia gemmella* L., Hembury Woods, Devon, 29-31.viii.85. *Teleiodes decorella* Haw., Hembury Woods, 26-27.viii.85. *Bryotropha basaltinella* Zell. 16.vi.84, Brixham,Devon. *Mompha lacteella* Steph., Dewerstone, Devon, ex larva 18.v.85 *Epilobium montanum* (coll. 13.iv.85); the textbooks give the larva as occurring in viii on *E.hirsutum. M.propinquella* Stt., exhibited for comparison with *M.lacteella. Cochylis pallidana* Zeller. Kynance Cove, Cornwall, 7.vi.84. *Celypha rurestrana* Dup., Ilfracombe, Devon, 26.vii.85; new to Britain. *Olethreutes lacunana* D. & S., exhibited for comparison with *C.rurestrana. Eudemis profundana* D. & S., Hembury Woods, Devon, 26.viii.85, an extreme form having the forewings ochreous with some blue grey scaling, together with the normal form. *Pelochrista caecimaculana* Hbn., Orley Common, Devon, 3.vii.85; new to Devon. *Cydia molesta* Busck, Plympton, Plymouth, ex larva 3.ix.85 imported peach. *Ostrinia nubilalis* Hbn., East Budleigh, Devon, ex larva 1.vi.85; new to Devon.

KNILL-JONES, Dr R.P.—*Mompha epilobiella* D. & S., Glasgow (VC 76), bred; Old Kilpatrick (VC 99), bred; new to Scotland. *Biselachista trapeziella* Stt., Glasgow (VC 77), bred two sites; Glasgow (VC 76), mines. *Eana argentana* Clerck, Glen Tilt, 18.viii.85. *Hysterosia inopiana* Haw., Glasgow (VC 77), confirmation of old Scottish record. *Phalonidia alismana* Rag., Glasgow (VC 77, VC 99); Old Kilpatrick (VC 99), bred; new to Scotland. *Endothenia ericetana* Humph. & Weston., Glasgow (VC 77); confirmation of old Scottish record. *Eucosma hohenwartiana* f. *fulvana* Steph., Galloway (VC 73); new to Scotland.

KNILL-JONES, S.A.—*Palpita unionalis* Hbn., 14.x.85. *Euchromius ocellea* Haw., 23.ix.85. *Dioryctria mutatella* Fuchs (?), 16.vii.85. *Gatoptria falsella* D. & S., 27 & 28.vii.85. *Lozotaeniodes formosanus* Geyer, 15.vii.85. *Alispa angustella* Hbn., 31.viii.85. *Alucita hexadactyla* L., 11.ix.85. *Morophaga choragella* D. & S., 4.vi.85. All taken at Freshwater, Isle of Wight.

LANGMAID, Dr J.R.—*Caloptilia rufipennella* Hbn., St. Margaret's Bay, four, bred sycamore ix.85; new to Kent. *Phaulernis dentella* Zeller, Torbryan, Devon, two, 14.vi.85. *Elachista collitella* Dup., Noss Mayo, Devon, four, 13.vi.85; locality courtesy of R.J. Heckford. *E. littoricola* Le March., Hurst Castle, Hants, four, 4.vi.85; locality courtesy of E.H. Wild. *E.cingillella* H.-S., Linton, Herefordshire, 25.v.82; new to Herefordshire, and over 100 miles from only other known locality. *Syncopacma suecicella* Wolff, Cornwall, four bred 1985, *Genista pilosa*; locality R.J. Heckford. *Euchromius ocellea* Haw., Southsea, Hampshire, one at light, 6.x.85. *Dioryctria* sp., two bred Moulsford, Berks, larvae 10.viii.85 in green cones of *Picea abies*, moths emerged 22-23.ix.85.

MICHAELIS, H.N.—*Eana penziana* T. & B. ssp.*colquhounana* Barr., Great Orme, Llandudno (VC 49), occasional. *Euzophera pinguis* Haw., Llangollen (VC 50), taken by S. Coxey, 1984. *Aphelia unitana* Hbn., Bodysgallen near Llandudno (VC 49), 1984; new to VC 49. *Agonopterix astrantiae* Hein., Millers Dale, larvae very scarce on *Sanicula*, 1983; new to VC 57. *A.bipunctosa* Curt., Litton Dale, one among *Centaurea scapiosa*, 1985; new to VC 57. *Glyphipterix haworthana* Steph., Cors Bodgynedd near Trefriw (VC 49), one bred 1985; also found in VC 50 and VC 52.

PARSONS, M.—*Euzophera bigella* Zell., from an Italian peach from an Eastbourne greengrocer; second British record. *Ethmia bipunctella* Fab., Ninfield, Sussex, one 26.v.85, one 30.viii.85. *Dolicarthia punctalis* D. & S., Solva, Pembrokeshire, 9.vii.85. *Infurcitinea argentimaculella* Stt., Hampshire. *Argyresthis arceuthina* Zeller, Hampshire. *Epiblema foenella* L., Hampshire. *Limnaecia phragmitella* Stt., Pevensey and Lullington Heath NNR, Sussex. *Cydia internana* Guen., Lullington Heath NNR, 27.v.85, 16.vi.85. *Pammene aurantiana* Stdgr., Friston, Sussex, 25.vii.85. *Agonopterix ulicitella* Stt., Ninfield, 24.ix.85. *Batia unitella* Hbn., Vert Wood, Sussex, 14.vii.85.

PELHAM-CLINTON, E.C.—British microlepidoptera collected, or discovered, in 1985. *Bohemannia quadrimaculella* (Boheman), Preston-on-Wye, Hereford, 21.vii.1985, under alder leaf. *Phyllonorycter staintoniella* (Nicelli), St. Agnes, Cornwall, two bred 17.vi.1985, from mines on *Genista pilosa*. *Phaulernis dentella* (Zell.), Torbryan, Devon, 14.vi.1985, three taken on *Chaerophyllum temulentum* flowers. *Coleophora* sp., East Meon, Hants., 1.vi.1985, vacated case and mined leaves of *Fragaria vesca*: this might be *C. gryphipennella* (Hbn.) on the wrong food plant, or *C. albicostella* (Duponchel), a continental species which feeds on *Fragaria* and *Potentilla*. *Elachista littoricola* Le Marchand, Hurst Castle, Hants. (E.H. Wild's locality), 4.vi.1985, six taken on the wing. *Elachista collitella* (Dup.), Noss Mayo, Devon (R.J. Heckford's locality), 13.vi.1985, six taken on the wing. *Syncopacma suecicella* (Wolff), Lizard, Cornwall, three bred 4-7.vii,1985, from larvae on *Genista pilosa*. *Cydia pactolana* (Zell.), Botley Wood, Fareham, Hants., 2.vi.1985, taken on the wing. *Pammene ochsenheimeriana* (Lien. & Zell.), Botley Wood, Fareham, Hants., 2.vi.1985, taken on the wing. *Celypha rurestrana* (Dup.), Tintern, Mon., 16.vi.1962, taken at light: a specimen of this species was collected by R.J. Heckford in Devon in 1985: after this news reached me I searched for it in my series of *Olethreutes lacunana* (Den. & Schiff.) and found this male specimen, the identity confirmed by dissection. *Euchromius ocellea* (Haw.), Axminster, Devon, 12.x.1985, at light. *Diasemiopsis ramburialis* (Dup.), Axminster, Devon, 8.x.1985, at light.

SATTLER, Dr K.—*Scrobipalpa stangei* (Hering) in Britain. Specimens of *Scrobipalpa stangei* (Hering), a species of Gelechiidae not previously known from Britain, were discovered in the Bankes and Whittle collections (BMNH) misidentified as *Scrobipalpa samadensis plantaginella* (Stainton). Most of the specimens are without data but two were collected on the Isle of Wight, Yarmouth, 11.vii.1882 (collector unknown).

On the Continent *S. stangei* is known mostly from coastal habitats in Fennoscandia and northern Germany but also from inland salt areas in Germany and Austria. The larva feeds in the roots and leaves of Sea Arrow-grass (*Triglochin maritima*) and Marsh Arrow-grass (*Triglochin palustris*).

An attempt by members of the Microlepidoptera Section (BMNH) to find *S. stangei* in the Isle of Wight in June 1985 was unsuccessful.

SIDDONS, P.N.—The following from Cornwall. *Micropterix aureatella* Scop., Ladock Wood (VC 2), 30.v.84. *Bucculatrix nigricomella* Zeller, Ellanglaze (VC 1), 13.vi.85. *Caloptilia cuculipennella* Hbn., Pendower (VC 2), bred 13.ix.85 ex larvae. *Ypsolopha mucronella* Scop., St. Clement (VC 2), bred 6.viii.85 ex larvae. *Coleophora caespititiella* Zell., Trendeal (VC 2), 16.vi.85. *C.salicorniae* Wocke, Newquay (VC 1), 30.vii.85. *Elachista regificella* Sircom, Bodmin (VC 2), 23.vii.84. *Agonopterix ciliella* Stt., Chyverton (VC 1), bred 6.viii.85 ex larvae. *A.liturella* D. & S., Perranporth (VC 1), bred 21.vii.84 ex larvae. *A.bipunctosa* Curt., Perranporth (VC 1), bred 11.vii.85 ex larvae. *A.kuznetzovi* Lvovsky, Kynance Cove (VC 1), bred 4.viii.85 ex larvae. *Bryotropha mundella* Douglas, Padstow (VC 1), *Epinotia tedella* Clerck, Trendeal (VC 2), 9.vi.84. *E.fraternana* Haw., Ladock (VC 2), 27.vi.84.

SIMPSON, Dr A.N.B.—*Agonopterix astrantiae* Hein., locally abundant in beech woods near Cranham, Gloucestershire, bred *Sanicula* vi.85. *Blastodacna atra* Haw., Colletts Green,Worcestershire, bred *Malus* cultivar shoots v.85; new county record. *Pseudotelphusa scalella* Scop., Sutton Park, Birmingham, beaten from birch trunk, 16.vii.85.

SMITH, Dr F.H.N.—A series of photographs illustrating the life history of a grey Nepticulid discovered in a coastal habitat near Perranporth in 1984. The larva mines *Lotus corniculatus*. It may prove to be *Levarchama eurema* Tutt, though there has been some doubt regarding its identity.

STERLING, Col. D.H.—(a) *Elachista luticomella* Zeller, bred from *Dactylis*; second record from VC 12. *E.unifasciella* Haw., bred from *Dactylis*; new to Hampshire.

Pulicalvaria piceaella Kearf., taken at light, Winchester (VC 11) and new to Hampshire; there are about half a dozen records of this species for England since it was first discovered here in 1952, all others being in London area or the South-East. See *Entomologist's Rec.J.Var.*, 97:139(1985). *Acleris lorquinana* Dup., Gosport (VC 11), three forms bred from *Lythrum*: typical, *uliginosana* H. & W. and *striana* Sheldon.

(b) Exhibited on behalf of J.C.K. Wells. *Euchromius ocellea* Haw., Winchester, Hants., at light, 5.iv.85.

Sterling, M.J.—*Elachista regificella* Sirc., Leicestershire, bred from *Luzula sylvatica*; new country record. *E.apicipunctella* Stt., Derbyshire, bred from *Dactylus*; new county record. *E.revinctella* Zell., Derbyshire and Leicestershire, bred from *Deschampsia*; new county records. *Aethese iercei* Obraz., Derbyshire Dales, flying by day. *Gymnancyla canella* D. & S., Gibraltar Point, Lincolnshire, bred from larvae on *Salsola.*

Sterling, P.H.—*Coleophora niveicostella* Zeller, third known Hampshire specimen, flying over downland by day. *Eupoecilia ambiguella* Hbn., with larval hibernating cases; when full fed, the larvae leave the *Frangula* berries and descend to the ground to construct a portable case, after which they ascend, *Coleophora*-like, up to a maximum of about 8 inches and fix the case for hibernation. *Cydia pallifrontana* L. & Z., flying by day over *Astragalus* in Wytham Wood, Oxford. *Euchromius ocellea* Haw., one taken in Hampshire (VC 11) at light.

Tweedie, M.W.F.—Species taken at Playden near Rye, Sussex in 1985, and recorded from here for the first time. *Platytes alpinella* Hbn., *Ephestia parasitella* Stdgr.ssp.*unicolorella* Stdgr.

Warren, R.G.—Species new to Staffordshire. (a) Industrial waste land/disused railway lines. *Eucosma pupillana* Clerck, Biddulph, 14.vii.76. *Cydia compositella* F., Apedale, 22.vi.81. *Homoeosoma sinuella* F., Gnosall, 19.vi.85. *Leoptilus osteodactylus* Zell., Apedale, 19.vii.82. (b) Oak/birch woodland. *Ypsolopha sylvella* L., Bishops Offley, 24.viii.76. *Pammene obscurana* Steph., Trentham, 3.vi.79. *P.fasciana* L., Cannock Chase, 22.vii.77. (c) Wet meadow. *Platyptilia isodactylus* Zeller, Aqualate, 16.viii.80.

Young, Dr M.R.—1 *Acrolepiopsis betulella* Curtis: 1 specimen netted 9 May 1984 and 4 specimens from a series of 18 reared from flower buds of *Allium ursinum* collected 2 June 1985. Buds were found to harbour larvae when some failed to open properly due to larval spinnings and damage. These specimens are the first ever reared in Britain. Cocoons show the open mesh structure characteristic of the genus. Locality: Inverpolly National Nature Reserve, Wester Ross.

2. Possible larval feeding signs of *Callisto coffeella* Zett. A leaf of *Salix phylicifolia* showing a short mine, leading to a "*Phyllonorycter*-type" blotch, and also a folded leaf edge. These may well be the larval feeding signs of *C. coffeella* since the leaf was collected from a sallow within 100 metres of the site of discovery of the only British specimen. Leaf collected 6.ix.84, Locality: Glen Callater, Aberdeenshire.

3. *Acleris abietana* Hbn. 3 specimens bred from pupae found within obliquely set crossed needles of *Abies grandis*, presumed to be the foodplant. Pupae collected September 1982 Near Kemnay, Aberdeenshire. The only bred British specimens.

Uffen, R.W.—Larvae of *Coleophora palliatella* Zincken from Bagley Wood, Oxford, with their patches of pin-head mines on oak and scattered mines of *C.lutipennella* Zeller and *C.flavipennella* Dup. for comparison.

Wilson, D.E.—*Euchromius ocellea* Haw., Dungeness, Kent, 5.x.85.

Youden, G.H.—*Agriphila tristella* D. & S., extreme melanic, Dover, Kent, light trap, 8.viii.85.

HYMENOPTERA

Despite having more British species than any of the other insect orders, the Hymenoptera were once again thinly represented at the Annual Exhibition. Why this should be so is unclear, since hymenopteran biology is no less interesting than that of beetles, flies or moths. Identification can be difficult in some families but recently published Royal Entomological Society keys on solitary wasps, cuckoo wasps, and the forthcoming key to bees, should improve this situation and, hopefully, will encourage more interest in the Hymenoptera.

ALLEN, Dr. A. A.—Two boxes of various hymenopterous families taken in 1985 were shown. Among the more interesting species were the wood wasp *Xiphydria prolongata* Geof. taken at Littlehampton, Sussex, on 22.viii; the potter wasp *Eumenes coarctatus* L. taken 29.viii at Hankley Common, Surrey; a spider wasp *Anoplius nigerrimus* Scop. taken 21.viii at Lewes, Sussex, and a solitary wasp *Tiphia femorata* F. at Hankley Common, Surrey, on 29.viii. The sphecid wasps included *Astata pinguis* Dahl. found in some numbers on *Salix caprea* at Dawlish Warren, Devon, on 5.viii; *Ectemnius dives* Lep. and Brullé taken 15.vi at Newhaven, Sussex; *Oxybelus argentatus* Curtis taken 3.viii at Dawlish Warren, Devon; *Nysson trimaculatus* Rossius at Dawlish Warren on 5.viii. The last mentioned is a cleptoparasite of *Gorytes* spp. and at the above site it may be associated with *G. bicinctus* Rossius. Both were found in some numbers together around isolated sycamore trees in the sand. The parasitic wasps included *Ichneumon stramentarius* Grav. and *I. gracilicornis* Grav., both taken in early May at Lewes, Sussex, on the flowers of Alexanders.

ARCHER, Dr. M. E.—Six local species of aculeate wasps and bees mostly taken in 1985. The cuckoo wasp *Omalus violaceus* Scop. was taken viii.85 at Duncombe Park, Helmsley, N. Yorks—this is the first Yorkshire record of a species not previously recorded north of Leicestershire. A potter wasp, *Pseudepipona herrichii* Saus. and a bee *Andrena hattorfiana* F., both taken in vii.85 in the Axmouth—Lyme Regis N.N.R., Dorset. Both these species have an N.C.C. vulnerable rating. The bee *Stelis ornatula* Klug, which is a cleptoparasite of *Osmia claviventris* Thom., was taken in vii.83 and vi.85 at Ainsdale sand dunes, Merseyside, and is a new record for this site. *Colletes halophilus* Ver. was taken in sand dunes at Saltfleetby—Theddlethorpe N.N.R., Lincs., in viii.84. This coastal bee is also known from Norfolk, Suffolk and Essex. The hornet, *Vespa crabro* L. seems to be regaining lost ground and the exhibitor reported a nest found at Gainsborough, Lincs., in viii.85. He also showed a queen hornet taken in vi.84 at Thorngumbald, N. Yorks. This is the fifth confirmed record for Yorkshire and indicates a northward spread by this species.

HALSTEAD, A. J.—Some local Symphyta taken in 1985 mostly in Surrey. *Hartigia linearis* Sch., whose larvae are stem borers of common agrimony, was found on a hogweed flower at Sheepleas, Surrey, on 6.vii.85. *Cephus nigrinus* Thom. was taken on a buttercup flower near the Hoe Stream, Mayford, Woking, Surrey, on 25.v.85. This is said to be a woodland species but in the two sites known to the exhibitor it occurs in boggy meadows. *Arge ochropus* Gmelin, taken at the R.H.S. Garden, Wisley, Surrey, on 18.vi.85. The larvae of this species feed on rose and it is often described in garden books as a pest. In Surrey, however, it is the larvae of a related species, *A. pagana* Panzer, which are much more frequently found on roses. Other sawflies shown were *Selandria sixii* Voll. taken 1.vii.85 at Longstock Garden, Hants.; *Dolerus pratensis* L. taken 22.v.85 at R.H.S. Garden, Wisley; *Empria pumila* Konow swept off the larval food plant, meadowsweet, near the Hoe Stream, Mayford, Woking, on 25.v.85; male and female *Ametastegia albipes* C. G. Thomson taken 25.v.85 and 8.vi.85 respectively on aspen on Wisley Common, Surrey; *Tenthredo* *distinguenda* R.v.Stein, taken on a hogweed flower at White Downs, Surrey, 7.vii.85; *Pristiphora crassicornis* Hartig taken 25.vi.85 at R.H.S. Garden, Wisley, on hawthorn; *Amauronematus fasciatus* Konow taken 1.v.85 near *Salix* spp. at R.H.S. Garden, Wisley.

LONG, R.—Two recently determined vagrant Hymenoptera taken in Jersey. These were the wood wasp *Urocerus augur* Klug taken viii.83 at St. Lawrence and a bee *Xylocopa violacea* L. taken 6.vii.79 at Grouville.

ODONTATA

HARMAN, T. W.—Twenty one dragonflies taken on Sulawesi, Ternate and Bacan Islands dring Project Wallace in 1985.

ARACHNIDA

HARVEY, P. R.—The exhibitor showed some breeze block and chalk rubble bearing the silk and grit retreats of *Zodarian italicum*, a species new to Britain. It was discovered in 1985 in two old chalk quarries at Grays, Essex. This spider feeds on ants and appears to be associated with *Lasius* sp. nests.

ILLUSTRATIONS

TWEEDIE, M.W.F.—A volume of photographs of invertebrates and botanical subjects, including snails, slugs, woodlice, spiders and lichens, plus flowers taken in daylight or tungsten and ultra-violet light. Seven colour photographs of larvae of *Allophyes oxyacanthae* Linn., *Falcaria lacertinaria* Linn., *Drepana curvatula* Borkh., *Ptilodon capucina* Linn., *Notodonta dromedarius* Linn., *Plagodis dolabraria* Linn., and *Leucodonta bicoloria* D. & S.

CHURCH, S.H. & PORTER, J.—Three volumes of photographs showing over 750 species of larvae of British macrolepidoptera.

FALK, S.J.—Twelve beautiful large and detailed ink drawings of British bees, for inclusion in the forthcoming R.E.S. Handbook by George Else.

SMITH, Dr N. H. S.—A series of photographs illustrating the life history of a grey Nepticulid moth, discovered feeding on the leaves of *Lotus corniculatus* in a coastal habitat near Perranporth, Cornwall, in 1984. There was some doubt as to its identity. Since the exhibition it has been proved, on dissection, to be *Trifurcula eurema* Tutt.

WARING, P.M.—On behalf of Oxford Polytechnic, a collection of maps and photographs of Hell Coppice/Bernwood Forest, and a request for pre-1960 photographs of this historic entomological site.

OWEN, J.—Photographs of Coleoptera, some rare, from Scotland, including a female of *Acanthocinus aedilis* Linn. egg-laying beneath pine bark. One photograph of a male *Schizotus pectinicornis* Linn. Drawings showing diagnostic features of *Byrrhus arietinus* Steff., *B.fasciatus* Forster, *Thinobius strandi* Smet. and *T. proctor* Smet.

GREATOREX-DAVIS, T.—Photographs taken in the Valaise Canton of Switzerland, showing a variety of interesting habitats rich in butterflies.

HYMAN, P.S. and TIGAR, B.J.—A map and photographs taken during the Lundy Survey of 1985 for the Oxford Polytechnic.

JONES, R.—Photographs of various Coleoptera and coleopterous larvae from West Sussex, Richmond Park, Hampstead Heath and Windsor Forest.

WALTERS, J.M.—Over 100 A4 size illustrations from life in colour and pencil of Lepidoptera, lepidopterous larvae and spiders.

HART, C.—A series of photographs, taken in Cornwall, showing the habitat, foodplant and feeding habits of *Hadena luteago* D. & S. ssp. *barrettii* Doubl.

BRADFORD, E.S.—Watercolour illustrations of twenty-one species of the Gelechiidae, to be included in future colour plates for the Society's Proceedings and Transactions.

LONDON NATURAL HISTORY SOCIETY—The exhibit included a number of distribution maps, photographs of species, and a series of publications showing many interesting aspects of the natural history of the London area.

NATURE CONSERVANCY COUNCIL—Illustrations, photographs, maps, and photographs of members involved in work covering all aspects of the environment and threats to habitats.

FIELD MEETINGS

BENHS Field Meeting: Chobham Common, Surrey, 26.v.1985. Leader: P. R. Harvey.—Eight members and friends attended this meeting. Although it was a warm morning, heavy rain and thunder at lunchtime continued at intervals into the afternoon. Faced with the very wet vegetation, we finished early, although not before a number of interesting species had been found.

Dick Jones found an uncommon spider, *Robertus arundineti*, in the car park before we set off. The rare spider, *Oxyopes heterophthalmus*, was common in places. Other interesting spiders recorded amongst a list of 46 species were *Thomisus onustus*, *Xysticus ulmi*, *Thanatus striatus*, *Dipoena inornata* and *Hypsosinga sanguinea*. Richard Jones recorded 33 species of Coleoptra including the very rare chrysomelid *Cryptocephalus biguttatus*. Single specimens usually occur about every five years. It was taken in Surrey near Esher in the late 19th century and one specimen was found at Chobham in 1969. It has also turned up in a couple of localities in Kent and Sussex in the last few years. Other beetles included *Agonum sexpunctatum*, *Ampedus sanguinolentus* and *Asemum striatum*.

BENHS Field Meeting: Pigbush, New Forest Hants, 6.vii.1985. Leader: K.H. Halstead.—Although the weather was fine, only four members attended, one showing his true dedication as a dipterist to search for marsh-loving flies by removing his socks and shoes to wade through the bog. Beside the bog, the area included typical New Forest healthland and deciduous woods, part of which adjoined private grazing land.

Several dolichopodid species were recorded, two being very local, also several larger Brachycera and many syrphids including *Trichopsomyia flavitarsis* (Meigen) and *Pelecocera tricincta* (Meigen). some aculeate Hymenoptera were noted.

Our coleopterist reported the better finds as follows: *Rhynchaenus iota* (F.), *Prionocyphon serricornis* (Müller) and *Cryptocephalus bipunctatus* (L.), as well as the heteropteran *Deraeocoris scutellaris* (F.) unrecorded for Hampshire in Southwood and Leston. The clouded buff moth was also noted.

Interesting arachnids swept in the locality of the bog included *Mangora acalypha* (Walckener), *Singa hamata* (Clerck) and *Hyposinga pygmaea* (Sundervall).

BENHS Field Meeting: Wooton Coppice, New Forest, 3.viii.85. Leader: A.J. Pickles.—This was one of a series of meetings organised for the N.C.C. survey of selected sites in the New Forest. Unfortunately it took place on a wet cold day when the four members who attended in the afternoon found little of note. The evening was even more depressing with temperature decreasing and rain increasing, when eleven members and friends found they were only just outnumbered by the moths. Eventually 23 species of macros were recorded at sugar and light on the wet heath bordering the coppice and within mixed woodland. Of these none are worthy of note.

BENHS Field Meeting: Frame Heath, New Copse and Ladycross, New Forest, Hants, 10.viii.1985. Leaders: Steve Pittis, John Phillips.—Despite continuous rain for several days prior to the field meeting, ten members and friends attended for all or part of the meeting and were thankful for a dry, if cool, afternoon and evening.

Few insects were encountered during the day and so attention was focused on the evening when it was hoped the use of sugar and mercury vapour lights would elicit an appearance of the two beautiful catocalid moths, *C. promissa* D. & S. and *C. sponsa* L,. which are both resident in this ancient oak woodland.

Oaks were duly sugared and with three lights set up we sat and waited as the temperature dropped! The first visitor to light was a hornet. No moths appeared and conversation turned to stories of *convolvuli* at the Lizard, *atropos* at Swanage, *fraxini* at Ham Street and generally to exploits of yesteryear.

Eventually it was decided to 'do a round' of the sugared trees and to the delight of two of the members, each boxed a pristine male *C. promissa* as it imbibed the sticky brew. This was the high spot of the day but it immediately became clear that the later-emerging *C. sponsa* was unlikely to appear. Nothing else of note was seen at sugar and visitors to light were virtually non-existent.

Just before packing up, one of the leaders of the meeting, casually investigating some 'unsugared' oaks, came upon a male *C. promissa* at rest on a tree trunk about a foot from the ground. Evidently the insect had not long emerged. Another member, a former secretary of the Society and veteran of many field meetings, claimed that he had obeyed the call of nature against that tree trunk a short time earlier and this action had clearly attracted the moth.

Lepidoptera recorded: *Timandra griseata* Pet., *Hydriomena furcata* Thunb., *Biston betularia* L., *Hyloicus pinastri* L., *Ptilodon capucina* L., *Euproctis similis* Fuess., *Lymantria monacha* L., *Eilema complana* L., *Eilema deplana* Esp., *Amphipyra pyramidea* L., *Cosmia trapezina* L., *Apamea monoglypha* Hufn., *Catocala promissa* D. & S.

A small number of species of Coleoptera, Diptera and Hymenoptera were also identified and a full list of insects recorded is being forwarded to the N.C.C. as part of the New Forest Invertebrate Survey.

BENHS Field Meeting: Darenth Wood, Kent, 3.xi.1985. Leader: J.M. Chalmers-Hunt.—For this post-exhibition meeting, the leader and 12 members and friends enjoyed as fine a day as one might wish for; it being dry, windless and blessed with uninterrupted sunshine. Microlepidoptera were the main object of search and study, and several unusual finds were reported. Mr Paul Johnson found a larva on *Origanum vulgare* seemingly that of the rare *Oncocera obductella* Zeller, which appeared to be about one-third grown; however, he will need to breed it out to confirm the identification. Mr Sokoloff spotted an abnormally late imago of *Argyresthia goedartella* L. (which was photographed), perhaps a second generation specimen, though so far as we are aware this species does not produce more than one brood per annum. Dr R. Knill-Jones, besides energetically beating out a number of hibernating moths, including *Acleris schalleriana* L., discovered in a sloe leaf the larval mine of the local nepticulid *Ectoedemia spinosella* Joan. (perhaps new to Kent). He also drew our attention to the interesting fact that there were numerous patches of reddish-brown frass exuding from the trunk of an ancient oak—the work of the larvae of *Argyresthia glaucinella* Zeller.

Other micros noted were: *Leucospilapteryx omissella* Stt. (empty mine on *Artemisia vulgaris*), *Coleophora argentula* Steph. (cases plentiful on *Artemisia millefolium*), *C. gryphipennella* Hbn. (larval feeding on rose), *C.serratella* L. (case on birch by Mrs Finch), *C.troglodytella* Dup. (? this sp.), some half dozen small cases fixed to the base of *Cirsium arvense* stems *Emmelina monodactyla* L. (several moths), *Phyllonorycter tristrigella* Haw. (mine on *Ulmus*), *P.cydoniella* D. & S. (mines on *Malus* by R.K.-J.), *P.corylifoliella* Hbn. (mine), *P.harrisella* L. (mine on Turkey oak), *P.quercifoliella* Zeller (an imago), *P.messaniella* Zeller (mine on *Castanea*), *Stigmella aurella* F. (mines on *Rubus*), *S.ulmivora* Fologne (mine on *Ulmus*), *S.malella* Stt. (mine on *Malus*), *S.floslactella* Haw. (mine on hazel), *S.anomalella* Goeze (mines on rose), *S.oxyacanthella* Stt. (mine on *Crataegus*), *S.distinguenda* Hein. (mine on *Betula*), *S.basiguttella* Hein. (mine on oak), *S.obliquella* Hein. (mines on *Salix*), *Ectoedemia subbimaculella* Haw. (mine on oak), *Calybites auroguttella* Steph. (spun leaves with larvae on *Hypericum* sp.), *Caloptilia syringella* F. (on ash), *Parornix devoniella* St.. (on hazel), *Callisto denticulella* Thunb. (mine on *Malus*), *Lyonetia clerkella* L. (mine on *Malus*), *Parornix anglicella* Stt. (lobe on *Crataegus*), *Psyche casta* Pallas (case), *Reuttia subocellea* Steph. (case on *Origanum*), *Tischeria marginea* Haw. (mines on *Rubus*), *T.ekebladella* Bjerk. (mines on oak), *Solenobia lichenella* L. (case on tree trunk), *Ypsolopha ustella* Clerck (one), *Agonopterix heracliana* L. (one), *Ancylis badiana* D. & S. (a larva in *Vicia sepium* by R.K.-J.), *Metzneria lapella* L. (larvae in seedheads of *Arctium lappa*), *A.mitterbacheriana* D. & S. (on oak), *Lathronympha strigana* F. (on *Hypericum*), *Phyllonorycter nigrescentella* Logan (mines plentiful on *Vicia sepium*), *Coleophora albitarsella* (case on *Origanum*), *Ectoedemia agrimoniae*.

Mrs Rosemary Ferguson reported seeing or identifying from their song (marked *) the following birds in Darenth Wood during the meeting: Wren*, Green Woodpecker*, Magpie, Chaffinch*, Blackbirds, Rooks, Starlings, Robin, Crow, House Sparrows.

With a light meal brought with us, refreshments were taken in the garden adjoining the Fox and Hounds, an ancient hostelry with entomological associations dating back to the first half of the nineteenth century.

BENHS Field Meeting: Chobham Common, Surrey, 24.v.1986. Leader: P.J. Baker.—Seven members enjoyed a cool windy day with a little sunshine later. The wind made beating and sweeping hard work, but all the expected species of Lepidoptera were recorded — albeit in low numbers — and interesting species of other groups were noted.

The very local marsh violet (*Viola palustris* L.) was found in bloom in a restricted area and the bogbean (*Manyanthes trifoliata* L.) was a superb display of blossom, very attractive to the peacock (*Vanessa io* L.) and small tortioseshell (*Algais urticae* L.) butterflies.

The common lizard (*Lacerta vivipara*) lived up to its name with a number being seen, especially in the sunny interludes later in the day. A small pond contained a number of small, very dark specimens of the smooth newt (*Triturus vulgaris*). This latter is now common in the area and represents the first reported sighting from the common for a number of years.

Birds were very much in evidence, with practically the first sighting of interest being of a cuckoo chased by a meadow pipit. Also seen were kestrel, stonechat, crow, wren, green woodpecker, skylark and greater spotted woodpecker. The warden reported the first sighting of a hobby this year and that the nightjars were once again in residence (some seventeen pairs nested this year).

Other Lepidoptera imagines recorded were:- *Callophrys rubi* (L.), *Lycaena phlaeas* (L.), *Pieris rapae* (L.), *P. napi* (L.), *Saturnia pavonia* (L.), *Anarta myrtilli* (L.), *Ematurga atomaria* (L.), *Pachycnemia hippocastanaria* (Hbn.), *Macrothylacia rubi* (L.), *Eupithecia nanata* (Hbn.), *Cyclophora albipunctata* (Hufn.), *Drepana falcataria* (L.), *Cydia succedana* (D. & S.), *Neofaculta ericetella* (Hbn.), *Pammene rhediella* Clerck), *Lampronia oehlmanniella* (Hbn.).

Heather produced the following larvae:- *Xestia castanea* (Esp.), *Perconia strigillaria* (Hbn.), *Lasiocampa quercus* (L.), *Dicallomera* (L.) *(Dasychira) fascelina* (L.), Birch: *Coleophora serratella* (L.), *Archiearis parthenias* (L.), *Geometra papilionaria* L.

Hymenoptera: *Hoplocampa alpina* (Zett.), *Scolioneura betuleti* (Klug), *Dolerus triplicatus Klug, Nematus cadderensis* Cameron.

Coleoptera: *Attelabus nitens* (Scop.), *Phytodecta olivacea* (Forster), *P. viminalis* (L.), *Lochmaea caprea* (L.), *Cylindronotus laevioctostriatus* (Goeze), *Adalia decempunctata* (L.).

Diptera: *Rhabdophaga rosaria* (Loew), *R. salicis* (Schrank), *Dasysyrphus venustus* (Meigen), *Orthonevra geniculata* (Meigen), *Lasiopogon cinctus* (F.).

Spiders: *Zora spinimana* (Sundeval), *Tibellus* spp., *Evarcha arcuata* (Clerck), *Pisaura mirabilis* (Clerck), *Dolomedes fimbriatus* (Clerck), *Ero* spp., *Theridion tinctum* (Walck.), *Meta mengei* (Blackwall), *Araneus redii* (Scop.), *A. cucurbitinus* (Clerck), *Microlinyphia pusilla* (Sund.).

BENHS Field Meeting: Thornden Wood near Herne, East Kent, 23.iii.1986. Leader: J.M. Chalmers-Hunt.—On the night of 18/19.viii.1984, Mr N.F. Heal took at light in this wood a specimen of *Tischeria heinemanni* Wocke, a microlepidopteron new to the British fauna. According to continental authors the larva of *T. heinemanni* mines the leaves of *Rubus* and reaches full growth in March. Suspecting *heinemanni* to be resident here, this meeting was held specially to try to discover the larva of this moth, and about a dozen members and friends enjoyed a dry and for the most part sunny day for the occasion. It was hoped that Mr Heal would act as co-leader, but unfortunately he was unable to be present. However, he had indicated precisely the location of his capture, and in due course tenanted mines were collected that appear to be those of *heinemanni*. The first of these was found by Mr P.A. Sokoloff within a few yards of the moth's place of capture, and nearby two more by the leader and Mr E.S. Bradford. Further search produced a few mines in *Rubus* of *T. marginea* Haworth, but no more *heinemanni*, whose mine is said to be appreciably larger than that of *marginea*. It is earnestly hoped that we may breed out the moth from these larger mines, and so confirm *heinemanni* as a resident British species.

Other Lepidoptera noted during the meeting were: Orange Underwing *Archiearis parthenias* L. (flying in the sun), *Tortricodes alternella* D. & S., *Schreckensteinia festaliella* Hbn. (larva on *Rubus*), *Lampronia fuscatella* Tengst. (galls in twigs of young birch trees), *Cariocolum tricolorella* Haw. (larva in spun leaves of *Stellaria holostea*), *Cedestis gysseleniella* Zell. (larva in needles of *Pinus sylvestris*), *Taleporia tubulosa* Retz. (several cases on cut logs).

Several interesting species of birds were observed, including Siskin, Crossbill and Woodcock.

INDOOR MEETINGS

BENHS meeting 25.vii.1985.—The PRESIDENT announced the recent death of a former member, Lt. Col. W.B.L. Manley, well known in particular for his joint authorship, with the late H.G. Allcard, of the book *The butterflies and burnets of Spain*.

Exhibits. Mr J.M. CHALMERS-HUNT. Young larvae of the local psychid moth, *Pachythelia vilosella* Ochsenheimer, from eggs laid by a bred Dorset example.

Dr J. MUGGLETON. Specimens of *Propylea quattuordecimpunctata* (L.) collected from lime trees at Le Puy, Auvergne region, France, a coccinellid beetle only once recorded for Britain from Cobham, Surrey by Stephens (1839).

Membership. A. Lisecki, C.P. Yates, K.C. Greenwood, R.M. Harris and M.K. Henderson were declared elected.

Lecture. Dr P.W.E. KEARNS of the Department of Genetics at Cambridge University spoke on *The ecology and genetics of ladybirds* Many British ladybird species had been cultured in the laboratory, in Petri dishes, feeding on the pea aphid and a synthetic diet of nutrients in agar. The Department of Genetics is working on a variety of species, but in particular *Adalia bipunctata* (L.), *Coccinella hieroglyphica* L. and *Neomysia oblongoguttata* (L.). By selective breeding, the genetics of some of the melanic and other colour forms was beginning to be understood. An area of especial interest, was the role of sexual selection in maintaining these colour variations in natural populations. Colour slides of most of the species and colour forms were shown. The talk was followed by questions from the audience.

BENHS/London Natural History Society meeting 12.ix.1985.—Held at S.Audley St.: Chairman Mr. P. A. SOKOLOFF (Vice-president).

Exhibits. Mr P.A. SOKOLOFF: A melanic female *Ennomos alniaria* L. (Canary-shouldered Thorn) taken by him at Stodmarsh, Kent, on 27.viii.85.

Mr C. PLANT: A male and female of the nationally rare hoverfly *Anasimyia interpuncta* Harris, taken at Rainham, Essex in 1985.

Mr R. JONES: *Conops ceriaeformis* Meigen (Diptera: Conopidae), which had been attracted to flowers of *Solidago* growing in a Peckham garden, on 8.ix.85.

Mr A.J. HALSTEAD: A worker of the tree wasp, *Dolichovespula sylvestris* Scop. collected at Sheerwater, Woking, Surrey on 18.viii.85, on the flower of wild Angelica. It has three orchid pollina stuck to its face, possibly those of the Broad Helleborine.

Minutes of the LNHS of 12.ix.85 and those of the BENHS of 25.vii.85 were read and approved.

Membership. Mr G.A. GRAYSON was declared an elected member.

Communications. Mr R.F. BRETHERTON asked any members who have reliably separated specimens of British *Colias hyale* (Pale Clouded Yellow) and *C.australis* (Berger's Clouded Yellow), for details of them with places and dates of capture or breeding. These are needed for writing accounts of these species for the forthcoming volume of *Moths and Butterflies of Great Britain and Ireland*.

Lecture. Mr K.J. WILLMOTT lectured on *The biology and ecology of British butterflies*. The talk was illustrated with 150 slides covering the entire British fauna with the exception of the Large Blue (*Maculinea arion*) and the Large Tortoiseshell (*Nymphalis polychloros*), the former being extinct and the latter probably on the verge of extinction. It was emphasised that the majority of the photographs were taken in the field. Early stages as well as adults were shown, including several species caught in the act of depositing their eggs on the foodplant. These included the Wood

White (*Leptidea sinapis*), Dingy Skipper (*Erynnis tages*) and the Green Hairstreak (*Callophrys rubi*). The rare Black Hairstreak (*Strymonidia pruni*) and Brown Hairstreak (*Thecla betulae*) were shown crawling down the twigs of Blackthorn (*Prunus spinosa*) searching for sites to deposit their overwintering eggs singly. Perhaps the rarest photograph of the evening was that of the Queen of Spain Fritillary (*Issoria lanthonia*) taken on the North Downs in the hot summer of 1976. Several rare aberrants were shown including ab. *nigricans* of the Silver-washed Fritillary (*Argynnis paphia*) and ab. *wimani* of the Dark Green Fritillary (*Argynnis aglaja*) both of which are almost entirely black. The silvery-white aberration of the Small Copper (*Lycaena phlaeas*) was also shown. One of the photographs, that of the Purple Hairstreak (*Quercusia quercus*) was recently published in *The Butterflies of Dorset* by Dr Jeremy Thomas and Nigel Webb. An interesting commentary accompanied the photographs, the lecturer presenting some original little-known field observations which he had discovered over many years carefully watching and photographing butterflies.

BENHS meeting 26.ix.1985.—The PRESIDENT, Mr P. BAKER, announced the deaths of Mr R.P. Demuth, Mr R. Lovell-Pank and Mr W.H.A. Harris.

Exhibits. Mr E.S. BRADFORD. (1) Specimens of *Apoda bifractella* Dup. (Lep., Gelechiidae) being some of more than 100 that emerged from a handful of *Aster tripolium*. The dead stems and flower heads were collected near one of the RSPB reserves at Dungeness, Kent and the moths emerged between 16.vii to 15.viii.1985. (2) *Aethes margaritana* Haw. (Lep., Cochilidae). Specimens bred 10.vii to 4.viii.1985 from dead stems with flower-heads of *Achillea millefolium* collected near Faversham, Kent in late March 1985.

Mr A.J. HALSTEAD: The spider *Achearanea tepidariorum* C.L. Koch: a female with egg sacs and spiderlings found in a walk-in polythene tunnel at the R.H.S. Gardens, Wisley, Surrey.

Mr R. SOFTLY: One of a number of empty pupa cases protuding from an ornamental crab apple trunk at the entrance to the B.M.(N.H.) in Cromwell Road, presumably those of the Red-belted Clearwing: *Conopia myopaeformis* Borkhausen.

Membership. Messrs. A.C. Linsell, D.L. Clarke, M.A. Howe and T. W. Fairless were declared elected.

Lecture. Mr R.I. VANE-WRIGHT of the British Museum (Natural History) described some of the bio-geographical curiosities of Sulawesi (formerly called Celebes) which Alfred Russel Wallace had considered to be "faunistically the most interesting island on Earth". Despite its position at the heart of the South East Asian islands, Sulawesi has a relatively poor butterfly fauna (about 430 species) compared with New Guinea to the east, or the Malay Peninsula to the west. Many S.E. Asian butterflies (e.g. *Ragadia*, *Cheritra*) are absent from Sulawesi, even though they occur throughout the islands to the north (Philippines), west (Borneo) and south (Java). Similarly, certain New Guinea region groups, such as *Ornithoptera* and *Tellervo*, also fail in Sulawesi, despite their presence in the Moluccas immediately to the east. Mr Vane-Wright went on to describe particularly Philippine (e.g. *Zethra*), Moluccan (e.g. *Troides hypolitus*) and Sundanian (e.g. *Papilio peranthus*) links in the Sulawesi fauna, and its very high endemicity (about 40% at species level in the Papilionidae and Danainae). He suggested that careful analysis of such data might shed light on current theories of a complex geological origin for Sulawesi. After brief reference to the curious phenomena of 'gigantism' and 'Sulawesi forewing' supposed to affect the butterflies of the island, the talk was concluded by an account of some of the butterflies encountered during the Royal Entomological Society 'Project Wallace' expedition to the Dimoga-Bone Valley, northern Sulawesi, during 1985. All of the work described in the talk will eventually be incorporated into a multi-author book, *The Butterflies of Sulawesi,* scheduled to appear in 1990/91.

BENHS meeting 10.x.1985.—The PRESIDENT announced the death of Dr L.G. Higgins at the age of 94.

Exhibit. Mr D.A. MOORE: A presumed immature exotic cockroach, captured in St. Albans market, Herts., on 29.ix.1985. The specimen crawled out of a bunch of bananas, origin unknown.

Communications. Mr B. K. WEST: (1) Very early appearance of *Erannis defoliaria* L. at light at Dartford, Kent on 22nd September 1985. (2) Despite the poor summer weather, several moths produced relatively abundant second generations in N.W.Kent (a) *Campaea margaritata* L., as many as 12 at mercury vapour light at Dartford, 8th September. (b) *Chloroclysta (Dysstroma) truncata* Hufn., the first brood of which in Kent has been very low in numbers in both 1984 and 1985, but the second brood commoner in both years. (c) *Opisthograptis luteolata* L.

Lecture. Mr D.H. WALKER read a fascinating paper (accompanied by a series of coloured photographic slides) entitled *Some observations on collecting insects in Saudi Arabia.* A summary of this account of the difficulties of collecting in an Islamic desert country is printed elsewhere as a practical guide.

BENHS meeting 24.x.1985.—*Exhibits.* Mr A.J. HALSTEAD: A male and female *Chrysops viduatus* F. (Diptera: Tabanidae), taken at the RHS Garden, Wisley, Surrey. The female was found in a polythene tunnel on 5.viii.85 and the male while feeding on nectar of a lime tree (*Tilia petiolaris*) on 12.viii.85.

Mr RICHARD JONES: The handsome hoverflies *Volucella zonaria* Poda and *V. inanis* L. (Diptera: Syrphidae) from a south London garden on 8.ix.85; both species were attracted to the flowers of the garden Golden Rod.

Mr M.J. SIMMONS: A photograph of *Lysandra coridon* Poda ab. *suavis* Schultz, observed in a wood near Eynsford, Kent.

Mr D.A. MOORE: A re-showing of the juvenile cockroach exhibited at the last meeting, and since identified by Mr R. G. Adams as *Nauclidas nigra* (Brunner). It is an inhabitant of the West Indies and Central America.

Membership. Mr N.P. Mallett was declared elected.

Communication. Mr A. J. HALSTEAD drew attention to a note in *The Grower* of 24th October regarding the Guernsey based 'Project Papillon', wherein it was stated that in 1985, over 3,000 pupae of Guernsey butterflies have been sent to destinations all over the U.K. This was despite requests by this Society and other responsible bodies not to do so. The writer of the Note, a Ms Cecilia Sparrow says 'we look forward to sending off more butterflies from Guernsey in the Spring of 1986.'

Dr C. LUMB of the Nature Conservancy spoke on the subject of *Seashores,* which he accompanied with slides. Dr Lumb demonstrated the wide range of conditions on shores around Britain, with particular reference to their seaweed floras. The effects of grazing by shellfish and of oil pollution on the succession of seaweeds were amongst the topics that provoked discussion at the end of a well-balanced dip into the enormous subject of intertidal marine life.

BENHS meeting 14.xi.1985.—*Exhibits.* Mr E. BRADFORD showed on behalf of Dr F.N.H. SMITH some adults of the nepticulid moth *Trifurcula eurema* Tutt. These were bred from larvae mining the leaves of *Lotus corniculatus* at Perrenporth Cornwall, in 1985 and is a new county record. At the Annual Exhibition the identity of these moths had been queried since, unusually for *T. eurema*, some of the larvae had made their cocoons inside the mines. Their identity had been subsequently confirmed by examination of the genitalia.

Mr M.J. SIMMONS showed some colour prints of spot pattern aberrations on the undersides of the hindwings of the Common Blue, *Polyommatus icarus* Rott. These photographs showed one example of var. *postpluripuncta* and two of var. *postobsoleta*. They were taken on the North Downs, near Eynsford, Kent, in 1984 and 1985.

Announcements. The SECRETARY, Mr J. MUGGLETON, showed some "Bug Boxes" that had been sent to the Society. These are small, clear, perspex boxes that incorporate a lens for viewing insects, etc. placed inside the box. The Society receives many circulars and advertisements from firms and the Secretary announced that in future these would be placed in a red folder marked "Current Information" and kept in the collections room on the magazines bench.

Communications. Mr. R. BRETHERTON reported that weather conditions in the autumn had been unfavourable for migrants and moths in general. Despite this, one silver striped hawk moth, *Hippotion celerio* L. had been recorded on 28th September on Orkney.

Slide Evening. Five members showed an excellent selection of their own slides. MICHAEL TWEEDIE showed some remarkable close-ups of aphids, followed by some of moths and their earlier stages. FRANCES MURPHY showed slides of insect and spiders, some of which were taken in the Dordogne. STEVEN MEREDITH showed slides of butterflies taken on a recent trip to Bolivia and Peru. DAVID WILSON's slides were mainly of moths and their larvae, some of which had been taken in France. RICHARD JONES showed a wide range of slides, including some of dermestid beetles, a recent Chobham field meeting, and syrphid flies on golden rod flowers in the jungle that he calls his new garden.

BENHS meeting 28.xi.1985.—*Exhibits.* Mr M.J. SIMMONS: *Vanessa atalanta* L. ab. *bialbata* Cabeau, Friston Forest, E.Sussex, 5.vii.84.

Mr RICHARD A. JONES. *Hallomenus binotatus* Quensel, attracted to m.v. light in a South London garden, 2.ix.85. This rare fungus-feeding beetle is recorded generally from the London area, but there is a specific record from Forest Hill (2½ miles away) from the 18th century.

Membership. The following were declared elected. N. G. Elvidge, P.D.M. Costen, M.L. Price, A.M.V. Hoare, R.J. Wootton, C. Causton, J.Damrel, G.T. Menendez, A.M. Wass, R. Child, R.A. Southon, R. Kemp, B. O'Brien, B.S. Harper.

Lecture: In the absence, owing to illness, of Mr J. E. BEBBINGTON the scheduled speaker, Dr JOHN MUGGLETON at very short notice kindly favoured the audience with an interesting talk entitled 'Flowers of the Pyrenees', which was illustrated by a series of his own beautiful coloured photo slides.

BENHS meeting 12.xii.1985.—*Exhibits.* Mr COLIN HART. A male of the geometrid moth *Angerona pilosaria* D. & S., attracted to light at Reigate on 6.xii.85, an early date for this species.

Dr D. LONSDALE. Specimens of *Cis bilamellatus* Fowler (Coleoptera: Ciidae), bred November 1985 from dried bracket fungus *Piptoporous betulinus* collected from Alice Holt Forest, Hants, summer 1985.

Mr RICHARD JONES. *Dendrochernes cyrneus* (Pseudoscorpiones: Chernetidae), from under thick oak bark, Windsor Forest, 28.iv.85. This is Britain's largest false scorpion. One specimen had hold of the beetle *Paromalus flavicornis* (Herbst) in its claws, and appeared to be feeding on it.

Abstract of lecture: The biology of pseudoscorpions, by Dr Gerald Legg.

False scorpions belong to the Arachnid order Pseudoscorpiones. Although superficially resembling scorpions, with their pincer-like pedipalps, they are far removed from them. As a small group of minute animals, they have been considerably neglected and overlooked by amateur and professional alike. Little is known in any detail of their physiology, ecology and general biology, although during the past fifteen years our knowledge of the group has increased 100-fold. As predators, they are at the top of the food chain and because they can occur in quite high numbers (although they are still difficult to find in the field) they are of considerable importance in the food web and overall ecology of the habitats in which they occur.

False scorpions have many intriguing and unusual habits, building silken chambers resembling miniature igloos in which to hibernate, moult, and secrete themselves when rearing a family. Females feed their eggs and larvae in external sacs with 'milk' derived from their ovaries; many keep their first instars (protonymphs) within the silken chambers until they moult into deutonymphs. They all mate using an indirect method: spermatophores. These silken pillars upon which a packet of sperm rests are deposited in some species at random, in others only in the presence of females, while some carry out an elaborate scorpion-like dance with or without contact with the female. some species can run backwards (and prefer to do so) quicker than forwards. Others are slow and ponderous in their movements. To get to a new habitat, several species hitchhike on various insects and harvestmen.

Much more can be learnt about these intriguing animals, not least of which are their distributions throughout Britian. The sorts of habitats in which they can be found include many that entomologists examine for other types of animals, including leaf litter, beneath tree bark, within birds' nests, in debris within barns and warehouses, within ants' nests and compost heaps. Phoretic species are often found on beetles and flies.

Dr Legg will welcome records or specimens for identification at The Booth Museum of Natural History, Dyke Road, Brighton, Sussex.

The Linnean Society publication on pseudoscorpions is shortly to be reprinted in a larger and updated edition featuring line drawings of all the British species.

BENHS meeting 9.i.1986.—*Exhibits*. Col. A.M. Emmet. Volume 1 of *Moths and Butterflies of Great Britain and Ireland* was published on the 16th January 1976. During the ten years which have lapsed since then the number of vice-county records of Nepticulidae has more than doubled, rising from 2,242 to 4,815; the average number of species recorded from each vice-county has risen from 15 to 32 and the average number of vice-counties from which each species is recorded from 23 to 51. Consolidated maps showing this increase were exhibited, together with the vice-county figures for 1976 and 1986. A distribution map for *Stigmella paradoxa* Frey, also exhibited, showed an increase of vice-county records from 17 to 55.

The increase is the result of fieldwork carried out almost entirely by members of the society, and has been stimulated by the publication of the distribution maps in MBGBI Volume 1 and accounts of the early stages in sufficient detail to make determination possible.

Mr P.A. Sokoloff. A living specimen of *Mythimna loreyi* Dup. bred from a female taken by B.K. West in Cornwall during the autumn 1985 immigration. The specimen emerged 20.xii.85, escaped in the house, and was recaptured early January.

Prof. J.A. Owen. Three scydmaenid beetles. *Scydmaenus tarsatus* Müll., garden compost. Epsom, August 1975; *S.rufus* Müll, farmyard debris, Headley, December 1985; *Microscydmus minimus* Chaudoir), red rotten oak, Windsor Forest, February 1982. He commented on their distribution in Britain.

Membership. S. M. Palmer, M.J. Dawson-Brown, S. Nash, G.W. Danahar, M.A. Elan and J.G. Williams were elected.

Communications. Col. A.M. Emmet. In MBGBI vol. 2 *Parornix fagivora* Frey and *P.carpinella* Frey (Lep., Gracillariidae) are synonymised. The Swedish entomologist, Ingvar Svensson, has pointed out differences in the female genitalia which have been confirmed by examination of British material. *P.carpinella* is therefore added as a new species to the British list.

A request was made for records of these two species of *Parornix* which can be confirmed from the foodplant.

Mr A.J. Halstead. Reported a specimen of *Agriopis marginaria* F. (Lep., Geometridae) at Wisley, Surrey on Christmas eve, 1985.

Lecture. Dr M.J. Adams gave a talk accompanied by slides, entitled *Butterfly search and research in the northern Andes.* He specialised in the satyrid genus *Pedaliodes*, and his talk mainly concerned these. He kindly agreed to supply an epitome for publication in the Society's Transactions.

BEHNS meeting 23.i.1986.—*Exhibits.* Mr I.R. Hudson: *Ceratina cyanea* (Kirby), specimens collected at Oxenbourne Down Nature Reserve. This is the only British representative of a large widespread genus. It is a rare and local bee largely confined to south-facing chalk downland in south-east England.

The adults hibernate from late August to mid-May, depending on the weather, inside dead stems of plants such as *Rubus* which they excavate and then enter head first. The stems may be still attached to the main plant or may be lying on the ground. The length of the hibernaculum varies considerably, from 3 to 30 cms. and from one to six or more adults of both sexes can be found in the same stem. At Oxenbourne, a Hants and Isle of Wight Naturalists' Trust Reserve the scrub is regularly cleared and fresh *Rubus* stems are cut for hibernacula each year. Consequently the bee is common on this site.

Communications. Mr E.S. Bradford reported an occurence of *Opisthograptis luteolata* at Whitstable about mid-December 1985.

Lecture. Dr P.H. Williams gave a talk on *The distribution of bumblebees.* Bumblebees originated in palaearctic Asia and spread through Europe and North and South America. They are largely absent from Africa and Australia. In Britain, three groups can be identified: those with a northern and western distribution, on the southern end of their range; those found everywhere, in the middle of their range; and those found in the south east, on the northern end of their range. The northern limit of the last group appears to coincide with the summer isotherm of 15°C.

Dr Williams illustrated his talk with diagrams and slides of representative species and their habitats. He also discussed local variations in distribution and the change of habitats due to changes in recent farming practices and other factors.

BEHNS meeting 13.ii.1986.—*Exhibits.* Mr A.J. Halstead showed a specimen of the cuckoo wasp *Omalus violaceus* Scop. (Hymenoptera: Chrysididae) taken 21.viii.82 on an alder bush near the Basingstoke Canal at Sheerwater, Woking, Surrey. This uncommon species, which is a nest parasite of certain sphecid wasps, has been recorded from most of the southern counties of England, but is possibly a first record for Surrey.

Prof. J.A. Owen showed a specimen of the woodboring beetle *Hemicoelus nitidus*

(Herbst) (Anobiidae) bred in August 1985 from logs of field maple collected in February 1984 from Windsor Forest. This is only the second example of this species to be found in Britain. The same batch of maple logs had earlier yielded the first confirmed British specimen of the wood wasp, *Xiphydria longicollis* Geoffroy.

B.K. WEST showed a possibly undescribed species of a clearwing moth taken in Tapah Forest, Perak, Malaya, on 14.iii.59. It was one of several attracted to urine used as a butterfly bait, and in flight it resembled a sweat bee. Also shown were some aberrations of the Silver Y moth, *Autographa gamma* L. These were ab. *bipartita* Orstadius, taken 14.x.85 at the Lizard, Cornwall, and ab. *nigrescens* Th.-Meig., taken 6.viii.85 at Dartford, Kent.

Mr P.J. JEWESS showed some specimens of *Lampronia flavimitrella* (Hbn.) (Lep.: Incurvariidae) taken in an m.v. trap in Mr J.S. Badmin's garden at Perry Wood, Selling, Kent. Two further examples were taken a week later at the same site in a Rothamsted trap. This species is usually taken flying in sunshine.

Dr C.E. DYTE showed a female *Medetera striata* Parent (Diptera: Dolichopodidae) taken 1.viii.85 on pine logs at Heath Warren, Hants. This appears to be the first English record for this scarce fly, which is otherwise found in old pine woods in the Spey Valley, Inverness.

Communications. Mr D. MOOR reported a comma butterfly, seen flying over the snow on 8.ii.86 at London Colney, Herts.

Prof. J.A. OWEN asked for help in identifying a person or organisation with the initials "F.M.". This appears along with the initials of other coleopterists in a list of beetles recorded on Esher Common, Surrey, taken between 1900–1963.

Lecture. Dr M. SPEIGHT of Oxford University gave a stimulating talk on the relationships between insects and tree health. Dr. Speight described how factors such as soil nutrients, altitude, climatic conditions and the age of trees affect their vigour and susceptibility to insects. Insect infestations affect their host plants by causing a loss of increment, height and seed production, while defoliation in successive years can quickly exhaust the tree's food reserves and cause its death.

BEHNS meeting 27.ii.1986.—The PRESIDENT, Mr P. BAKER, announced the death of special life member Mr W. Lewis Rudland.

Membership. The names of Cavan Barry Collins, Stephen Walter Street, Gordon Pringle, Stephen Carroll, David Astell, Jeremy Paul Field, R.I. Heppenstall and Henry John Egglishaw were read for the second time and duly elected.

The meeting was followed by the Annual General Meeting.

BEHNS Annual General Meeting at the Alpine Club, 74 South Audley Street, London W.1. The PRESIDENT, Mr Peter BAKER, in the chair and 37 members present.

Minutes ofthe last Annual General Meeting were read and approved.

Reports were read by the Treasurer, the Secretary (for Council), the Librarian and the Curator. The Secretary then read the report of the Hering Memorial Research Fund for Dr Scoble, who was unable to be present. The President proposed the adoption of the above reports, Mr C. Plant seconded the proposal which was passed unopposed. The reports are appended.

1986–7 Officers and Council. The PRESIDENT read the names of the Officers and members of Council recommended by Council for 1986–7 and, as no other names had been submitted, he declared the following to be duly elected:

President	J.M. Chalmers-Hunt	Editor	R.W.J. Uffen
Vice-Presidents	P.J. Baker	Curator	P.J. Chandler
	Prof. J.A. Owen	Librarian	S.R. Miles
Treasurer	Col. D.H. Sterling	Lanternist	R.A. Jones
Secretary	Dr J. Muggleton		

Ordinary Members of Council, C.B. Ashby, B.R. Baker, G.N. Burton, R. Dyke, Dr I. McClenaghan, C.C. Penney, B.F. Skinner, P.A. Sokoloff, D.W. Yendall, E. Bradford.

The SECRETARY then read By-law 22d and invited motions or questions: there were none.

The PRESIDENT read his report and gave his address. He then installed the new President, Mr J.M. CHALMERS-HUNT.

Mr CHALMERS-HUNT proposed a vote of thanks to the retiring President and asked for permission to print the Presidential Address. Permission was given.

Col. A.M. EMMET proposed a vote of thanks to the retiring Officers and Council.

Auditors. The re-election of Messrs A.J. Pickles, F.C.A. and R.A. Bell was proposed by the President, seconded by Dr Muggleton and passed unopposed.

BEHNS meeting 13.iii.1986.—The PRESIDENT, Mr J.M. CHALMERS-HUNT, in the chair.

Exhibits. Mr A.J.E. HARMAN showed some microscope slides of three species of sucking lice from mammals and three species of biting lice from birds. The sucking lice were the human louse, *Pediculus humanus* L., the pig louse, *Haematopinus suis* L. and the horse louse, *H. asini* L. The biting lice were a *Halipeurus* sp. from a manx shearwater, a *Goniocotes* sp. on a peacock and an undetermined species taken on a blackbird.

Mr R.A. JONES showed two specimens of *Orchesia undulata* Kraatz (Coleoptera: Melandryidae) taken in Richmond Park on 8.3.86. This rather local beetle was found under the bark of a small log which was probably oak.

Lecture. Dr J.W. MAUNDER gave a lively and humorous account of lice, concentrating particularly on the three species that infest man. Despite their uncomfortably close association with man, there are many misconceptions concerning the biology of these parasites and Dr Maunder's talk clarified the situation and dispelled the myths.

BEHNS meeting 10.iv.1986.—*Exhibits.* Mr M. BROWN showed a shoot of birch collected 23.iii.86 at the Blean Woods, Kent field meeting. The shoot axils were swollen as a result of feeding by the microlepidopterans *Epinotia tetraquetrana* Haw. or *Lampronia fuscatella* Tengst. Descriptions in the literature of the galls caused by these two species appear to be inadequate to identify with certainty the causal insect so it remains to be seen what will emerge from the galls.

Prof. J.A. OWEN showed two examples of a water beetle *Oreodytes alpinus* (Paykull) (Dytiscidae) collected at Caithness on 21.iii.86. This boreal species has only recently been added to the British list.

Mr P.A. SOKOLOFF showed some live specimens of the gelechiid moth *Teleiodes paripunctella* Thunb., bred from larvae on bog myrtle collected in August 1985 in Skye. He also showed some live and set specimens of the tortricid *Argyrotaenia pulchellana* Haw. These were bred from larvae found feeding on grapes (*Vitis vinifera*) growing on vines in Battersea, London, in October, 1985. This is a polyphagous species normally associated with heathland and moorland.

Membership. Rystek Czeslaw Malinsky, Eileen Thorpe, Donald Willoughby Thorpe-Young, Adam Philip James and Paul K.S. Hartley were elected as members.

Announcements. The Librarian, Mr S. Miles, announced that he had received a report on 'Administrative Commentary on Butterfly Conservation in North America' by Pat Torrie and that it could be consulted in the library.

Mr A. Halstead drew attention to the 1986 programme of field meetings received from the Kent Field Club. Some of their meetings are in areas likely to be affected by the Channel Tunnel Fixed Link route and they are most anxious to obtain and update records forthese sites during 1986. Members of the BEHNS were urged to help in this matter if they could.

The Lecture. Mr E.C.M. Haes gave an excellent talk on *The distribution of crickets, grasshoppers and groundhoppers in the British Isles.* Five species are of widespread occurrence but the other 28 are more frequently found south of the Severn-Wash line. Two local species, the long-winged cone-head and Roesel's bush cricket, have shown significant increases in their range in recent years.

BEHNS meeting 24.iv.1986.—*Exhibits.* Mr N.A. Callow showed a nest of a leaf-cutting bee (*Megachile* sp.) found in a seed box in a greenhouse at Surbiton, on 23.iv.86.

Mr M.J. Simmons showed some live and pinned specimens of an unidentified ichneumonid wasp bred from pupae of the Holly Blue butterfly, *Celastrina argiolus* Verity, that had been collected as larvae of mixed age on ivy at Lewisham, South London. One parasite emerged on 28.xi.85, while others emerged on 22.iv.86 about 7–10 days after the emergence of the host butterflies. Eighteen of the 23 pupae were parasitized.

Mr R.A. Jones showed specimens of *Plegaderus vulneratus* (Panzer) and *P. dissectus* Erichson (Col.: Histeridae) found under spruce bark at Windsor Forest on 9.iv.85. *Plegaderus vulneratus* is associated with conifers, whereas *P.dissectus* is normally found on broad-leaved trees. It is therefore unusual to find both species on the same tree. Several scolytid beetle species were breeding under the bark and were probably providing food for the *Plegaderus* spp.

B.K. West showed a series of *Mythimna loreyi* Dup. taken at the Lizard, Cornwall. One specimen was taken at sugar on 1.x.85 and the others were bred in December from a female taken at light on 14.x.85. He also showed a final instar larva of the Copper Underwing, *Amphipyra pyramidea* L. and indicated how it differed from *A. berbera* Rungs larvae. The larva was raised from eggs laid by a female taken at Dartford, Kent, in September, 1985.

Membership. Christopher John Creighton, David John Wedd, Henry Arthur Edmunds, Tom Sidney Hawes Wordsworth, Howard Edward Bishton, Ronald Edward Smith, Susan Edith Southway, John W. Maunder and Harry I'Anson Heyworth were elected to membership.

Announcements. The Secretary, Mr J. Muggleton, displayed a letter from the firm of Binnie Taylor, who are conducting a water services survey for the Wessex Water Authority. They are interested in receiving records of insects and other natural history information in the S.E. Dorset and W. Hants area covered by this survey.

The Indoor Meetings Secretary, Mr R.A. Jones, drew attention to a misprint in the membership card. The date of the second lecture in October should be the 23rd and not the 12th as printed.

Mr P. Baker announced that he had been asked to dispose of the entomological books and equipment of our late member Mr R. Lovell-Pank. Some lists were made available and more would be provided for the next meeting.

Slide Evening. A selection of slides illustrating the interests of five members were shown. Dr K. SATTLER showed a series of slides of the immature stages of gelechiid moths of the genus *Scrobipalpa*. Mrs F. MURPHY showed spiders and other animals on a recent visit to Singapore and New Zealand. Mr A.J.E. HARMAN showed slides of seven species of stick insects from the Far East which he is currently rearing in Britain. Mr N.A. CALLOW showed a large selection of insects and other invertebrates, fungi, lichen and higher plants photographed in Britain, Andorra and the French Alps. Finally, Mr R.A. JONES showed some slides of last year's Annual Exhibition and some beetles seen in Richmond Park and at Pegston, Herts.

BEHNS meeting 8.v.1986.—The death of Mr L.F. Crick was announced by the PRESIDENT.

Announcements. The secretary, Mr J. MUGGLETON announced that Council had considered the matter of subscription fees and had decided that an increase was necessary. From January 1st, 1987, London rates will be £11.50, Ordinary Members rates will be £6.50 and Junior Membership will be £3.00. The rate for life membership has been increased to £200 with effect from 8th May 1986. The Secretary drew attention to the fact that persons over 65 years of age could pay £2.00 less than the appropriate annual rate, and those suffering financial hardship could apply to Council for dispensation to pay a lower rate.

Mr P. BAKER made available lists of books and entomological equipment being sold from the estate of our late member, Mr. R. Lovell-Pank.

Communications. B.K. WEST commented on the lateness of the season as evidenced by a recent trip to the Scottish Highlands. During the first week of May at Grantown-on-Spey, Morayshire, the commonest moths taken at light were *Lycia hirtaria* Clerck, *Lampropteryx suffumata* D.& S., *Nephopterix carpinata* Borkh. and *Earophila badiata* D. & S. At Struan, Perthshire, only one *Cleora cinctaria* D. & S. was found. All of these were freshly emerged specimens. Near Aviemore three *Brachionycha nubeculosa* Esp. were seen at hotel lights, as was a male *Endromis versicolora* L., which is normally a day-flying moth. Mr West also commented on the fact that in the *Moths and Butterflies of Great Britain and Ireland*, Volume 9, it is stated that the white ermine, *Spilosoma lubricipeda* L. is polyphagous on herbaceous plants without showing any particular preference. He had offered young larvae of an F_3 generation a choice of groundsel (*Senecio vulgaris*) and dock (*Rumex obtusifolius*) and they had ignored the former and fed exclusively on the dock leaves.

Dr M.R. YOUNG stated that males of the Kentish Glory, *Endromis versicolora*, were taken in large numbers in Rothamsted light traps in central Deeside.

Mr J.M. CHALMERS-HUNT reported that the Scarce Prominent moth was now fully out in Kent.

Lecture. Dr Z. ERZINCLIOGLU gave a fascinating lecture on *Forensic entomology*. He showed by reference to case histories in which he and others had been involved how a knowlege of the rate of development of insects associated with corpses could give an estimate of the minimum length of time that had elapsed since death. He also explained how the types of insect and other arthropods found with a body can indicate whether it has lain undisturbed or if it had been moved to a new place of concealment. Although forensic entomology is a comparatively new science in Britain, its value in criminal investigations is now fully appreciated by the police and the courts.

BEHNS meeting 22.v.1986.—The PRESIDENT announced the death of Mr H.S. Robinson.

Exhibits. The PRESIDENT, Mr J.M. Chalmers-Hunt: living examples of

Phyllonorycter insignatella Zeller bred from mines on *Trifolium pratense* collected at Herne Bay, Kent, October 1985. The species is extremely local in Britain with a very wide discontinuous distribution: Western Ireland, N.E. England and East Kent.

PROF. J.A. OWEN: a pair of the staphylinid beetle *Gabrius scoticus* (Joy & Tomlin) sieved from moss at 750m on Mt. Morrone, Braemar 14.v.1986. This constitutes the third British locality. This is a boreo-alpine species, occurring in northern Scandinavia but not in central Europe.

RICHARD A. JONES: *Platyderus ruficollis* (Marsham) (Col.: Carabidae), from under a stone in a Peckham garden 26.iv.1986. This beetle is widespread but local; it usually prefers sandy or chalky soils and it is rather unusual to find it in a locality with rather more than its fair share of London clay. The small area in which it was found had been used to store sand during building work and a lot of sand and gravel had been mixed into the soil.

Membership. P. Waite, K. Ward, J. Milner and H. Roberts were elected members.

Communications. B.K. WEST related a recent experience whilst collecting in the New Forest. A number of constables had been attracted to light following observations from members of the public. The officers had suggested that collectors inform the police prior to setting up lights to avoid any waste of police time.

Lecture. B. EVERSHAM of the Biological Records Centre gave a talk entitled *Farming, conservation and invertebrates*. After briefly outlining the work of the BRC, the speaker provided an interesting exposition on the changes in distribution of various insect species that could be linked with changes in farming practice.

BEHNS meeting 12.vi.1986.—*Exhibits*. Mr R.A. JONES showed specimens of the elm bark beetle, *Scolytus scolytus* F. (Scolytidae) which is the vector of dutch elm disease. Also shown were specimens of two other beetles, *Corticeus bicolor* Oliver (Tenebrionidae) and *Aulonium trisulcum* Fourcroy (Colydiidae), both found in *Scolytus* tunnels and thought to be predators of the bark beetles. All three species reached a peak in 1976 but have since declined and become more local due to the loss of elm trees.

Mr A.J. HALSTEAD showed some local insects likely to be found on the forthcoming field meeting on Wisley Common, Surrey. These were the wood cricket, *Nemobius sylvestris* Bosc, the puparium of a syrphid *Microdon eggeri* Mik, three beetles *Agonum sexpunctatum* L. (Carabidae), *Tritoma bipustulata* F. (Erotylidae), *Orchesia undulata* Kraaz (Melandryidae), and three moths *Polia hepatica* Clerck, *Elaphria venustula* Hbn. and *Euphyia unangulata* Haw.

Mr C.W. PLANT showed the nest of an unidentified solitary bee which had made its nest in a 12-bore shot-gun cartridge case. The nest was found by Mr M. Marney in Cordes, S.W. France in May, 1986. Mr Plant also displayed a copy of his recently published book "The Birds of Newham".

Announcements. Mr R. A. JONES read a letter from Mr G. McGavin, Assistant Curator at the Hope Collection, inviting members to attend a weekend field meeting to be held on 27–29th June at Wychwood Forest and Aston Rowant N.N.R., with accommodation available at Keble College, Oxford.

Communications. Mr M. BROWN reported finding a single melanic specimen of the Square Spot moth *Ectropis consonaria* Hbn. in mid-May at light at Hoads Wood, Ashford, Kent, and another specimen during the day at rest on a tree trunk at Shoreham, Kent.

Lecture. Dr P.D. MOORE gave an account of the rise and decline of the elm in Britain in prehistoric times based on pollen records, and compared this with the more recent decline due to dutch elm disease.

INCOME AND EXPENDITURE ACCOUNT FOR 1985

£		£	*£*		£
2721	Publications Account	3721	*4539*	Subscriptions	4732
1704	Rent and Insurance	1724	*2362*	Interest and Dividends	3583
668	Stationery and General Expenses	617	*44*	Donations and bequests	57
484	Indoor Meetings and Exhibition	521	*211*	Surplus on sales (Ties, spare equipment and Christmas cards)	94
	Cabinets and collections	9			
108	Subs/donations to other societies	106	*1*	Surplus on Annual Dinner	
	Library	16			
1472	Excess of Income over Expenditure	2204			
7157		8468	*7157*		8468

SCHEDULE OF INVESTMENTS AT COST AS AT 31st DECEMBER 1985

		General £	Hering Memorial Fund £
£1600	Agricultural Mortgage Corp. 9¾% Stock 1985–8	646.49	646.48
1010	Drayton Premier Investment Trust 25p Ordinary Shares	1398.21	
410	Shell Transport & Trading 25p Ordinary Shares	477.79	771.83
150	Unilever 25p Ordinary Shares	248.45	
£450.35	Treasury 9½% Stock 1999		400.00
£4098.06	Treasury 13¾% Loan 1993	4041.44	
£6836.92	Treasury 8¼% Loan 1990	5910.00	300.00
£2138.90	Funding 5¾% Stock 1991	1670.00	
3446	Charifund Units	6330.00	817.24
		20722.38	2935.55

OFFICERS' REPORTS

HONORARY TREASURER'S REPORT FOR 1985

The Society had another satisfactory financial year. As you will see from the Publications Account (which deals only with the production and distribution of *Proceedings*), the net cost of these rose by some £550, mainly due to an increase in distribution costs and a fall in receipts from sales to outside bodies and of back numbers. Apart from this, expenditure varied little from 1984. Subscription income rose by £200 and investment income by just over 50%, so our overall surplus rose by over £700. This level of investment income is unlikely to be maintained even if interest rates remain high, as apart from other items, the £1500 interest-free loan from the Royal Society is due for repayment this year and the Special Publications Committee are planning a second edition of the Hoverfly book, so the amount of cash available for short-term investment can be expected to fall sharply.

It should be noted that the routine running costs of the Society exceeded the amount received from subscriptions, most of the balance being made up from investment income.

Turning to the balance sheet, the library fund is now merged with the general fund. The special publications fund (which deals with publications for sale) received nearly £1500 from surplus on these, even though 1985 saw no new publication. The cash part of this fund is held in short-term investments to be available as needed for further publications. Half of the Hammond Memorial Fund capital is similarly held in case of quick need, as the Society's rooms continue to be occupied on a monthly licence. The income from the Hammond Memorial Fund has been used to provide coloured plates for the Proceedings, the 1985 membership list, a donation to the Royal Entomological Society towards Project Wallace and provision for a new stock of woven ties for sale to members.

BALANCE SHEET AS AT 31st DECEMBER 1985

FUNDS

1984 £	£		1985 £	£
	13142	*General Fund*—Opening balance (Inc. old Lib. Fund)	14464	
14464	*1322*	Excess of Income over Expenditure	2204	16668
2308		*Housing Fund*		2308
	9626	*Special Publications Fund*—Opening balance	13714	
13714	*4088*	Surplus from sales	1473	15187
	26206	*Hammond Bequest Fund*—Opening balance	26702	
	2539	Interest and dividends	2947	
	28745		29649	
26702	*2043*	Expenditure	1909	27740
	2713	*Hering Memorial Fund*—Opening balance	3037	
		Gain on investment disposal	191	
	324	Income	366	
	3037		3594	
3037	*NIL*	Expenditure	450	3144
60225		TOTAL FUNDS		65047

Our thanks are due to our new Subscriptions Treasurer, Geoff Burton for the excellent work that he has been doing and may I again appeal to you all to ease the burden of his duties by paying your subscriptions correctly and promptly by 1st. January each year.

BALANCE SHEET AS AT 31st DECEMBER 1985 contd.—

THESE FUNDS ARE REPRESENTED BY

1984			1985	
£	£		£	£
		Investments at cost (details appended)		
	20722	General Investments	20722	
23065	*2343*	Hering Memorial Fund Investments	2936	23658
		Stock		
	3539	Special Publications at cost	1681	
3872	*333*	Christmas cards	234	1915
		(The value of the library, collections, ties and back numbers of Proceedings is not included in the accounts)		
		Liquid Assets		
	28354	N.S. Investment Account	36248	
	1280	Debtors and advance payments	1268	
	3430	Cash on deposit	3742	
	2264	Cash on current account	2007	
	35328		43265	
		Less:		
	1500	Royal Society Loan	1500	
33288	*540*	Subs. in advance, amounts owed and provisions	2291	39474
60225		TOTAL ASSETS		65047

AUDITORS' REPORT

In our opinion the annexed Balance Sheet gives a true and fair view of the Society's affairs as at 31st December 1985 and the Income and Expenditure accounts give a true and fair view of the Society's results for the year.

A.J. Pickles F.C.A.
R.A. Bell

THE PROFESSOR HERING MEMORIAL RESEARCH FUND, 1985

Two awards were made this year, one of £250 to Miss Beatrice Tengecho, a postgraduate student at University College, Cardiff, and the other of £100 to Dr J.P. Brock of Milton Keynes, Buckinghamshire.

Miss Tengecho's award will cover a portion of the costs of her fieldwork in Kenya for her study of the taxonomy of leaf-mining and stem-boring Agromyzidae of Leguminosae occurring in that country. The primary aims of this work are to make a faunal study of Kenyan agromyzids and to produce keys. A further aim is to characterise the juvenile stages, and to describe the appearance of the damage to the plants. An extensive itinerary is planned.

Dr Brock's principal aim is to make a detailed study of the phylogeny of the lower Ditrysia, which includes so many predominantly leaf-mining lepidopterans. His project is a follow-up to his earlier work on lepidopteran phylogeny. The award will chiefly help Dr Brock to meet travel costs for collecting and for visiting museums.

M.J. Scoble

British Entomological and Natural History Society

PUBLICATIONS ACCOUNT FOR 1985
(Publications free to members)

1984	Expenditure	1985	*1984*	Income	1985
£		£	*£*		£
4065	Production of Proceedings	3767	*633*	Sales	293
396	Distribution Costs	645	*1107*	Hammond Bequest grant for plates	848
			2721	Net cost to Income & Expenditure	3271
4461		4412	*4461*		4412

SPECIAL PUBLICATIONS ACCOUNT FOR 1985
(Publications for sale)

£		£	*£*		£
6324	Opening stock saleable publications	3539	*7620*	Sales of publications	3854
352	Correction slips/Hoverfly binding	168	*3539*	Closing stock saleable publications	1681
395	Distribution & General costs	355			
4088	Surplus to Spl. Publications Fund	1473			
11159		5535	*11159*		5535

COUNCIL'S REPORT FOR 1985

1985 has been a quiet year for the Society's Council, with no matters of great moment or contention to be discussed. In consequence Council meetings have been marked by an unaccustomed, if welcome, brevity. The 1985 season was a poor one for insects and alas, also for membership of the Society. We have lost 11 members by death, 9 by resignation and 31 members were struck-off for not paying their dues. Against this 45 new members were elected. Membership now stands at around 700, the lowest total for ten years. While this is in part due to the pursuit of longstanding subscription defaulters by our Assistant Treasurer, we cannot afford to be complacent. Comments by members, especially those from outside the London area, on how the Society's services and activities could be improved are always welcome.

No new publications have been produced in 1985, but all the Society's publications have continued to sell well and our most recent publication, *British Hoverflies*, has now sold out. The demand for this book greatly exceeded expectations. A second edition is in preparation and should be available in the autumn. A new publication on the Hemiptera: Heteroptera is in preparation.

Mr Richard Jones's first indoor meetings programme has produced some very good talks on a wide range of subjects. Particular attention should be drawn to the slide evenings, for the Society is fortunate in having some excellent photographers amongst its members, and it is a great shame that their efforts can only be appreciated by members able to attend the meetings. The field meetings programme was again arranged by Mr Andrew Halstead and a number of favourite, and some new, localities were visited. The bias towards meetings in southern England is not intentional, but merely reflects those areas from which offers to lead meetings have been received. The Council hopes that more members from other regions will come forward with offers of help.

The Annual Exhibition was again well attended and the exhibits were of a high quality in spite of the inclement weather this year. Exhibits of Coleoptera, which had almost disappeared in recent years, showed a welcome increase. Once again the Society is indebted to Mr Ken Evans for ensuring that all went well. Attendance at the Annual Dinner fell to 50 and the Council feels that this continuing lack of support suggests that members may prefer an alternative arrangement. A buffet meal has been suggested, as has the possibility of moving the event to the evening of the Exhibition. Members' opinions on this will be canvassed during 1986. In the meatime arrangements will have to remain unchanged for 1986, and we are very grateful to Dr MacNulty for ably organising the event.

Mr Eric Bradford is resigning as Hon. Curator after ten years of overseeing the Society's collections and keeping the *Anthrenus* at bay. His efforts in maintaining the collections will be appreciated by all who use them. He also serves the Society in many ways behind the scenes and we hope he will continue to do so. The Council was very pleased, therefore, to elect Eric Bradford to Honorary Membership.

The previous Secretary, Mrs Frances Murphy, greatly eased the Secretary's burden by devolving a number of the Secretary's duties. The present incumbent greatly appreciates this, but the reorganisation has escaped many members' attention and much mail has to be redirected, incurring extra postal charges to the Society and delaying replies to members' letters. A list of where to write will appear on the next programme card; it is hoped that members will follow this where possible.

LIBRARIAN'S REPORT 1985

As a result of earlier reviews of the Society's journal exchange arrangements with other entomological and natural history organisations a total of eight foreign exchanges have been terminated this year. One European and three British exchange arrangements have been brought up to date following long periods where the exchange journals due were not forthcoming. This pruning of exchanges will assist the Society in reserving shelf-space for those runs of journals which it wishes to retain. In the long term a close eye will need to be kept on our exchange arrangements so that such material does not over-dominate the library in the demand for shelf-space, especially with the continuing increases in binding costs.

A further grant from the British Library has been applied for to defray binding costs on the Society's stock of foreign journals. At the time of writing this report it is not known whether the application will be successful.

More batches of separates have been sorted this year into the appropriate subject headings and these have been placed in box files and put on the library shelves. The titles added this year were:- British Diptera Local Lists, Obituaries, Lepidoptera Local Lists and a further two boxes on Palaearctic Lepidoptera.

I would like to thank all those individuals and organisations who have given books and separates to the Society during the year and especially to the following members:- Mr. E.P. Wiltshire, Mr. S.N.A. Jacobs, Mr. B. Harley, Mr. A. Stubbs, Mr. C.L. Nissen and Mr. R.F. Bretherton. I would also like to thank Messrs. W. Parker, E. Bradford, P. Sokoloff, C. Ashby, Mrs. F. Murphy and the library committee for their assistance in organising the library during the period of this report.

OBITUARY

L. G. HIGGINS

Dr Lionel George Higgins, M.A., M.D., M.R.C.S., F.R.E.S. died on October 9, 1985. He was one of the leading experts of recent times on Palearctic, especially European, butterflies. He built up his knowledge of them from his early boyhood until his last year at the age of 93 by active collecting and travel with his devoted wife Nesta, in an astonishing number of places; by making contacts both personally and by correspondence with other collectors, and by obtaining specimens from them over a much wider area, and by acquiring a splendid library of entomological books and separates, including many of those by the early fathers. He was also for many years, with his friend and collaborator Norman Riley, a continuous student at the British Museum (Natural History). He also visited many museum collections abroad, some of which are almost unknown to British entomologists. He gave most of his library some years ago to the Hope Department at Oxford, and his collection of Palearctic butterflies, probably the finest ever made by a British amateur, to the British Museum.

Lionel made large contributions to classification and nomenclature in his three descriptive catalogues of the Nymphalid genera *Melitaea*, *Euphydryas* and *Mellicta*, published by the Royal Entomological Society of London between 1940 and 1955, and in 1975 by his book, *The Classification of European butterflies*, in which he figured and discussed the male genitalia of almost all of them. Some of this work is inevitably controversial, and it may be thought that he paid too little attention below the generic level of their earlier stages, which he did not himself collect or rear.

Amateur collectors and observers, especially, owe much to Lionel's help. He published, mostly in the *Entomologist*, many accounts of his collecting abroad, such as his articles on his lepidopterological expedition to Piedmont in 1930 and on butterflies in Norway in 1936. Among his later articles his check list of Turkish butterflies (1966), in which nearly two thirds of the species mentioned had been seen there by himself, is still the only guide which is readily available for that little-known country. He was also always ready with help and advice to the many people who asked him where to go and what to look for, and then to check identifications of their results by seeing his collection.

Finally, there is his joint book with N.D. Riley, the *Field guide to butterflies of Britain and Europe*. This was published in 1970, but was much revised and extended in later editions to 1980, and was translated into several foreign languages, with its excellent distribution maps and colour plates by Brian Hargreaves. This is likely to remain for many years a lasting memorial as the best and most widely available introduction to the subject.—R.F. BRETHERTON, August, 1986

Hemianax ephippiger **(Burmeister) (Odonata) in Hampshire.**—On 18.vii.1984 a male *H. ephippiger (Aeshna mediterranea)* was caught on the windscreen wiper blade of my neighbour's car at Dibden on the very eastern boundary of the New Forest, Hampshire. It was shown to me within an hour of this happening when the dragonfly was still alive but dying from a split thorax. The brilliant blue on the second segment of the abdomen was very oustanding at the time but gradually faded over the next few days and finally disappeared.

This insect had not previously been recorded from Hampshire, there being only two previously confirmed records in Britain (see Corbet, Longfield and Moore, 1960 *Dragonflies*, Collins); the first, a female, taken on 24.ii.1903 in Devonport (J.H. Keys), the second, also a female, on the 12.x.1910 in Dublin (A. Douglas). According to a report in the Odonata Recording Scheme Newsletter No. 5, a third specimen of this very rare vagrant was found in Cornwall in 1980, but no details are given of the observer, exact date or location. The Devonport specimen is in the British Museum (Natural History) collection, as is another specimen reputed to have been collected by B.P. Pickles at Feltar in the Shetlands but again there is no date for the capture.

Hemianax ephippiger is a migrant, which is known to fly considerable distances even over open sea, which is why it occasionally turns up in this country. The species is very common in the Middle-East and Arabia, where it breeds in desert oases and temporary pools. Its range covers the Mediterranean region, East Africa south to Tanzania and extends eastwards to India. Sometimes individuals appear in Northern Europe and it is the only species of dragonfly to have been recorded from Iceland.

I am indebted to Tony and Noelle Welstead for confirming the identity of the specimen and to Stephen Brooks of the BM(NH) for further information on the habits of this species.—K.H. Halstead, East Boldre, Brockenhurst, New Forest.

Liancalus virens **(Scop.) (Diptera: Dolichopodidae) on brickwork seepages in East London.**—This distinctive fly has mainly a northern and western distribution in Britain, being found wherever fresh water is trickling down a vertical rock face. The south-east is very much lacking in the necessary rock exposures so it was something of a surprise to note this species in urban Leystone in east London (grid ref. TQ 394868).

At first I passed the insect over as *Scellus notatus* (F.) which is widely distributed in small numbers in Essex. However, the habitat was wrong and the fly seemed particularly attached to seepages coming through the brick-work of four railway arches (one of which I was working in). The seepages could date back to bomb damage sustained between 1939–45. Closer examination revealed a fly very different to *Scellus*: the males had very distinctive genitalia and the long wings, although partially clouded along the costal edge had a small but very noticeable opaque white spot at the wing tip. Derek Smith, the county Diptera recorder confirmed the species to be *Liancalus virens* (Scop.)

Between August 1984 and October 1985 the following observations were made. The adult insects were present in the months March–November inclusive with the earliest date being 12.iii.85 (one female) and the latest 30.xi.84 (three males). The numbers of adults peaked in the months July–September with 24 males and females on 30.ix.85 on the four seepages. On 1.viii.85 a male was seen to be predated by a zebra spider *Salticus scenicus* (Clerck). 1985 has been at times a particularly wet year and I assume this has benefitted the flies.

I thank Mr Derek Smith for his help with this note.—M.W. Hanson.

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