







QA
B85 21
Ent.

300

APRIL 1978

Vol. 11, Parts 1/2

Proceedings and Transactions of The British Entomological and Natural History Society

SMITHSONIAN
JUN 20 1978
LIBRARIES



Price: £3.00

Officers and Council for 1978

President:

G. Prior, F.L.S., F.R.E.S.

Vice-Presidents:

R. S. Tubbs, O.B.E., F.R.I.B.A., F.R.E.S.

Rev. A. J. L. AGASSIZ

Treasurer:

R. F. Bretherton, C.B., M.A.

Secretary:

E. H. Wild, M.I.BIOL.

Curator:

E. S. Bradford

Librarian:

A. A. Allen, PH.D., B.SC.

Lanternist:

S. A. Knill-Jones, A.R.C.M.

Ordinary Members of Council:

P. A. Sokoloff, M.SC., M.I.BIOL., M.I.S.T., F.R.E.S.	Mrs. F. M. Murphy, B.SC.
R. Dyke	W. G. Tremewan, M.I.BIOL.
B. F. Skinner	Col. D. H. Sterling, F.B.C.S.
B. J. Jackson	C. G. Roche, F.C.A.
R. Fairclough	A. E. Stubbs, B.SC., F.R.E.S.

Editorial

Editor: E. P. Wiltshire, C.B.E., F.R.E.S.

Address: c/o National Westminster Bank, Cookham, Berks.

with the assistance of:

T. R. E. Southwood, B.SC., PH.D., A.R.C.S., M.I.BIOL., F.R.E.S.
T. G. Howarth, B.E.M., F.R.E.S., F.Z.S.
M. W. F. Tweedie, M.A., F.Z.S.
R. W. J. Uffen, F.R.E.S.
E. S. Bradford

Published at the Society's Rooms, The Alpine Club, 74 South Audley Street, London, W.1, and printed by Charles Phipps Ltd., 225 Philip Lane, Tottenham, N15 4HL

Proceedings and Transactions of
The British Entomological and
Natural History Society

The correct abbreviation of THIS Volume is:
'Proc. Trans. Br. ent. nat. Hist. Soc.'

Vol. 11
1978

Published at the Society's Rooms, The Alpine Club, 74 South
Audley Street, London, W.1, and printed by Charles Phipps
Ltd., 225 Philip Lane, Tottenham, LONDON, N.15

EDITORIAL

Apologies are doubtless due to readers who may have been confused by the editor's address printed in the Proceedings and membership card during recent months. Selling a London flat and moving to the country is not a smooth or swift process these days. There have been several slips between the cup and the lip; one country address, too confidently proclaimed on the inside cover of Vol. 10 (1/2), had to be abandoned to a rival when two would-be purchasers of the flat in succession withdrew. As we go to press the contract for the purchase of a future house has not yet been signed and it seems safer to depend on my bank to forward contributors' mail, even though this is a day or two slower. I trust that our next issue will give an address not so subject to mutations as these last three.

The Society's list of the Lepidoptera of the garden of Buckingham Palace (not yet sold out!) has shown that Central London has at least one habitat where, if the only Monarch is the human one, not a few butterflies and moths, with humbler but perhaps longer titles, have either survived from rural days over two centuries, or have penetrated and colonised the royal oasis; however, from the window of my Westminster flat, the most I ever saw was a dancing male Vapourer Moth last August, nor had my abode a balcony on which I might have set a Robinson trap, to draw from the night sky one or two nocturnal fugitives from nearer gardens. The thirty-mile move to East Berkshire, therefore, to water-meads, chalk downs and beech woods, has been eagerly awaited, but having to be made in mid-January, was entomologically unsatisfactory. About once a week the Natural History Museum and the Society's Rooms in Mayfair will draw me back along the M4. This motorway may be one of the better arterials into the metropolis; but my first morning's trip was performed in a snow-storm, and weather and traffic conditions left much to be desired. Things can but improve from now on, I console myself.

Having arrived in the Cookham neighbourhood, there is one old acquaintance I am certain to find in the summer, if I but break open the seed-heads of the garden hollyhocks, for I have found it there already: this is the Gelechiid *Pexicopia malvella* (Hübner), both a town and country moth: I first took it in marshmallow flowers in the Waveney marshes on the Norfolk-Suffolk border, and later in the hollyhocks of Vincent Square, Westminster. I am sure, too, that Her Majesty, if she would like a specimen of two, will find the creature in her hollyhocks, whether in her town garden or that of her residence in East Berkshire.

CORRIGENDUM

Vol. 10 (3/4), p. 117, line 48: FOR Curculionidae READ Scarabaeidae.

THE 1977 ANNUAL EXHIBITION

(see Plates I and II)

The Annual Exhibition took place, as is customary, on the day immediately after the Annual Dinner, that is on Saturday, 29th October, the venue again being Chelsea Old Town Hall. The attendance exceeded the previous year's remarkably high figure, 350 members and visitors signing the entry-book. One hundred and ten different exhibits, of which further details are given below, were on show. Considering that the season had been below the average for insects, these figures are remarkable and a cause for satisfaction. As usual, a high standard was achieved by exhibitors.

BRITISH MACROLEPIDOPTERA

The display of Macrolepidoptera was remarkably interesting, the results of the current poor season being supplemented by a large aftermath of captures and rearing from the brilliance of 1976. Some 60 exhibitors, out of about 100 in all, showed British Macrolepidoptera, either alone, or in a dozen cases along with Microlepidoptera, foreign species, or exhibits of other Orders. A few failed to provide notes, and their exhibits are not recorded here.

Highlights were two Noctuid species new to the British list — *Blepharita solieri* (Bdv.) (fig. 12), a Mediterranean species whose arrival in a light-trap in Roxburghshire is, even in such a year as 1976, hard to explain; and *Herminia lunalis* (Scop.), whose normal range extends through France and Belgium to the Netherlands and whose appearance in the Thames Valley is less surprising. Besides these, there was a preliminary exhibit of a new species or sub-species in the *Thera* group of Geometers; and among the Rhopalocera an *Erebia*, stated to have been caught in the Scottish Highlands in 1969, was recognised during the exhibition as an example of that legendary British species *Erebia ligea* (L.), the Arran Brown (Pl. II, fig. 11).

Immigrant species caught in 1977 were few; but they included a *Coscinia cribraria arenaria* Lempke from Kent, a single *Hyles lineata livornica* (Esp.) from north Lancashire, and two examples from Scotland of the many *Eurois occulta* (L.) which invaded eastern Britain in 1977. Among 1976 captures not previously exhibited was a notable *Trigonophora flammea* (Esp.) from West Sussex, with several other scarce immigrants.

The number and variety of aberrations was one of the striking features of the exhibition. Some had been caught in the field, others were the result of skilful selective rearing, or of temperature experiments. Among the former, there was a remarkable collection of twelve major aberrations of *Argynnis paphia* (L.) which had been caught in one wood during 1976 and 1977 (figs. 2, 3), an extreme underside *Plebejus argus* L. ab. *striata* (exhibited on behalf of a non-member) (fig. 14), and a probably unique banded aberration of *Xestia castanea* (Esp.) (fig. 4), as samples of many good things. Among the results of selective breeding, some very fine *Hipparchia semele* L. ab. *holonops* Brouwer (fig. 1) were conspicuous.

Exhibits of the scarcer resident species and of new county records were thinner than usual; but it was interesting to see specimens in various exhibits of the recently discovered *Eriopygodes imbecilla* F. (fig. 7) and all three sub-species of *Luperina nickerlii* Frr. A curious specimen of *Clostera curtula* L. bred from a larva found near Loch Ness is, if not the first

record for Scotland, by far the most northerly. Probable first captures of *Photedes extrema* (Hüb.) in Kent and of *Leucochlaena oditis* (Hüb.) in Sussex were also shown.

Photographs and paintings both of imagines and of larvae were numerous and good, and some new types of distribution maps were on view.

ADAMS, A. E. C. — Interesting species of Macrolepidoptera captured in East Sussex over the past two years, notably: *Hyloicus pinastris* (L.), *Hyles lineata livornica* (Esp.), *Stauropus fagi* (L.) and *Odontosia carmelita* (Esp.).

AGASSIZ, D. and SKINNER, B. — A preliminary exhibit on the *Thera variata* (D. & S.) group, showing series of *T. obeliscata* Hüb., *T. "variata"* britannica Turner, and Continental specimens of the true *T. variata*, with photographs showing the differences in the male antennae.

ALLEN, A. A. — *Cryphia muralis* Forst.: a series taken at Dawlish Warren, 14/18.viii.77, illustrating a multiplicity of forms.

BAKER, B. R. — Species taken or bred from Southern Ireland in June 1977: (A) from Co. Kerry: *Conopia scoliaeformis* (Borkh.), from cocoons; *Leptidea sinapis juvernica* Williams, *Atolmis rubricollis* (L.), *Deltote bankiana* (F.), all from Killarney area. *Ectropis consonaria* (Hüb.), *Acrionicta euphorbiae myricae* Guen., from Minard, Dingle Peninsula. (B) from Co. Clare (Burren): *Zygaena purpuralis hibernica* Reiss., *Adscita staites* (L.), *Erynnis tages baynesi* Huggins, *Euphydryas aurinia hibernica* (Birchall), *Semiothisa clathrata hugginsi* (Baynes), *Pseudopanthera macularia* L., an extreme rayed variety (fig. 18), and *Setina irrorella* L., bred. (C) from both Co. Kerry and Co. Clare: *Hadena perplexa capsophila* Dup. and *H. caesia mananii* Gregson, the latter showing contrast between blue grey specimens from the Burren of Clare and blacker specimens from Dingle Peninsula.

BAKER, P. J. — Interesting garden trap records from Thorpe, N.W. Surrey, 1977: *Apocheima pilosaria* (D. & S.) — a perfect melanic, 5.iii.77; *Eupithecia dodoneata* Guen., five, being a new garden record, over the period 28.iv/12.v.77; *Rhyacia simulans* (Hufn.), a new garden record, 3.vii.77; *Dicycla oo* (L.), a new garden record, 16.vii.77; *Abrostola trigemina* Wernb., new, 27.vii.77; *Mythimna vitellina* Hüb., new, 21.x.77. *Cabera exanthemata* (Scop.): examples of f.₁ and f.₂ generations bred from a melanic female, Studland, Dorset, 1976; *Perconia strigillaria* (Hüb.) — two examples bred from a female taken in Surrey, 7.vi.76.

BAKER, P. J. and PARKER, Wm. — *Herminia lunalis* (Scop.) (*tarsiplumalis* Hüb.). A specimen taken at light in a garden at Dorney Reach, Bucks., in September 1976. First British record.

BANNER, Dr. J. V. — British lepidoptera taken or bred in 1977: *Agrius convolvuli* (L.), from ova laid by a female taken in Surrey; *Hesperia comma* (L.), taken in Sussex: a male with pale ground colour and normal for comparison *Pyronia tithonus* (L.) taken in Sussex: ab. *excessa* Leeds and ab. *pallidus* Leeds.

BRETHERTON, R. F. — Series of *Spaelotis ravidata* (D. & S.) and *Photedes fluxa* (Hüb.) from central Lincolnshire, 31.vii/1.viii.77; *Helicoverpa armigera* (Hüb.), three bred 14.v/6.vi.77 from larvae found on tomatoes, and one *Spodoptera littoralis* (Bdv.), 24.iv.77, from chrysanthemum, all ex Covent Garden, London; series of *Mythimna vitellina* Hüb. reared from an f. *pallida* Warren female caught at Bramley in 1976, those reared wholly at 60°/70°F. being all f. *pallida* and those cooled in the last larval instar and as pupae being f. *vitellina*; *Alcis repandata* L. f. *nigra* Tutt, Bramley, 18.vii.77; *Dasychira pudibunda* L. f. *bicolor* Cockayne, 3.vi.77, and f. *nigra*

Stdgr., 17.vi.77, from Bramley; *Aporophyla lutulenta* (D. & S.), a form near *luneburgensis* Frr., Bramley, 20.ix.77.

BRITISH MUSEUM (NATURAL HISTORY) — from the National Collection of British Lepidoptera (including Rothschild-Cockayne-Kettlewell Collection): *Clostera pigra* (Hufn.), including hybrids with *C. curtula* (L.), two drawers from the newly curated British Notodontidae; two drawers from the Huggins Collection, bequeathed to the National Collection. The Pyralidae include a specimen of the scarce migrant *Hymenia recurvalis* F., first recorded in Britain in 1951; the Geometridae show a fine series of *Campptogramma bilineata* L., including ssp. *isolata* Kane. Also two drawers of Noctuidae from the collection of Mr. W. Reid, recently purchased by the Cockayne Trust, showing melanic forms of *Acronicta* spp.

BRITTON, M. R. — Specimens of *Bembecia chrysidiformis* (Esp.), *Aegeria culiciformis* (L.) (yellow banded form), *Hydraecia osseola hucherardi* Mab., *H. petasitis* Doubl., *Xylena exsoleta* (L.), *Lycia lapponaria* (Bdv.), *Orthosia gothica* (L.) ab. *gothicina*, *Anarta melanopa* (Thunb.), *Catocala promissa* D. & S., with slides of larvae and imagines.

BURTON, G. N. — Selected Heterocera from Minster, Isle of Sheppey, Kent, taken in 1977. They included a very dark melanic *Tethea occularis* L. and a fine male *Coscinia cribraria* L. ssp. *arenaria* Lempke (fig. 9), taken at light on 5th July. This is only the fifth specimen of this race recorded in Kent, the previous four having been taken between Sandwich and Deal, the last in 1937.

CHIPPERFIELD, H. E. — On behalf of Mr. Clive Naunton, *Plebejus argus* L. female underside ab. *striata* (fig. 14), taken in a colony of the species on Westleton Heath, Suffolk.

COLLINSON, W. E. — *Lasiocampa quercus* L. ssp. *callunae* Palmer, forms *luridens*, *olivaceo*, *pallidens*, *femina-colorata*; also cross-pairings of *quercus* and *callunae*, with examples of varieties in the f.₂ of this cross: all from original wild Yorkshire and Hampshire stock bred over several years.

CRASKE, R. M. — Butterflies collected in Hampshire, Sussex and western Ireland in 1977: *Pieris napi* L., female, an extreme ab. *radiata* Rober (upperside), Sussex, July; *Anthocharis cardamines* L., two females with greenish hindwings, Sussex, May; *Polyommatus icarus* Rott. ssp. *mariscolore* Kane, a small series including male and female ab. *obsoleta* Gillmer, west Ireland, June/July; *Celastrina argiolus* L., two females from a third brood observed in Hove in early October; *Maniola jurtina* L., extreme female ab. *anticrassipuncta* Leeds (underside), Sussex, July; *Pyronia tithonus* L. ab. *crassiexcessa* Leeds, two females, Sussex, August; *Melanargia galathea* L., four with costal areas of the forewings heavily suffused with black: this is a very local recurrent form observed in Hants. and Sussex since 1972; a male with very wide border on hindwings, Sussex, August.

CRIBB, P. W. — *Euphydryas aurinia* Rott., a series bred originally from West Sussex stock, showing considerable variability. Stock is available for any *bona fide* attempt at establishment in the wild; *Melitaea cinxia* L., examples from stock taken in the Isle of Wight, which has been breeding wild in Middlesex for six years; *Mellicta athalia* Rott. from Cornish stock, bred for three years on *Plantago lanceolata*, showing signs of aberration; one ab. *eos* Frohawk, another with a large homeotic area on the hindwing; *Lycaena dispar batavus* Obth., three heavily striated, bred from Dutch stock from an aberrant female in 1976; *Nymphalis polychloros* L., bred from larvae taken in south France.

DALEY, T. J. — *Coenonympha pamphilus* L., ab. *partimtransformis* Leeds (female), and ab. *postexcessa* Leeds (male); *Maniola jurtina* L. ab. *partimtransformis* Leeds (female) and ab. *antialba* Leeds (male); *Melanargia galathea* L. with right wing more yellow than left (male); *Pieris rapae* L. ab. *minor*; *Lysandra coridon* Poda ab. *discoelongata* Leeds; a female *Erebia* with white pupils absent in eye-spots, and white-chequered fringes, caught with many *E. aethiops* in the Scottish Highlands in July 1969 (Pl. II, fig. 11): exhibited as an aberration of *E. aethiops* (Esp.): further investigation has shown it to be an example of *E. ligea* (L.).

DOBSON, A. H. — *Hemaris fuciformis* (L.), a second brood specimen caught on 1.viii.77 at Whiteparish, Wiltshire; *Catocala promissa* (D. & S.), New Forest; a small selection of lepidoptera from Hampshire, including species obtained in a bog near Romsey.

EDMUNDS, H. — *Zygaena exulans* (Hohenwarth) ab. *pallida*, from Braemar; a series of *Polyommatus icarus* Rott. ab. *obsoleta*, from Mull; *Polyommix flavicincta* (D. & S.), two contrasting specimens from different localities.

FAIRCLOUGH, A. J. and R. — *Luperina nickerlii* (Frr.) ssp. *gueneei* Doubl., Clwyd, 20.viii.77; *Scopula rubiginata* (Hufn.), second brood, bred August 1977, Suffolk; *Lysandra coridon* (Poda), male underside ab., Surrey, 11.viii.77.

FEARNEHOUGH, T. D. — Aberrations of butterflies captured in the Isle of Wight, *Thymelicus sylvestris* Poda, having whitish forewings and blackish hindwings, 27.vii.68, and ab. *intermedia* Fourc., 12.vii.69; *Pyronia tithonus* L. ab. *albidus* Cockerell, two female, one male, August 1974, 1975, 1977; *Maniola jurtina* L. ab. *pallens* Th-Meig., 31.viii.63, and ab. *semi-intermedia* Lempke, two females, 27.vii.68, 7.viii.72; *Lycaena phlaeas* L. ab. *cuprinus* Pey., 19.viii.73, and ab. *latomarginata* Tutt, 27.viii.74; *Lysandra bellargus* Rott., extreme underside ab., 26.viii.70; *L. coridon* Poda ab. *caeca* Courv., 4.viii.70 and ab. *discreta* Tutt, 20.viii.67.

HARBOTTLE, Rev. A. H. H. and JONATHAN, JANE and DAVID HARBOTTLE. — *Hipparchia semele*, females from Cornish heath and Cornish sandhills; *Clossiana selene* D. & S., second brood (three); *Mesoacidalia aglaja*, dusky female, south Cornwall; *Inachis io* L., a remarkable ab. with large pale area in discoidal cell forewings; *Plebejus argus* L., series from south Cornwall, including one lavender-coloured male and two blue females; *Leptidea sinapis* L., second brood female ab. *erysimi*; *Anthocharis cardamines* L., bred series including one male with orange markings greatly reduced, and series of female ab. *macula-punctata-quadrupunctata*; *Zygaena filipendulae* L., six yellow specimens.

HARMAN, T. W. — Lepidoptera taken or bred in 1976 and 1977: particularly notable were: *Photedes extrema* (Hübner), Dungeness, 2.vii.76: the first authenticated specimen for Kent; *Cyclophora puppillaria* Hübner, at mercury vapour light, Field Study Centre, Canterbury, 26.x.77; a Noctuid moth, not identified, bred from a larva found on board a shipload of Brazilian ginger. Reared on *Veronica* sp., emerged 24.x.77.

HARMER, A. S. — Selected aberrations of British Lepidoptera taken 1972-1977: these included *Quercusia quercus* L. female ab. *depuncta* Lempke (fig. 15); *Lysandra bellargus* Rott. male *subtus-partim-radiata* Oberthur=*digitata* Courv.; *Mesoacidalia aglaja* L. male abs. *viridiata* Strand and ab. nov.; *Clossiana selene* D. & S. male ab. *medionigrans* Cab. and female ab. *transversa* Tutt; *C. euphrosyne* L. male ab. *albinea* Lambillion=*xanthos* Frohawk; *Euphydryas aurinia* Rott. ab. *melanoleuca* Cab.; *Mellicta*

athalia Rott. male extreme ab. *corythalia* Hübn.=*eos* Frohawk; *Erebia aethiops* Esp. male and female transitional to ab. *infasciata* Warren; *Hipparchia semele* L., female ab. *monocellata* Lemke and ab. *caeca* Tutt.

HARPER, Dr. M. W. — *Lomaspilis marginata* L., melanic ab., Woodwalton Fen, Hunts., July 1976; *Graphiphora augur* L., albino, Ledbury, Herefordshire, 1976.

HART, C. — *Orthosia gothica* L. ab. *circumsignata* Hasebrk., from m.v. light, Hooley, Surrey, 21.iii.77; *Agrotis clavis* Hufn., black suffused ab., at m.v. light, Hooley, 27.vii.77.

HEATH, J. (BIOLOGICAL RECORDS CENTRE). — Examples of distribution-maps for eleven Noctuidae, prepared from data assembled by R. Bretherton. These will appear, it is hoped, shortly, both in Vol. 9 of *Butterflies and Moths of Great Britain and Ireland* and *The Provisional Atlas of the Insects of the British Isles*.

HORTON, Dr. G. A. N. — Lepidoptera taken in Monmouthshire in 1977: (A) In his garden at Usk: *Agriopis leucophaeria* (D. & S.); *Orthosia miniosa* (D. & S.); *O. opima* (Hübner.), *Diaphora mendica* (Clerck), female; *Egira conspiciellaris* (L.); *Harpyia bicuspis* (Borkh.), two; *Peridea anceps* (Goeze); *Cryphia muralis* (Forst.), two; *Agrotis puta* ab. *nigra* Tutt (fig. 5.). (B) In north Monmouthshire: *Aconitica menyanthidis* (Esp.), *Lacanobia biren* Goeze; *Parasemia plantaginis* (L.). (C) In south Monmouthshire: *Mythimna obsoleta* Hübn., two.

HYDE, G. E. — A small selection of British butterflies caught or reared in the last 40 to 50 years, including some species now in danger of extinction; also an *Issoria lathonia* L., bred from British stock, and two *Aporia crataegi* L. from east Kent. Two small books on larvae recently published by Jarrold & Son.

IMBER, S. F. — Aberrations of butterflies obtained mostly in garden and Ewhurst area, Surrey, including *Limenitis camilla* L. ab. *nigrina* Weym., and short series of ab. *semi-nigrina*; *Coenonympha pamphilus* L., ab. *anti-excessa* Leeds; *Aglais urticae* L., an unnamed ab. (fig. 10); *Inachis io* L. with scale abnormality; *Lysandra coridon* Poda ab. *alba*.

JACKSON, B. C. — *Eupithecia insigniata* (Hübner.), Huntingdon, at m.v. light, 18.v.74; *Xanthorhoe designata* (Hufn.), Stapleford, Essex, 1st brood, 22.v.76, 2nd brood, 14.viii.76; *Diaphora mendica* (Clerck), bred from larva, Rochester, Kent, 11.iv.75; *Plemyria rubiginata* (D. & S.), Dunton, Essex, 20.vi.74; *Hyles lineata livornica* (Esp.), Heysham, north Lancs., 5.vii.77.

KETTLEWELL, H. B. D. — A selection of Lepidoptera collected at two stations in Scotland in summer 1977.

KNILL-JONES, S. A. — Specimens taken at Freshwater or Freshwater Bay, Isle of Wight, 1st/16th August 1977: *Eremobia ochroleuca* (D. & S.); *Celaena leucostigma* (Hübner.); *Apamea ophiogramma* (Esp.); *Eupithecia phoeniceata* (Rambur); *Cryphia muralis* (Forst.), a series showing local variation; *Nonagra dissoluta* (Treit.); *Semiothisa liturata* (Clerck) ab. *nigrofulvata*; *Cosmia affinis* (L.); *Dypterygia scabriuscula* (L.); *Mythimna albipuncta* (D. & S.), taken 10.vii.77.

LANGMAID, Dr. J. R. — (A) *Melanthia procellata* D. & S., an aberration with suffused smoky brown forewings, which occurs regularly on the South Downs: taken near Petersfield, 5.vii.75; *Xanthorhoe fluctuata* (L.) ab., Southsea, 18.ix.77; *Autographa gamma* (L.), ab. with forewing ground colour velvety black, Southsea, 14.ix.77, with very pale example from Cape Cornwall, 1976. (B) Noctuidae taken at Inch, Co. Kerry, August 1977: *Mesoligea furuncula* (D. & S.), three of unicolorous pale sandy form, on dunes; *Luperina nickerlii knilli* Boursin, four; *L. testacea* (D. & S.), one,

superficially very like *L. knilli*. (C) Taken in Co. Clare, August 1977: *Calamia tridens occidentalis* Cockayne, four; *Aspitates gilvaria burrenensis* Cockayne, four; *Perizoma minorata* (Tr.) ab.; *Photedes captiuncula tincta* Kane, one.

MCFEELY, J. — *Euphydryas aurinia* (Rott.), bred examples from Gloucestershire and Oxfordshire; *Clossiana euphrosyne* (L.), minor varieties bred 1976/1977; *Celastrina argiolus* (L.), three females approaching ab. *lilacinasuffusa* Tutt; *Argynnis paphia* (L.), second brood examples bred 1976; *Apatura iris* (L.), examples bred from larvae which survived virus-like conditions, with photograph of pupa.

MARCON, Rev. J. N. — *Maniola tithonus* ab. *excessa* Leeds, female; *Polyommatus icarus* (Rott.), four Irish, June/July 1977, one blue female, one male with large orange lunules, one male ab. *obsoleta*, one female *obsoleta*.

MESSENGER, J. L. — *Xestia castanea* (Esp.) from Surrey: an extreme aberration with forewings crossed by blackish basal and terminal fasciae (Pl. I, fig. 4), with normal pink, biscuit-coloured and the rare yellow forms for comparison.

MICHAELIS, H. N. — Lepidoptera from North Wales: *Apamea sublustris* (Esp.), *A. charactera* (Hüb.), *Xestia agathina* (Dup.) from heather growing on limestone pavement, *Paradiarsia glareosa* (Esp.), all from Pydew, Caerns.; *Luperina testacea* (D. & S.), *Celaena leucostigma* (Hüb.), from Glanwydden, Caerns.; *Luperina nicklerlii gueneei* Doubl. from Denbighshire and Anglesey; *Apamea oblonga* (Haw.) from Glan Conwy, Denbighshire; *Rheumaptera undulata* (L.) from Maenan, Denbighs.

PELHAM-CLINTON, E. C. — *Agrotis trux* (Hüb.), four specimens collected in September, Ventnor, Isle of Wight — ? second generation; *Eurois occulta* (L.), Winchburgh, West Lothian, two, 13th August, from a large immigration which occurred in Scotland at that time; *Apamea ophiogramma* Esp., melanic, 11th August, Winchburgh, West Lothian. On behalf of Royal Scottish Museum, Edinburgh: *Blepharita solieri* Bdv. (fig. 12), Denholm, Roxburghshire, August 1976, collected in a light trap by Mr. Andrew Buckham. New to the British list.

PHELPS, H. G. and LIPSCOMB, Major-General C. B. — Representative series of twelve major aberrations of *Argynnis paphia* L. taken by the exhibitors in one wood in 1976 and 1977, including ab. *confluens*, male and female, ab. *valezina*, ab. *ater*, female, ab. *ocellata*, male and female, ab. *nigricans*, female.

PICKERING, R. R. — Immigrant and other unusual species taken at m.v. light in a garden at Aldwick Bay, West Sussex, during a period of south and south-westerly winds and heavy rain, 22nd September to 27th October 1976, including: *Acherontia atropos* (L.), 22.ix, evidently chased in by a cat; *Agrius convolvuli* (L.), 3.x, also 25.ix (two); *Trigonophora flammea* (Esp.), 14.x; *Leucochlaena oditis* (Hüb.), 7.x—?, first Sussex record; *Cyclophora puppillaria* (Hüb.), 21.x; *Mythimna unipuncta* (Haw.), 27.x, also 2.x.1975; *M. albipuncta* (D. & S.), 11 and 25.x, also 8.x.1977; *M. vitellina* (Hüb.), 28.ix and 3.x.1976, also 9.x.1977 (two), 13, 19 and 25.x.77; *Helicoverpa armigera* (Hüb.), 14.x.76; *Eumichtis lichenea* (Hüb.), 24.ix/23.x.76, eight shown for colour comparison; *Lithophane leautieri* (Bdv.), *hesperica* Bours., first specimens in 1977 on 2.x, thereafter rising to peak 8/10.x.

PICKLES, A. J. — Selected lepidoptera bred during 1977: *Thecla betulae* (L.), ex ovis, Sussex; *Hemaris fuciformis* (L.), e larvis, New Forest; *Xanthia citrigo* (L.), e larvis, Lymington; *Agrotis ripae* (Hüb.), at rest on marram,

Hayling Island, Hants.; *Xestia ashworthii* (Doubl.), e larvis, Minffordd, Coris; *X. agathina* (Dup.), e larvis, swept in New Forest; *X. castanea* (Esp.), e larvis, swept in New Forest; *Orthosia gracilis* (Esp.), ex ovis, New Forest; *Mythimna litoralis* (Curtis), e larvis, Hayling Island; *Acrionicta alni* (L.), ex ovis, New Forest.

REVELS, R. C. — Results of breeding *Hipparchia semele* L. ab. *holonops* Brouwer to the F₂ generation, which produced a fine female of this ab. (fig. 1); results of eight years breeding of *Lysandra coridon* Poda, abs. *ultrafowleri* B. & L. and *semi-syngrapha* Tutt, which include very extreme forms of these abs.; butterfly aberrations captured in 1977, the best being *Lysandra coridon* (Poda) female ab. *antidigitata* B. & L. (from Dorset) and ab: *ultranubile* B. & L. (from the Chilterns); *Coenonympha tullia* (Müll.) ab. *lanceolata* Arkle (Lake District); also abs. of *Fabriciana adippe* (D. & S.), *Melanargia galathea* L., *Hipparchia semele* L.

RICHARDSON, N. A. — (A) from North Wales, 1976: *Orthosia gothica* (L.), melanic ab. (vol. 10, pl. VIII, fig. 10), *Discestra trifolii* (Hufn.) ab. (B) from Hunts., 1977: *Zeuzera pyrina* (L.), *Hadena compta* (D. & S.), *Aporophyla lutulenta* (D. & S.), *Eremobia ochroleuca* (D. & S.), etc.

RUSSWURM, A. D. A. and MIDDLETON, H. G. M. — British butterfly aberrations, summer 1977, including: *Plebejus argus* L. ab. *privata* Courv., three males, New Forest; an *infraobscura*, three males, New Forest; ab. *albopunctata*, four females, Dorset; *Lysandra coridon* Poda, various abs.; all from Portland, Dorset; *Hipparchia semele* L. ab. *mosleyi* Obth., Dorset; *Maniola jurtina* L., six female abs. from Dorset; *Pyronia tithonus* L., six female abs. from Dorset; *Pyronia tithonus* L., five abs. from a Hampshire field. Also *Syngrapha interrogationis* L., an extreme example of the Continental form taken in m.v. trap at Boldre, Hants., 7.viii.68 (Pl. I, fig. 6).

SIMSON, Brig. E. C. L. — *Ectropis crepuscularia* D. & S., 'rayed' form (fig. 16), with normal pale and dark forms for comparison; *E. consonaria* Hübn. (fig. 17), male and female forms, South Wales.

SKINNER, B. — *Diarsia mendica orkneyensis* B.-S., showing great variation, Orkney Mainland, July/August 1977; *Clostera curtula* L., bred from larva on aspen, Loch Ness, Inverness-shire; *Eriopygodes imbecilla* F., short series, Monmouthshire, 16.vii.77; *Hylaea fasciaria* L. f. *prasinaria* Schiff., bred from larvae on Douglas fir, Ham Street, Kent; *Agrotis puta insula* Rich., St. Mary's, Scilly, on ragwort blossom, August 1977.

TREMEWAN, W. G. — *Zygaena trifolii palustrella* Verity, series from chalk downs, and *Z. trifolii decreta* Verity from bogs and marshes, with blown larval skins, cocoons and photographs of habitats; *Z. lonicerae transferens* Verity, series, with blown larva skin and cocoon. All from various localities in England.

TUBBS, R. S. — *Limenitis camilla* L. ab. *nigrina* Weym., taken near Winchester: twenty eggs collected nearby with a view to breeding an F₂ generation; *Hipparchia semele* L. ab. *holanops* Brouwer, from eggs given by R. Revels, F₂ generation. This aberration appears to be a simple recessive.

WALKER, D. G. — Rhopalocera obtained in Surrey 1969/1977: *Polyommatus icarus* Rott. ab. *caeca*, female; *Pieris napi* L., asymmetrical ab., bred; *Coenonympha pamphilus* L. ab. *transformis* Leeds, male.

WATSON, A. W. and Mrs. A. — Aberrations of British Lepidoptera, including: *Pyronia tithonus* (L.) ab. *transformis* Leeds; *Melitaea cinxia* (L.), temperature experiments; *Aglais urticae* (L.), temperature experiment

(donated by M. Dukes); *Polygonia c-album* (L.), temperature experiments; *Lasiocampa quercus callunae* Palmer, bred by Amanda Watson from larvae collected in Scotland and donated by W. E. Collinson, Yorkshire; *Callimorpha dominula* (L.), from larvae at Downton, Wilts., many specimens approaching f. *basinigra* Cockayne; *Amphipoea oculea* (L.), with discoidal extending to white streak; *Tyria jacobaeae* (L.), four drawers of aberrations, many more extreme than those previously bred; *Laothoe populi* (L.) x *Smerinthus ocellata* (L.) (*hybridus* Steph.), a dozen resultant aberrant specimens.

WHEELER, A. S. — *Pararge aegeria* (L.), representative series of bred specimens, Guernsey and Herm, Channel Islands, spring and summer 1972, and St. Mary's, Scilly (ssp. *insula* Howarth), autumn 1976 and 1977.

WILD, E. H. — Aberrations of British lepidoptera taken in his garden at m.v. light, Selsdon, Surrey: *Mimas tiliae* L., pale grey form with transverse pink band and black hindwings; *Phlogophora meticulosa* L., heavily suffused with grey; *Agrotis exclamationis* L. ab. *pallida-unicolor* Tutt; *A. segetum* D. & S. f. *pallida* with stigmata outlined in black and without transverse lines, small — 32 mm.; *A. clavis* Hufn., selected abs.; *Xanthia icteritia* (Hufn.) ab. *virgata* Tutt, an extreme pink suffused form; *Aglais urticae* L., a purple-transfused form, and a form with large additional yellow area in the centre of the forewing. Also *Tyta luctuosa* (D. & S.), 2.viii.77 — the first in the area for many years; *Aegeria culiciformis* (L.), yellow banded, Wansford, 1948.

WILTSHIRE, E. P. — *Lithophane leautieri* (Bdv.) *hesperica* Boursin, from larvae beaten from Cypress, Dunster, north Somerset, 17.vi.77, emerged mid-September: transparency of larva, cocoons, pupa cases, and two adults (male and female) showing range of dark and light variation.

WORMS, Dr. C. G. M. DE. — Selections of British Lepidoptera taken or bred in 1977, mainly from St. David's (Pembrokeshire), the Lizard (West Cornwall) and Orkney, including *Eilema caniola* Hübn., *Euxoa obelisca* D. & S., *Luperina nickerlii leechi* Goater, from the Lizard; *Oligia versicolor* Borkh., *Autographa bractea* Dup., *Zygaena trifolii decreta* Verity from St. David's; *Eupithecia venosata orcadensis* Prout., *Hadena confusa* (Hufn.) from Orkney; *Eriopygodes imbecilla* F. from South Wales. A number of minor aberrations were shown, and also series of forms of *Plebejus argus* L.: from heathland in New Forest and Surrey and, as the extinct f. *masseyi* Tutt, from Westmorland; from sand dunes in south Cornwall; from chalk in Dorset and Hampshire, with the larger f. *cretaceus* Tutt from Eynsford in Kent, and also f. *caernensis* Thompson on limestone on Great Orme, Caernarvonshire.

YOUNG, L. D. — *Plebejus argus* L., a series of five type and one ab. *basijuncta* bred from a wild female ab. *basijuncta* taken in the New Forest, June 1975; *Lysandra coridon* Poda, a second brood series from female collected in August 1976; *L. bellargus* Rott., a selection of the bluest females in F₁ from Berkshire parent, September 1974 — F₂ produced entirely brown females; also six male variations bred in August 1977 from a parent collected on the North Downs on 14th June, 1977; *Polyommatus icarus* Rott. ab. *caeca* and an ab. with light yellow lunules on hindwings upperside, collected in Berks. and Hants., August 1976; also a female form with enlarged fore and hindwing discoidal spots, a feature maintained through three bred generations.

FOREIGN LEPIDOPTERA

Fifteen exhibitors showed foreign Lepidoptera, mostly Palaearctic, with France as the predominant source. Miss M. L. ARCHER exhibited two dozen species of Alpine butterflies from a visit to La Gorge de St. Pierre and Allos, Hautes Alpes, in August 1977, including interesting *Erebia* and Coppers. M. HADLEY and M. J. PARSONS showed the results of five weeks' collecting at Chateau de Paron, Sens, Yonne, in July and August, including many Heterocera caught in a Robinson light trap. R. F. BRETHERTON, P. W. CRIBB and R. C. DYSON showed representative selections of butterflies caught during a six-man expedition to the French Massif Central, with some stops during the journey there, from 4th to 16th July, an account of which will appear in the *A.E.S. Bulletin*. About half of the 110 species recorded were exhibited, some of the more interesting being *Boloria aquilonaris* (Stichel), *Lycaena helle* (D. & S.), *Scolitantides orion* (Pallas), *Clossiana titania* (Esp.), *Melanargia russiae* (Esp.), and local races of six species of *Erebia*. All these were from the Massif Central; the very local Hesperid *Heteropterus morpheus* (Pall.) was found in the Forêt de Vierzon, Cher, and, along with *Apatura iris* (L.) and *A. ilia* (D. & S.), in the Forêt de Rambouillet, Yvelines. G. N. BURTON also showed species of *Erebia* from Cantal, Massif Central, and *Lysandra coridon* (Poda), whose presence in this purely "volcanic" area is surprising, collected in August 1977; he also had various species from the Jaca district in north Spain. From that country H. G. PHELPS exhibited a selection of Lycaenidae taken in May and June 1976 and 1977, including possible hybrids between *Lysandra coridon asturiensis* de Sag. and *L. bellargus* (Rott.), with bred specimens of the latter's f. *ceronus* Esp. S. E. WHITEBREAD showed a large selection of Lepidoptera taken in Sicily and Calabria in August and September 1977, mostly not yet identified but including species of Heterocera which are familiar as immigrants to Britain. Completing the European exhibits, C. B. ASHBY showed a first instalment of a representative collection of Swedish Macrolepidoptera which the Society has been pleased to accept from our member in Stockholm, STIG TORSTENIUS.

From the Middle East, W. G. TREMEWAN showed a series of *Zygaena cambyzes* Led. and *Z. tamara* Christoph. reared in England ab. *ovis* Iran: the life history of *Z. cambyzes* was previously unknown. T. B. LARSEN showed from Lebanon *Maniola telmessia* (Z.), an extreme ab., Tripoli; *Melitaea didyma libanotica* Belter, female ab., Byblos; and an unidentified Lycaenid, probably a hybrid, from the Cedar mountain; from Jordan, *Euchloe falloui* Allard, Ras el Naqb, and *E. belemia* (Esp.), Ramtha, species which are rarely sympatric; from Israel *Iolana alferii* Wiltshire; from Sinai Peninsula two recently described endemic species, *Strymonidia jebelia* Nakamura and *Pseudophilotes sinaicus* Nakamura; from Morocco, *Gonepteryx cleopatra* (L.), inter-sex, near Tetouan.

From the Nearctic zone L. J. EVANS had an interesting collection of 32 species of butterflies taken in South Ontario, Canada, eight of which are also on the British list: From Africa D. M. TREMBATH showed six drawers of butterflies (104 species) from Kenya and two drawers from South Africa. Among the rarer Kenyan species were *Bematistes quadricolor* Rog., *Amauris inferna* Butler, *Apaturopris cleocharis* Hew., and various *Cymothoe* Hübner. G. H. MANSELL exhibited a fine selection of butterflies from Malaysia.

BRITISH MICROLEPIDOPTERA

There were many noteworthy microlepidoptera among those exhibited, including *Gelechia sabinella* Z., *Eucosma metzneriana* Treitschke (fig. 13) and *Scythris potentillae* Z., all three new to Britain. Among others of particular note were *Olethreutes aurofasciana* (Haw.), *Coleophora hydrolapatella* Hering (bred), *Stigmella aceris* (Frey) (bred), *Acanthophila alacella* (Z.), *Parameria gnomana* (Clerck) and *Pammene luedersiana* (Sorhagen).

AGASSIZ, Rev. D. J. L. — *Gelechia sabinella* Z., new to Britain, from Enfield. Four newly introduced species of Nymphulinae taken among exotic aquatic plants in nursery hothouses at Enfield: *Nymphula enixalis* Swinhoe (= *linealis* Moore); an unnamed *Nymphula* sp.; *Parapoynx diminutalis* Snellen and *Oligostima angulipennis* Hampson. All five species taken by the exhibitor in 1977.

ALLEN, Dr. A. A. — *Paracystola acroxantha* Meyrick. Only 7½ specimens (the "½" being a forewing) have been recorded from Britain, 3½ of these in the 1920's. The species was rediscovered in 1971 (cf. Agassiz, *Ent. Rec.*, 83: 39 (1971)) and the exhibit consists of the captures since then. Two were found in moorland near Dawlish, Devon, 23 and 26.vi.1976; the third was caught 18.viii.1977 in Dawlish. For a more complete account see Allen, A. A. in *Proc. Brit. ent. nat. Hist. Soc.*, 9: 119 (1976) and *Ent. Rec.*, 89: 14 (1977). *Nemaxera corticella* (Curtis), Sidlow, near Reigate, one in crevice of oak bark, 30.vii.1974. *Ochsenheimeria mediopectinellus* (Haw.), two of many specimens flying in mid-day sun in a localised part of Folkestone Warren, 29.viii.1975. *Pseudotelphusa scaella* (Scop.), one, Bradfield, Berks., 17.vii.1977. *Teloides decorella* (Haw.), one on oak bark taken near Tilford Common, Surrey, 27.ii.1977. *Stathmopoda pedella* (L.), disturbed from *Ahnus glutinosa*, Brownsea Island, Dorset, 9.vii.1977. *Mompha lacteella* (Stephens), one at actinic light in a wood at Salfords, Surrey, 12.vi.1976. *Glyphipteryx linneella* (Clerck), part of a series obtained at Manor Park, London, E.12, 25-26.vi.1977 — the insects were caught as they flew in mid-day sunshine around limes. *Olethreutes aurofasciana* (Haw.), near Chiddingfold, Surrey, 26.vii.1975. *Zeiraphera isertana* (F.), form with marked green forewings, Newton Abbot, Devon, 27.vi.1976. *Gypsonoma aceriana* (Dup.), Salfords, Surrey, bred 21.vi.1975 from a larva in *Populus tremula*. *Commophila aeneaa* (Hbn.), Salfords, Surrey, 13.vi.1976, 3.vii.1977.

BRADFORD, E. S. — A drawer of lepidoptera bred or taken during 1977. The most noteworthy, all from Kent, being: *Scythris grandipennis* (Haw.), bred from larvae on *Ulex*, Clowes Wood, Blean. *Cydia* (*Cydia*) *conicolana* (Heylaerts) bred from a pine cone taken at Covert Wood, Barham. *Infurcitinea argentimaculella* (Staint.), bred from larvae, Duncan Down, near Whitstable and Faversham. *Cydia* (*Grapholita*) *modesta* (Busck), found flying in a house near Blean. *Dasycera oliiviella* (F.), East Blean. *Stenodes alternana* (Steph.), Sandwich, bred from larva feeding in flower-head of *Centaurea scabiosa*. *Capperia britanniodyctyla* (Gregs.) and *Anania funebris* (Ström) taken on the Society's field meeting at Ellenden Wood, 31.vii.77.

BRETHERTON, R. F. — *Eurrhypara perlucidalis* (Hb.), one, Central Lincolnshire, 31.vii/1.viii.77, probably the first Lincs. record. *Dioryctria* ? *simplicella* Heinemann (possibly only a form of *D. abietella* (D. & S.) or *D. mutata* (Fuchs)), Bramley, Surrey, 1.ix.76, 21.viii.77; these (and others not exhibited) appear to be identical with *D. simplicella*, figured and described as a species new to the Netherlands in *Ent. Bericht* (1976), 36: 98; the validity of this as a good species is, however, disputed.

BROTHERIDGE, D. — A collection of about 170 moths, mostly micros, collected at or near Swindon, Wilts., including: *Cyclophora pupillaria* (Hbn.); *Hoplodrina ambigua* (D. & S.) (the second for Wilts.); *Eupithecia intricata arceuthata* Frr.; *Parachromistis albiceps* (Z.); *Blastodacna hellerella* (Dup.); *Batia lunaris* (Haw.); *Teleiodes alburnella* (Z.). (Note: the latter is perhaps a new county record. — J.M.C.-H.)

CHALMERS-HUNT, J. M. — *Anania funebris* (Ström), Irish form, Rinnamona, Co. Clare, 8.vi.77. *Pyrausta sanguinalis* (L.), Irish form, Carran, Co. Clare, 8.vi.77. *Nymphula enixalis* Swinhoe and *Oligostigma angulipennis* Hampson, Enfield, Middx., 22.ix.77, taken among tropical aquatic plants in nursery hothouses. *Epinotia nisella* (Clerck), striking black and grey ab., Gorswen, near Builth Wells, Breconshire, 3.ix.77. *Coleophora saturatella* Stainton, Dartford Heath, series bred vii.77 from cases found on broom, also two spp. of hymenopterous parasite. *C. hydrolapathella* Hering, Hickling, Norfolk, two bred 4, 6.vii.77 from cases collected by the exhibitor on *Rumex hydrolapathum*, 3.x.76. *Scythris fletcherella* Meyrick, Trottiscliffe, Kent, 5.vii.77. *Cosmopterix drurella* (F.), Derreen Wood, Lauragh, Co. Kerry, 5.vi.77, new to Ireland. *Gelechia hippophaella* (Schrank), Sandwich Bay, several bred 9-19.viii.77 from larvae on *Hippophae rhamnoides* collected 5.vii.77. *Pancalia latreillella* Curtis, Rinnamona, Co. Clare, 8.vi.77.

EMMET, Lt. Col. A. M. — (i) New or rare Microlepidoptera from the county of Essex collected in the course of the compilation of a county list to be published in 1979. *Bohemannia quadrimaculella* (Boheman), Berechurch, 16.viii.77; new to Essex. *Ectoedemia turbidella* (H.-S.), Great Chesterford, 28.v.77; new to VC19. *Etainia decentella* (H.-S.), Thornden Park, bred 14.vi-14.vii.77; Ugley, bred 26.vi.77; Littlebury, 7.vii.77; new to Essex in both vice-counties (VC18 and 19). *Stigmella tiliae* (Frey), Chalkney Wood, Earl's Colne, bred 4.viii.77; new to Essex. *Nematitis cupriacella* (Hb.), Great Sampford, 6.vii.77; first Essex record since *Victoria County History* (1903). *Diplomodoma herminata* (Geoffroy), Thornden Park, bred 26.vi.77; first Essex record since 1951. *Bacotia sepium* (Speyer), Great Chesterford, bred 25.vii.77; new to VC19; first Essex record for over a century. *Ochsenheimeria bisontella* (L. & Z.), Sawbridgeworth Marsh NR, 28.viii.77; new to VC19; first Essex record since 1936. *Phyllonorycter ulicolella* (Stainton), Hainault Forest, 4.vii.77; new to Essex. *P. scopariella* (Z.), Woodham Walter, 4.vii.77; first Essex record since 1880. *Coleophora trigeminella* Fuchs, Benfleet, bred 24-27.vi.77; new to Essex. *C. junicolella* Stainton, Tiptree Heath, 3.viii.77; new to Essex. *Stephensia brunnichella* (L.), Saffron Walden, bred 3-7.v.77; new to Essex. *Elachista biatomella* (Stainton), Saffron Walden, bred 10.v.77; new to VC19; first Essex record since 1915. *E. utonella* Frey, Sawbridgeworth Marsh NR, 22.vii.77; new to VC19; first Essex record since 1951. *E. scirpi* Stainton, Vange, bred 20-27.vi.77; Colne Point, bred 18.vi.77; first Essex record since 1911; new to VC19. *E. cinereopunctella* (Haw.), Saffron Walden, bred 1-9.iv.77; new to Essex. *E. gleichenella* (F.), Saffron Walden, bred 16.v.77; new to Essex. *E. megerlella* (Hbn.), Epping Forest, bred 16-17.iii.77; new to Essex. *E. alpinella* Stainton, Sawbridgeworth Marsh NR, 22.vii.77; new to Essex. *Monochroa lucidella* (Stephens), Matching Green, 14.viii.77; noted in this locality, then new to VC19, by R. W. Uffen in 1975. *M. palustrella* (Douglas), Malden, taken in light trap by Mrs. C. Harley; last Essex record 1909. *Aristotelia ericinella* (Z.), Tiptree Heath, 3.viii.77; new to VC19. *Pulicalvaria piceaella* (Kearfott), Little Baddow, 10.vii.77; new to

Essex; this is believed to be the fourth British specimen of this North American species. *Pseudotelphusa scalella* (Scopoli), Thorndon Park, 23.v.77; a scarce species, but well known from south-west Essex. *Teleiodes paripunctella* (Thunberg), Hainault Forest, 29.vi.77; a scarce species last recorded in Essex in 1949. *Aroga velocella* (Z.), Chigwell Row, taken in a Rothamsted trap by I. Sims; first Essex record since 1913. *Neofriseria singula* (Stgr.), Fingringhoe, bred 12-18.vii.77; new to Essex. *Caryocolum fraternella* (Douglas), Chingford, bred 30.vi-6.viii.77; new to Essex. *Telephila schmidtiiellus* (Heyden), Littlebury, bred 6-14.vii.77; new to Essex. *Stathmopoda pedella* (L.), Little Baddow, 10.vii.77; first Essex record since VCH (1903). *Dystebenna stephensi* (Stainton), Hainault Forest, 30.vii.77; first Essex record from this locality since 1859. *Aethes hartmanniana* (Clerck), Great Sampford, 10.vii.77; new to VC19; first Essex record since VCH (1903). *Clepsis spectrana* (Treitschke), Newport, bred 20.vi-6.vii.77; on typical and two f. *liverana* Mansbridge, a form new to Essex. *Cnephasia conspersana* Douglas, Maldon, taken in a Rothamsted trap, 4.viii.77, by Mrs. C. Harley; first Essex record since 1886. *Eana incanana* (Stephens), Weeleyhall Wood NR, 4.vii.77; new to VC19. *Dichrorampha sylvicolana* Hein., Epping Forest, 30.vii.77; first Essex record since 1897. *Gypsonoma oppressana* (Treitschke), Saffron Walden, 12-15.vii.77; new to north-west Essex. *Adaina microdactyla* (Hbn.), Hatfield Forest Marsh NR, 28.viii.77; new to VC19, first Essex record since 1901.

(ii) Nepticulidae from the county of Kent. *Stigmella repentiella* (Wolff), Sandwich, bred 12.iv-1.v.77; first recorded in Britain in 1976 after the detection of a misidentified specimen (bred 7.viii.1957) in coll. S. H. Wakely. *S. aceris* (Frey), Four Elms, bred 27.vii.77; the first British specimen since the one bred by Lord Walsingham from a larva taken at Lymington, Hants. on 22.viii.1914 and misidentified as *S. speciosa* (Frey).

FAIRCLOUGH, A. J. & R. — *Pelochrista caecimaculana* (Hbn.), 18.vii.77. *Coleophora saturatella* Stainton, bred Suffolk vii.77. *Acanthophila alacella* (Z.), one specimen to m.v. light, Kent, 9.vii.77 (cf. *Ent. Rec.*, 89: 283). *Acleris cristana* (D. & S.) f. *fuscana* Clark, f. *nigrocapucina* Manley, f. *postchantana* Webb, f. *protolana* Manley and another new form related to the one shown in 1976, all bred 1977 from Surrey and Sussex crosses and Sussex and Hunts. crosses. *Coleophora artemisicolella* Bruand, Surrey, living larvae on *Artemisia vulgaris*. *C. wockeella* Z., Sussex, living larvae on *Stachys betonica*. *C. fuscocuprella* H.-S., Sussex, living larvae on *Corylus avellana*.

GODFRAY, H. C. J. — *Parameria gnomana* (Clerck), near Burwash, Sussex, viii.77; first confirmed British occurrence (cf. *Ent. Rec.*, 89: 274). *Evergestis extimalis* (Scop.), Folkestone Warren, 28.vii.77. *Pandemis corylana* (F.), near Burwash, Sussex, two, including one with markings obsolescent, vii-viii.77. *Lozotaeniodes formosanus* (Geyer), near Burwash, Sussex, two, 21.vii.77.

HARGREAVES, B. — Plates of Tortricoid Moths from Volume 2 of *British Tortricoid Moths* for intended publication by the Ray Society.

HARPER, Dr. M. W. — 36 species of Genus *Phyllonorycter* (Lep.: Gracillariidae), from Herefordshire, bred between 1975-77.

HARPER, Dr. M. W. and LANGMAID, Dr. J. R. — The leaf-mines of eight of our oak-feeding species of *Phyllonorycter*. The drawer demonstrated both upperside and underside views of the mines, and series of the following species: *harrisella* L., *roboris* Z., *heegeriella* Z., *quercifoliella* Z., *messaniella* Z., *muelleriella* Z., *distentella* Z., and *lautella* Z.

HORTON, Dr. G. A. N. — Exhibited the following taken in his garden at Usk, Monmouthshire: *Ptycholomoides aeriferanus* H.-S., *Palpita unionalis* Hb., *Pammene aurantiana* Staud.

JOHNSON, P. J. — A small selection of lesser-known species of microlepidoptera: *Syncopacma vinella* (Bankes), Ditchling Common, Sussex, 1976, bred from *Genista tinctoria*. *Cryptoblates gnidiella* (Millière), feeding larva and imago bred from pomegranate bought from a Cambridge greengrocer, 1976. *Scrobipalpa ocellatella* (Boyd), Mucking Creek, Essex, 1976, bred from *Beta maritima*. *Cydia leguminana* (L. & Z.), Wicken Fen, bred 1976 from a pupa. *Lozotaeniodes formosanus* (Geyer), Horseheath, Cambridge-shire, 1977.

KNILL-JONES, S. A. — *Galleria mellonella* (L.), Freshwater, Isle of Wight, viii.1977. *Aethes hartmanniana* (Clerck) and *Nemophora scabiosella* (Scopoli), Featherbed Lane, Addington, Surrey, 24.vii.1977, taken on the occasion of the Society's Field Meeting.

LANGMAID, Dr. J. R. — *Clepsis spectrana* (Tr.) f. *liverana* Mansbridge, Shrewsbury, v.1977, bred from *Tanacetum vulgare*. *Syndemis musculana* (Hbn.), Cape Cornwall, two specimens of a form similar to ssp. *musculinana* (Kennel), bred 1976. *Crociosema plebejana* (Z.), Cape Cornwall, series bred from *Lavatera arborea*, 1976. *Epiphyas postvittana* (Walk.), Penzance, series bred 1976. *Platyedra subcinerea* (Haw.), Portsmouth and Southsea, series bred from *Malva sylvestris*, 1977. A series each of three species of *Tortrix* associated with *Abies grandis* in Hampshire: *Pammene ochsenheimeriana* (L. & Z.), *Epinotia fraternana* (Haw.), *E. subsequana* (Haw.); the last two, previously considered rare, are very abundant in some localities. *Pyrausta sanguinalis* (L.), *Eana penziana colquhounana* (Barrett) and *Epiblema incarnatana* (Hbn.), all from the Burren, Co. Clare, taken viii.1977.

MICHAELIS, H. N. — Lepidoptera from N. Wales: *Hypochalcia ahenella* (D. & S.), Pydew, Caerns. *Apodia bifractella* (Dup.), Glanwydden, Caerns. *Scrobipalpa instabilella* (Dougl.), Conwy, Caerns. *Mompha epilobiella* (Roemer), Glan Conwy, Denbs. *Cydia compositella* (F.), Glanwydden, Caerns. *C. internana* (Guen.), Deganwy, Caerns. *Hysterosia inopiana* (Haw.), Glanwydden, Caerns. *Phalonidia manniana* (F. & R.), Glanwydden, Caerns. *Phyllonorycter quinnata* (Geoff.), Glan Conwy, Denbs.; leaf of hornbeam showing upperside mine — hornbeam is not native to these parts and the trees were introduced as a screen about 20 years ago; presumably the larvae came with the young trees.

PELHAM-CLINTON, E. C. — *Eutromula diana* (Hbn.), Glen Affric, Inverness-shire, three, 21.viii.77. *Pammene luedersiana* (Sorhagen), Rannoch, Perthshire, 18.vi.77 — the third British specimen.

REVELL, R. J. — *Eucosma metzneriana* Treitschke, a single specimen taken at m.v. light (tripod and sheet) at a waste chalky locality near Cambridge; the species is new to Britain. Also from the same locality, *Homoeosoma nebulella* D. & S.

ROCHE, J. — Specimens of *Scythris potentillae* Z. taken by the exhibitor in Suffolk, 30.vi.77. Previously unrecorded for Britain.

SOKOLOFF, P. A. — A selection of microlepidoptera bred during 1977, including *Galleria mellonella* (L.), Guildford, ex honeycomb; *Reuttia subocella* (Steph.), Bromley, Kent, ex *Mentha aquatica*; *Chionodes distinctella* (Z.), Trottscliffe, Kent; *Ptycholomoides aeriferanus* (H.-S.), Andrews Wood, Shoreham, Kent, ex larch.

WHITEBREAD, S. E. — A selection of specimens taken in Sicily and Calabria in August and September 1977; the principle collecting areas were at Borgetto, near Palermo, Sicily and Nicotera and Sitizano in Calabria. (1) From Sicily *Ancylolomia tentaculella* (Hbn.). (2) From Calabria: *Agriphila trabeatella* (H.-S.); *Pleuroptya ruralis* (Scop.); *Aethes margarotana* (Dup.); *Endotricha flammealis* (D. & S.); *Dysgonia algira* (L.); *Pyrausta sanguinalis* (L.); *Angustalius malacellus* (Dup.); *Ancylolomia inornata* (Stgr.). Also, *Opostega crepusculella* Z. which was flying in numbers over a species of *Mentha* growing in a small stream; the foodplant of *crepusculella* is unknown but the species is thought to be associated with *Mentha*.

DIPTERA

CHANDLER, P. J. — (1) Some notable Diptera found during 1977: *Limonia quadrimaculata* (L.) (Tipulidae), Windsor Forest, Berks., 25.vi, on decaying beech; *Solva maculata* (Mg.) (Xylomyiidae), reared from puparia collected on 7.vi, ex rot hole in living beech, Windsor Forest, Berks., ♀ emerged 18.vi, ♂ 20.vi.; *Rhadiurgus variabilis* (Zett.) (Asilidae), 11.vii, ♂ and ♀ on sunlit boulders by River Dee, Invercauld Bridge, Grampian Reg.; *Laphria flava* (L.) (Asilidae), with *Aphodius* sp. as prey, Glen Lui, Grampian Reg., 12.vii; *Atherix ibis* (Fab.) (Rhagionidae), ♂ on riverside by Dee, Bridge of Aboyne (clusters of dead females exhibited by A. E. Stubbs, were found further up the Dee at Ballater), 13.vii; *Megasyrphus annulipes* (Zett.) (Syrphidae), 15.vii, Invercauld Bridge, on *Cirsium heterophyllum* (L.) Hill flowers on river bank; *Chamaesyrphus scaevoides* (Fall.) (Syrphidae), Glen Ey and Claybokie, Grampian Reg., pine forest; *Eurygnathomyia bicolor* (Zett.) (Pallopteridae), the second British record, on low vegetation in alder wood, Scargill, N. Yorks., 16.vi; *Amiota (Phortica) variegata* (Fall.) (Drosophilidae) numerous at sap runs from a *Cossus* infected oak, New Forest, 10.ix.

(2) Examples of two British species of *Chorisops* (Stratiomyidae), previously confused under *tibialis* (Meigen) but recently distinguished by Dr. R. Rozkosny; *tibialis* which is darker in colour, is commoner and reaches Yorks. and south-east Ireland, while the new species is southern but already known from Kent/Sussex to Cornwall and S. Wales; one male of the latter was reared from flood refuse by the River Test at Leckford, Hants.

(3) Some flies found in unusual associations at Windsor Forest, Berks. during 1977: (a) *Microsania* species (Platypezidae), the well known Smoke Flies, and *Homopeza obliterata* Zett. (Emphididae), a little known species attracted to burning pine wood, 22.vi, the second British record — both sexes of the latter settled on smouldering logs and their whitish wings made them inconspicuous against the ash, in the pooter they preyed on *Microsania*; (b) *Astiosoma rufifrons* Duda (Asteiidae), new to the British list, numerous on cold bonfire ash, vi-vii, and at smouldering elm wood, Old Windsor, 11.ix; (c) *Chymomyza distincta* (Egger) (Drosophilidae) on cut ends of pine logs with *C. fuscimana* (Zett.), a commoner species, but also only readily found on cut ends of logs left lying in woodland; (d) photographs of the bonfire site and adjacent stack of cut logs at which the above species were collected.

ELSE, G. R. — (1) Some uncommon or local, mostly parasitic, Diptera collected in Hants. in 1977: *Acrocera globulus* Panzer (Acroceridae), New

Forest, 25.vii; *Ogcodes gibbosus* (L.) (Acroceridae), New Forest, 10.viii, beaten from sallow; *Thyridanthrax fenestratus* (Fall.) (Bombyliidae), New Forest on sandy path, 2.vii; *Bombylius canescens* Mikan (Bombyliidae), Porton Down, Wilts., 25.vi, at rest on *Echium vulgare* L. flower; *Gasterophilus intestinalis* (Deg.) (Gasterophilidae), flying around a pony with its ovipositor exerted, hanging vertically, Lyndhurst, 27.vii; *G. pecorum* (F.), flying low on heathland, New Forest, 27.vii (its remembrance to a worn *Bombus pascuorum* (Scop.) when in flight was noted); *Hippobosca equina* L. (Hippoboscidae), New Forest, 2/9.vii, common in the Forest during 1977; *Eustalomyia histrio* (Zett.) and *E. vittipes* (Zett.) (Anthomyiidae), Crab Wood, 10/11.ix on dead beech trunk.

(2) *Solva maculata* (Mg.) (Xylomyiidae), 9.vii, settling on bracken and a dead beech tree near Lyndhurst, Hants.; this striking insect is rarely seen on the wing, most examples in collections like those exhibited by P. J. Chandler (see above).

JONES, R. A. — Some uncommon Diptera collected during 1977, mostly in Sussex and Hants.: *Myolepta luteola* (Gmelin) (Syrphidae), taken in late vii at Braemore Wood (chalk), sitting on a bramble leaf; *Xylotomima lenta* (Mg.) (Syrphidae), Heathfield and Harewood Forest; *Thecophora fulvipes* (R.-D.) (Conopidae), South Heighton; *Gymnosoma rotundatum* (L.), on *Heracleum* flowers at Arundel and *G. globosum* (Fab.) (Tachinidae), swept on White Downs; *Subclytia rotundiventris* (Fall.) (Tachinidae), Harewood Forest; *Cylindromyia interrupta* (Mg.) (Tachinidae), Kingspark Wood; *Mintho rufiventris* (Fall.) (Tachinidae), Newhaven.

MILES, S. — *Callicera aenea* (F.) (Syrphidae), hovering over birch logs at Odiham Common, Hants., 11.vii.77; *Laphria marginata* (L.) and *Dioctria oelandica* (L.) (Asilidae) from the same locality.

SOKOLOFF, P. A. — A selection of Diptera of medical importance from the island of Mauritius, including the vectors of Malaria (*Anopheles gambiae*), Yellow Fever (*Aedes aegypti*) — now eradicated — and Filariasis (*Culex fatigans*) (all Culicidae).

STUBBS, A. E. — (1) A cluster of about 100 females of *Atherix ibis* (F.) (Rhagionidae), which assemble for oviposition on branches overhanging rivers in which the larvae are free living predators; they die in this characteristic aggregation;

(2) Affected samples of the foodplants illustrating the life histories of some picture-winged flies (Tephritidae) whose larvae may be collected in the autumn: *Euleia cognata* (Wied.), a leaf-miner of Coltsfoot (*Tussilago farfara* L.), *Rhagoletis alternata* (Fall.) in rose hips (*Rosa* sp.) and *Phagocarpus permundus* (Harris) in hawthorn berries (*Crataegus* sp.);

(3) A live pair of *Tipula pagana* Mg. (Tipulidae) to show the nearly wingless female;

(4) A selection of flies from each of the groups which are currently the subject of Recording Schemes and a series of maps showing the distribution of examples of each of these groups: (a) the situation map for post 1960 records of crane flies (Tipulidae) to indicate those areas from which records are most urgently required; (b) a comparison of the distribution of the widespread *Tipula variicornis* Schummel and the more local southern *T. yerburyi* Edwards, closely related species which are rarely found in the same locality; (c) *Nephrotoma guestfalica* (Westhoff) (Tipulidae), found on dry ground in the south-east but river banks in the north; apparently absent from N. Wales and Lancs.; (d) *Villa modesta* (Mg.) (Bombyliidae), coastal sand dunes but inland in the breck district; (e) *Conops vesicularis* L. (Conopidae), southern, on heathland reaching Cheshire and Anglesey with

one record from the west of Ireland; (f) *Dictya umbrarum* (L.) (Sciomyzidae), mainly western on base rich flushes; (g) *Themira lucida* (Stg.) (Sepsidae), widely distributed with comparatively few records; (h) *Dixa submaculata* Edw. (Dixidae), by streams in England, Wales and S. Ireland, not known from Scotland; (i) *Xylota coeruleiventris* Zett. and *X. florum* (Fall.) (Syrphidae), showing the mutually exclusive distribution of these closely related species.

ACULEATE HYMENOPTERA

ELSE, G. R. — Local and rare aculeate Hymenoptera collected in Hampshire, the Isle of Wight and Lancashire during 1977. Among the 17 species exhibited, the following six are perhaps of special note (all except the last were collected on the Isle of Wight). *Psen* (= *Mimesa*) *atratinus* (Morawitz) (Sphecidae): a pair *in cop.*, Lucombe Chine, 20.vii. These are the second and third British examples, the first was a ♀ collected at Ladder Chine — also on the Island — on 7.viii.1950 by O. W. Richards. *Methocha ichneumonoides* Latreille (Tiphidae): an example of the rare ♂, Lucombe Chine, 20.vii; *Nysson interruptus* (F.) (Sphecidae): 2 ♂♂, Red Cliff, nr. Sandown, 3.vi; *Sphecodes niger* Sichel (Halictidae): 2 ♂♂, 2 ♀♀, Blackgang area, 21 and 28.vii. This small bee, an inquiline of certain small *Lasioglossum* species (also Haltictidae) has always been very rare in Britain, with apparently only three published records — East Sussex, Buckinghamshire and Bedfordshire. In the British Museum (Natural History) there is a male collected on Hampstead Heath in 1938 and a female from Ruislip, 1939. Another rare bee exhibited was a fresh ♂ *Osmia xanthomelana* (Kirby) (Megachilidae): Lucombe Chine, 21.v. The only Lancashire specimens were 3 ♂♂ *Colletes cunicularius* (L.) (Colletidae), a large bee much resembling the common honeybee. *Cunicularius* is a speciality of coastal dune slacks in north Wales, Lancashire and Cumberland. The specimens were collected at Ainsdale, 8.iv.

JONES, R. A. — A display of various British insect Orders collected in 1977 included a selection of aculeates and one sawfly, the local *Xyphidria camelus* (L.). The latter was a ♀ from Heathfield, Sussex (no date available). Aculeates were — also without dates — as follows: *Myrmosa atra* Panzer (Tiphidae): 1 ♀, Little Horsted, Sussex; *Hedychridium roseum* (Rossi) (Chrysididae): 1, Kingstone Common, New Forest, Hampshire — the uncommon inquiline of the Sphecid *Astata boops* (Schrank); *Omalus panzeri* (F.) (Chrysididae): 1, Ringwood Forest, Dorset; and *Eumenes coarctatus* (L.) (Eumenidae): a specimen of the 'Potter Wasp' from Kingstone Common.

MILES, S. R. — A selection of aculeates from Odiham Common, north Hampshire, 1977. These included two uncommon species. *Astata boops* (Schrank) (Sphecidae): 1 ♂, 1.viii; *Ceratina cyanea* (Kirby) (Xylocopidae): 1 ♂, 1 ♀, ex-*Rubus* stems, 3.i. *Cyanea* has hitherto been considered a rare bee, but a number of localities have been found for it in recent years in Kent, West Sussex and Hampshire (mainly as a result of gathering dead *Rubus* stems during the winter). During the spring the females excavate the pith of dry dead stems and construct their cells in the linear gallery. Burrows in the stems also act as hibernacula for both sexes.

PACKER, L. — Some interesting aculeates from Kent, 1977 and a selection of inquilines and associated aculeate hosts from various British localities. The following species collected in Kent are of interest (these are not nationally rare but some are either specialities of, or of uncommon status in the county). *Omalus violaceus* (Scopoli) (Chrysididae): 1, Herne Bay,

22.vi—collected in a garden as have the majority of British records; *Colletes halophilus* Verhoeff (Colletidae): 1 ♂, Faversham, 7.ix, a bee restricted to salt marshes in S.E. England; *Andrena hattorfiana* (F.) (Andrenidae): 1, Lydden, nr. Dover, 19.viii, our largest *Andrena*, has a preference for the flowers of *Knautia arvensis* L. *A. apicata* Smith: 1 ♂, Bonnington, iv. Both the *Andrenas* are the first Kentish records since the period 1900-19. *Sapyga clavicornis* (L.) (Sapygidae) was the most interesting of the inquilines exhibited. The species was represented by a ♂ from Heol-y-Gaer, nr. Hay-on-Wye, Herefordshire/Wales border, 5.vii. According to the literature, this wasp is a cleptoparasite of *Osmia* species and *Chelostoma florissomne* (L.), all Megachilid bees.

PARASITIC HYMENOPTERA

There were two main contributors to this order and the quality of the exhibits reflected the growing interest in the Parasitica, helped not least by the increasing co-operation of Lepidopterists in saving their parasites. Amongst the more notable species shown were: *Apanteles gades* Nixon (a first British record) bred from *Stauropus fagi* L.; *Microplitis strenuus* Reinhd., bred from *Diloba caeruleocephala* L.; *Astiphromma graniger* Thoms.; *Cratichneumon albifrons* Steph.; *Absyrtus vicinator* Thb.; *Aphanistes xanthopus* Shrk.; *Cliocentrus excubitor* Hal.; an unusually large brood of a *Litomastix* species, and *Sympiesis dolichogaster* Ashmead (a first British record).

ALLEN, A. A. — A selection of Ichneumonoidea both caught and bred by himself, mainly during 1976-77. Omitting 13 species dealt with in our Vol. 10 (1977) Proceedings, there were: *Rogas testaceus* Spinola: One of several examples bred from *Abraxas grossulariata* larvae found at Salfords, Surrey. The exhibited ♂ was bred 16.vi.76 from a host larva found on *Prunus spinosa*, 9.v.76. *Apanteles lacteicolor* Viereck: A solitary species, regularly obtained as a parasite of *Nola cucullatella* larvae. The specimen shown was bred 21.v.76, from the aforementioned host found 9.v.76 at Salfords, Surrey. *Apanteles fraternus* Reinhd.: Several adults, representing a fraction of the total brood which hatched late July-early August 1977, from the characteristic cocoon mass discovered on a grass stalk, 2.vii.1977 at Rye, Sussex. *Protomicroplitis minuta* Reinhd.: Six examples, from a total brood of 61 adults, bred in June 1976 from a larva of *Alcis repandata* obtained late March 1976, Salfords, Surrey. *Microplitis strenuus* Reinhard: The only host from which this uncommon species has been obtained is *Diloba caeruleocephala* L., and it was from this larva that the exhibit was bred. The young host was taken at Salfords, Surrey, 29.v.1977; the *strenuus* larva appeared early in June, and a ♀ was bred 16.vi.77. *Meteorus* sp., nr. *fragilis* Wesmael: Apparently an uncommon species. The ♂ exhibited was bred 16.vi.1976 from a larva of *Nola cucullatella* beaten from *Prunus spinosa*, 26.v.76, at Salfords, Surrey. *Casinaria orbitalis* Gravenhorst: A ♀ bred 27.vi.1976 from a cocoon of *Zygaena trifolii* found 13.vi.76 at Salfords, Surrey. When taken, the freshly spun cocoon still contained the pre-pupal larva; shortly afterwards the host was killed. *Casinaria moesta* Gravenhorst: From a cocoon of this species, found 13.ii.1977 on *Prunus* sp., Salfords, Surrey, a specimen was bred 28.iii.77. The exhibitor had obtained identical cocoons in this area from *Campaea margaritata*, but unfortunately these had not been bred. *Agrypon anxium* Wesmael: A rather frequent species, bred 18.x.1976, from an unidentified larva of the Tortricidae discovered between birch leaves, 27.viii.76, on Studland Heath, Dorset. *Cratichneumon albifrons* Stephens: From a lepidopterous pupa dug under

oak, 20.i.1974, near Reigate, Surrey; a ♀ of this rare (Perkins, 1959) species appeared 20.iii.74.

There then followed a collection of Ichneumonidea caught in the field. *Zele testaceator* Curtis: A ♀ caught at 6w. actinic light (hereafter 'acl.')

19.vii.1976, at Salfords. *Zemiotes chrysophthalmus* Nees: An example, ♂, swept from low vegetation at High Halstow, Kent, 23.vii.77. *Meteorus scutellaris* Nees: One of two (♀) specimens which came to acl. 9.x.1976, in Plaistow Woods, West Sussex. *Banchus volutatorius* Lin.: Two specimens, ♀ ♂, illustrating the sexual dimorphism often encountered in this genus. They were obtained 23.vii.1977 at Funton Kent, as they flew in the late afternoon over low ground. *Absyrtus ?vicinator* Thunberg: A second species of this genus may occur in Britain. The exhibited insect (♀) was obtained at mvl., 9.x.1976, in Plaistow Woods, W. Sussex. *Enicospilus tournieri* Snellen: One of several examples which came to acl. in Dawlish Warren, Devon, 14.viii.1977. *Agrypon flaveolatum* Gravenhorst: Perhaps the most common of the sub-family Anomoloninae, the ♂ displayed was secured on Brownsea Island, Dorset, 21.v.1977, as it flew in sunshine over heathland. *Aphanistes xanthopus* Schrank: The exhibit showed a ♀ of this rare species, which was swept from heather, 20.vi.1977, on moors near Dawlish, Devon. *Coelichneumon microstictus* Gravenhorst: The specimen (♂) was captured in a shop window, 22.vi.1977, at Dawlish, Devon. The species appears to be local and attached mainly to the S.W. coast. *Cratichneumon corruscator* Lin.: One example of the second generation, caught 31.vii.1976, in Plaistow Woods, W. Sussex. Although the males of this generation are often marked with yellow, the exhibited male was so to an excessive degree, even the propodum was entirely yellow.

The last four species consisted of common representatives of the Ichneumoninae (in addition to the previous sp.). They were: *Barichneumon albilineatus* Grav. (♀), caught 24.ix.1977 at Reigate, Surrey; *Ichneumon sarcitorius* Lin. (♀), caught 3.vi.1977 at Reigate, Surrey; *Ichneumon deliratorius* Lin. (♂), caught at mvl. (unusually for this group), 9.x.1976, in Plaistow Woods, W. Sussex; *Amblyteles armatorius* Forster (♂), caught 3.vii.1977, in a cornfield, Reigate, Surrey.

SHAW, M. R. — Interesting parasites, all of which were generously donated by Lepidopterists, who thereby received acknowledgement of their contribution to these studies. *Litomastix* sp. nr. *truncatellus* Dalman: An exhibit of 100 examples of the above species (Chalcidoidea: Encyrtidae) selected from a total of 1,914 males, all bred by K. Noble from a larva of *Apamea monoglypha* Hufn. *Macrocentrus grandii* Goidanich: An all female brood (total=54) of the species (Braconidae: Macrocentrinae) was shown, complete with cocoon mass. The insects were bred by T. H. Ford from a larva of *Pleuroptera ruralis* Scop. Both this and the sp. above illustrate the phenomenon of the polyembryony; a mode of reproduction in which a single ovum laid by the female divides many times in the host; the resulting larvae necessarily produce adults of one sex only. *Sympiesis dolichogaster* Ashmead: Examples, all ♀♀, were shown bred from *Caloptilia leucapennella* Stephens, collected by Lt.-Col. A. M. Emmet from *Quercus ilex* at Tresco, Isles of Scilly, 1974, and from *C. ?fribergensis* Fritzsche, collected by S. E. Whitebread from *Acer pseudoplatanus* at Neuwelt, Switzerland, 1976. Both of these records constitute new records for the two countries; subsequently, the exhibitor had obtained *S. dolichogaster* (Chalcidoidea: Eulophidae) from various species of *Caloptilia* obtained from S. Cumbria and N. Cheshire. Possibly the sp. may be widely spread in Britain. *Cliocentrus excubitor* Haliday: An example of this

Braconid (Rogadinae) was shown, with the mummified host, bred by S. E. Whitebread, from a larva of ?*Ancylis badiana* D. & S., found in Switzerland. *Cliocentrus gracilipes* Thomson: A specimen of this parasite was obtained by K. P. Bland from a larva of *Anthophila fabriciana* Lin.; this species is now known to be widespread in Britain. *Trogus lapidator* Fab.: (i) ssp. *lapidator* Fab.: The species is a common parasite of *Papilio machaon* Lin. (Lep.: Papilionidae) on the continent; the exhibits of this ssp. (found in S. Europe) were supplied by R. N. Hobbs and M. W. Cooper. (ii) ssp. *coerulator* Fab.: This N. European form differs in having less infumate wings than the type. The specimen exhibited was bred (out of the pupa) from a larva of *P. machaon* taken in Norfolk by M. Britton, and was of particular interest for a recent survey (*Ecol. Ent.*, 1: 71-84, 1976) failed to confirm the British status of the ssp. *Trogus violaceus* Mocsary: This sp. has replaced *T. coerulator* in Corsica and Sardinia, in which countries it is a notorious parasite of *Papilio hospiton* Gén ; the host occurs above about 600 m. The exhibit was especially interesting for it displayed a specimen of *T. violaceus* bred by R. Plumbley from a larva (but parasite emerging ex host pupa) of *P. machaon*, a host hitherto unrecorded for *violaceus*. The host was taken in Corsica, at sea-level.

The only other exhibit of Parasitic Hymenoptera was by a non-member, who showed some African Braconidae. No notes have been received.

OTHER ORDERS

KIRBY, P. — Heteroptera collected July-August 1977 in Greece.

The report on the Coleoptera was received too late to include.

ILLUSTRATIONS

This year the quality and variety of photographs and illustrations rose once again, demonstrating the increasing swing towards these arts.

A series of the original illustrations from his forthcoming book *The Dragonflies of Great Britain and Ireland* by Mr. C. O. HAMMOND were the subject of much interest, as were illustrations for a butterfly and moth stamp issue by Norfolk Island by Mr. B. HARGREAVES.

Amongst the photographs were a display by Mr. W. A. VICKERS of prints from his complete collection of transparencies of the British butterflies, including the regular migrant species.

MESSRS. P. A. SOKOLOFF and R. C. REVELS both showed prints of Rhopalocera aberrations. The latter also included black and white photographs of the life histories of several butterflies. Mr. K. P. WILMOTT exhibited photographs of some of the rarer butterflies (by invitation of Mr. G. PRIOR) and Mr. R. W. J. UFFEN a number of subjects and natural history prints demonstrating his prowess at all the photographic processes.

An interesting series of photographs showing inter-specific variation in pupal characters of British *Pylonorhynchus* (Lep., Gracillariidae) was the subject of Mr. M. R. WILSON. These relate to the current construction of a key to the pupal stage.

Lastly, a selection of colour prints of Lepidoptera by Mr. I. G. FARWELL, which included pictures of the finding of an *Acherontia atropos* pupa and following stages.

It is to be hoped that the excellent standard set will be maintained and that the uses and scope of photography become more widely realised by entomologists.

INSTAR NUMBER AND PUPAL COLOURATION IN PALESTINIAN *PIERIS BRASSICAE* L.

by BRIAN O. C. GARDINER

(Agricultural Research Council, Unit of Invertebrate Chemistry and Physiology,
Department of Zoology, University of Cambridge, Downing Street, Cambridge,
CB2 3EJ)

ABSTRACT

Pieris brassicae L. larvae from Palestine have been reared at 15-20°C. and 25-30°C. At both temperatures the number of larval instars was five. This confirms recent statements by various workers and the early work of Klein, still quoted in the textbooks, that the number of instars varies with temperature is refuted and its basis queried. It is considered that *brassicae* always has five instars. A note was made that the pupal colouration of these Palestinian *brassicae* differed markedly from British examples.

In 1932, working in Palestine, Klein (1932) produced a paper in which he claimed that the larvae of *P. brassicae* had a variable number of instars according to the temperature of rearing. These varied from three at rearing temperatures of over 25°C. to five at below 15°C. This report was shortly picked up by Hoskins & Craig (1935) in their review of insect physiology and has remained in the physiological literature ever since. However, the taxonomic and biological literature has continued to state there are five instars, without mention of variability (Frohawk, 1934; Howarth, 1973) and no confirmation of Klein's results has come to my attention. On the contrary, all authors who have used *brassicae* as an experimental insect, when rearing at temperatures which, according to Klein, should have produced three or four instars, all state that they had five instars (Gibson & Silvestre de Sacy, 1956; Long, 1955; Schoonhoven, 1967; Srihari, 1970). In 1962 David & Gardiner published the results of very detailed work on large numbers and maintained that the number of instars was constant at five over the whole range of temperatures from 10-33°C. at which rearing of the insect is possible. They made the proviso that Klein's contrary findings could perhaps be due to some physiological difference in *brassicae* originating in Palestine. After many years over which tens of thousands of larvae were bred, Gardiner (1974a) again reaffirmed the constancy of five instars. In spite of all these findings, however, Klein's results continue to be quoted in the standard textbooks (Wigglesworth, 1972 for instance).

In 1977, due to the kindness of Miriam Rothschild, who brought some *brassicae* eggs back with her from Palestine, I was able to rear Palestinian *brassicae* under the same temperatures at which Klein stated they had three and four larval instars.

The eggs arrived in two batches, laid on Nasturtium (*Tropaeolum majus* L.) and Caper (*Capparis spinosa* L.) respectively. All those on the Caper hatched, but only about 25% on the Nasturtium, to give a total of 96 larvae. Half these were reared at 15-20°C. and half at 25-30°C. under normal British May daylight. According to Klein these should have had four and three instars respectively. Not so. The larvae were fed on cabbage and a control batch of the five instar 'Cambridge' *brassicae* (David & Gardiner, 1962) run alongside for comparison. All the larvae passed through five instars and 48 and 44 pupae respectively were obtained from the cool and the warm conditions.

The chrysalids, however, were strikingly different from those of the Cambridge stock. It has already been reported that the Cambridge chrysalids

are straw-coloured, or green when in diapause (Gardiner, 1974b). However, this is not so during the first few hours after formation. As the larval skin is shed all chrysalids are bright green with a bright yellow dorsal keel. They then change to their final colour. The Palestinian *brassicae* chrysalids on formation were a pale mauve colour and the dorsal keel was a very pale straw colour. This mauve gradually faded to give the final colour. In these non-diapause chrysalids this was silvery-grey, more nearly resembling in colour that of a *P. rapae* as figured by Poulton (1887), Fig. 35, his plate 26.

The reason for this colour is not clear, but may be due to the necessity, in Palestine, of being cryptically coloured and this silvery-grey colour is one which can be associated with hot dry climatic conditions.

David & Gardiner (1962) and Gardiner (1974a) based their results on literally tens of thousands of larvae. It is difficult to decide how many were used by Klein. Certainly his observations appear to be based on far fewer larvae than have just been reared from Palestine. He also suffered from appalling mortality and it is quite possible that at that time (1928-30) *brassicae* in Palestine were suffering from the outbreak of virus disease first reported by Paillot in 1924. In his introduction Klein states that he observed much material, but we find in his Table 8, a mere 17 records of larvae and it is on this table that the entire statement that *brassicae* has fewer instars at higher temperatures is based. It is worth quoting a translation of his account in full.

'In the course of the year we have observed moulting of the larvae and we noticed that the duration of instars was different in different seasons. We set up breeding to investigate the number of moults in relation to climatic factors and the larval duration. We now observed that for each 10-day duration of the larval period there is an additional instar. The least number of moults can be seen at the highest temperature and lowest humidity and this coincident with the shortest duration of the development of the larvae.'

Nowhere do we find any account of how he followed the instars. There is no mention of measuring of head capsule size, as was done by David & Gardiner (1962). If we turn to Klein's Table 9 we find a sixth instar listed, which is not only unaccounted for by explanation in the text, but is in conflict with Table 9 as at the temperature 14.6-15°C. Table 9 lists six instars, but Table 8 only five.

The very high larval mortality observed by Klein is given in his Tables 20, 21 and 22. These are so incredibly high that in my opinion they are most likely to have been due to virus disease. It is also of interest that Table 22 again lists six instars. Additionally the 100% mortality in the first two instars at temperatures exceeding 25.3°C. must in themselves leave suspect that only three instars occur at these temperatures.

Having now had the opportunity of rearing Palestinian *brassicae*, even though in small numbers, I feel that David & Gardiner's (1962) statement that the larval instars are constant at five is reinforced and the statement in the textbooks that the instars decrease with temperature, needs to be expunged from future editions.

I would like to thank Miriam Rothschild for bringing me the eggs from Palestine, and Dr. H. J. Pflüger for the translating of Klein's paper.

REFERENCES

- David, W. A. L. & Gardiner, B. O. C. (1962). Observations on the larvae and pupae of *Pieris brassicae* (L.) in a laboratory culture. *Bull. Ent. Res.*, **53**: 417-436.

- Frohawk, F. W. (1934). *The Complete Book of British Butterflies*. London: Ward, Lock & Co., 384 pp.
- Gardiner, B. O. C. (1974a). *Pieris brassicae* L. established in Chile; another palearctic pest crosses the Atlantic. *Jour. Lep. Soc.*, **28**:269-277.
- Gardiner, B. O. C. (1974b). Observations on green pupae in *Papilio machaon* L. and *Pieris brassicae* L. *Wilhelm Roux' Archiv.*, **176**:13-22.
- Grison, P. & Silvestre de Sacy, R. (1957). L'élevage de *Pieris brassicae* L. pour les essais de traitements microbiologiques. *Ann. Epiphyt.*, **7**:661-674.
- Hoskins, W. M. & Craig, R. (1935). Recent progress in insect physiology. *Phys. Rev.*, **15**:525-596.
- Howarth, T. G. (1973). *South's British Butterflies*. Fred. Warne & Co.: London, pp. 1-210.
- Klein, H. Z. (1932). Studien zur Oekologie und Epidemiologie der Kohlweissling. I. Der einfluss der Temperatur und Luftfeuchtigkeit auf Entwicklung und Mortalität von *Pieris brassicae* L. *Z. angew. Ent.*, **19**:394-448.
- Long, D. B. (1955). Observations on sub-social behaviour in two species of lepidopterous larvae, *Pieris brassicae* L. and *Plusia gamma* L. *Trans. Roy. Ent. Soc. Lond.*, **106**:421-437.
- Paillet, A. (1924). Sur une nouvelle maladie des chenilles de *Pieris brassicae* L. et sur les maladies du noyau chez les insectes. *C.R. Hebd. Acad. Sci.*, **179**:1353-1356.
- Poulton, E. B. (1887). An enquiry into the cause and extent of a special colour-relation between certain exposed Lepidopterous pupae and the surfaces which immediately surround them. *Phil. Trans. (B.)*, **178**:311-441.
- Schoonhoven, L. M. (1967). Chemoreception of mustard oil glucosides in larvae of *Pieris brassicae*. Koninkl. Nederl. Akademie Van Wetenschappen — Amsterdam Proceedings, Series C, **70**, No. 5.
- Srihari, T. (1970). Etude quantitative de la consommation et de l'utilisation de la nourriture au cour de la croissance larvaire de *Pieris brassicae* (Lep. Pieridae). *Ann. Soc. ent. Fr. (N.S.)*, **6**:1003-1014.
- Wigglesworth, V. B. (1972). *The Principles of Insect Physiology*. Chapman & Hall: London, pp. 827

A REVISION OF THE BRITISH ASTEIIDAE (DIPTERA) INCLUDING TWO ADDITIONS TO THE BRITISH LIST

by PETER J. CHANDLER

(Weston Research Laboratories, 644 Bath Road, Taplow, Maidenhead, Berks.)

The Asteiidae are a small family of about a hundred known species, arranged in ten genera, although nearly half belong to *Asteia* itself. Three genera including seven species may now be recognised as British; the discovery of *Astiosoma rufifrons* Duda under unusual circumstances has led me to pursue the problem of the identity of our species of *Leiomyza* which have hitherto been confused, although they were dealt with by Sabrosky (1956a) in the European context.

They are small flies, which were formerly included among the Drosophilidae although recent taxonomic researches (Hennig, 1965; Griffiths, 1972) have suggested that they are closer to the Anthomyzidae, Trixoscelidae and Opomyzidae. They differ from all these groups in the unbroken costa. The wing venation is characteristic, the second basal cell being confluent with the discal cell (if present) and the anal cell absent (at least in British genera), while the subcostal vein is only visible basally and veins 3 and 4 are convergent apically. The legs are simple in both sexes and vibrissae are usually absent or weak (although quite well developed in our species of *Asteia* itself). Most species are brightly marked in black and yellow, although *Leiomyza* have uniformly dark bodies.

Leiomyza is different in several respects from other members of the family, both in its association with fungi and structurally. Griffiths (1972) has mentioned the presence of double telomeres as had already been

depicted by Sabrosky, who included the genus in his sub-family Sigaloessinae with *Astiosoma* on the basis of the wing characters. Hennig (1969), when dealing with his fossil genus *Succinasteia*, concluded that *Leiomyza* had a sister group relationship with all other Asteiidae but otherwise recognised the remaining Sigaloessinae as a 'Phlebostera-group', the Asteiinae being retained as his 'Asteia-group'. Sabrosky (1977), however, discussed the genus *Anarista* (Papp, 1972) indicating that it cut across this sub-division in possessing a posterior cross-vein but lacking an alula. In any case, the genital structure confirms that *Astiosoma* is more closely related to *Asteia* than to *Leiomyza*. The telomeres in *Astiosoma* show slight asymmetry tending towards that found in *Asteia*, while they are completely symmetrical in *Leiomyza*.

KEY TO BRITISH GENERA

1. Second vein long, ending in costa well beyond first vein. Posterior cross-vein present. Mesopleuron with numerous fine hairs developed near upper margin. Alula present, margined with long hairs. One pair of strong proclinate orbitals. Arista short pubescent. Vibrissae short and weak. Only 1 pair of dorsocentrals *Leiomyza* Macquart
- Second vein short, ending in costa only a little beyond first vein. Mesopleura entirely bare. Two pairs of dorsocentrals (in British species) 2
2. Hind cross-vein absent; alula absent, wing margin bare in alular region. One pair of strong reclinate orbitals. Arista branched in a zig-zag fashion (in British species). Vibrissae present *Asteia* Meigen
- Hind cross-vein present opposite end of second vein; alula present, margined with long hairs. Orbitals short and weak. Arista with very short pubescence. No distinct vibrissae *Astiosoma* Duda

There is only one other European genus, *Phlebostera* Duda (two species in Greece and Cyprus), which agrees with *Astiosoma* in the venational characters except in the presence of a faint but clearly traceable anal vein and short quadrate anal cell; it agrees with *Leiomyza* in possessing mesopleural hairs.

Genus *Astiosoma* Duda

This is a small genus with only eight described species (Sabrosky, 1956a; 1957) of which half are Nearctic, two Oriental and one Australian. In Europe it is previously known only from the single Yugoslavian female described as *A. rufifrons* by Duda (1927). According to Sabrosky, the Old World species are all very similar, his *okinawae* also described from a single female being particularly similar to *rufifrons*. The British material described here agrees essentially with Duda's description and figure of the wing venation; the type (which was in the Budapest Museum) is presumably lost and in the absence of other European material the British specimens are considered conspecific with *rufifrons*.

Astiosoma rufifrons Duda (Figs. 1-3)

Mainly yellow with partly fused black thoracic stripes and dark pleural markings. Abdomen whitish yellow with reddish brown dorsal markings, differently arranged in the two sexes. Also a sexual difference in eye colour and in the ground colour of head and thorax.

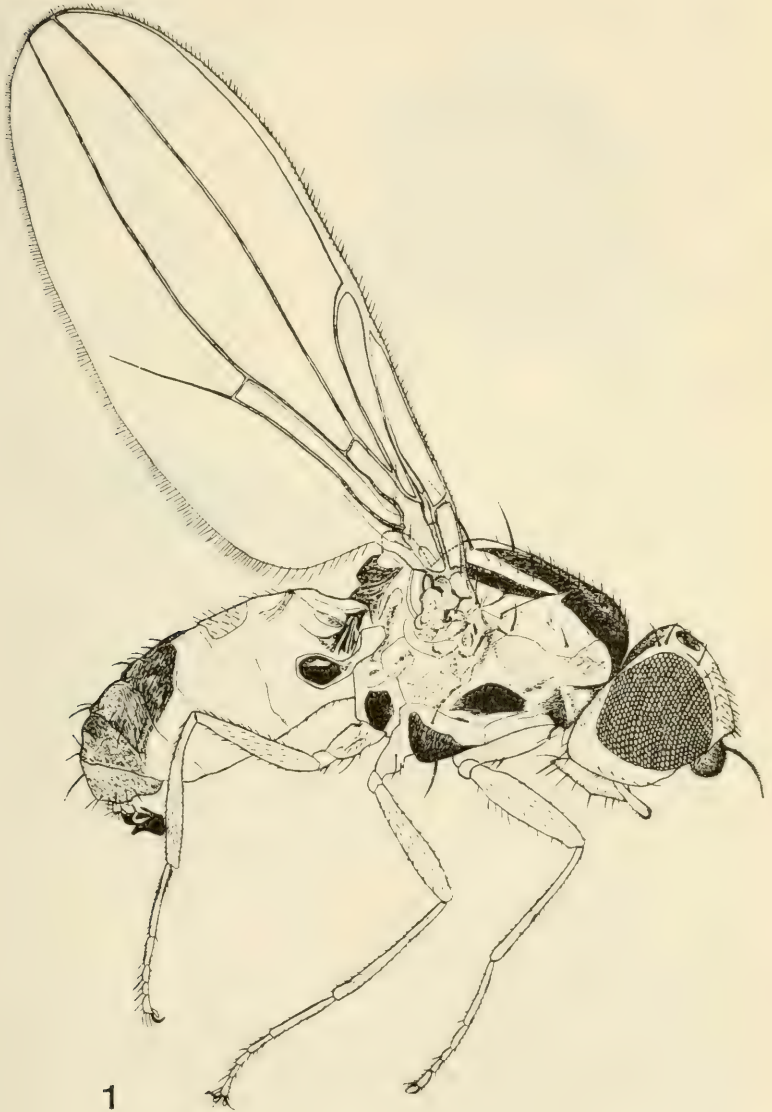
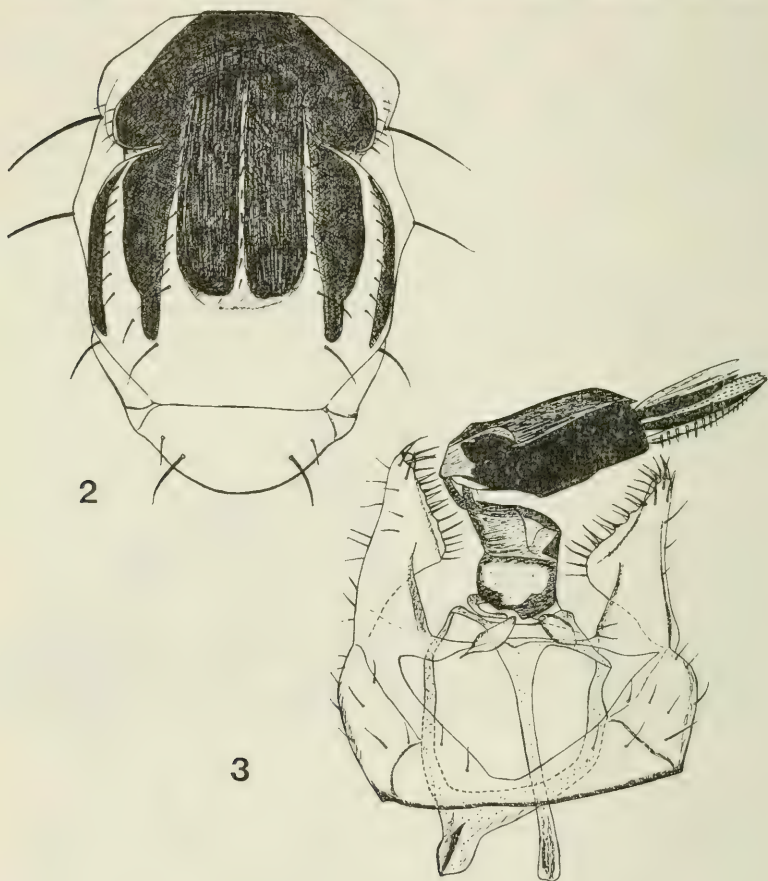


Fig. 1. *Astiosoma rufifrons* Duda, male.

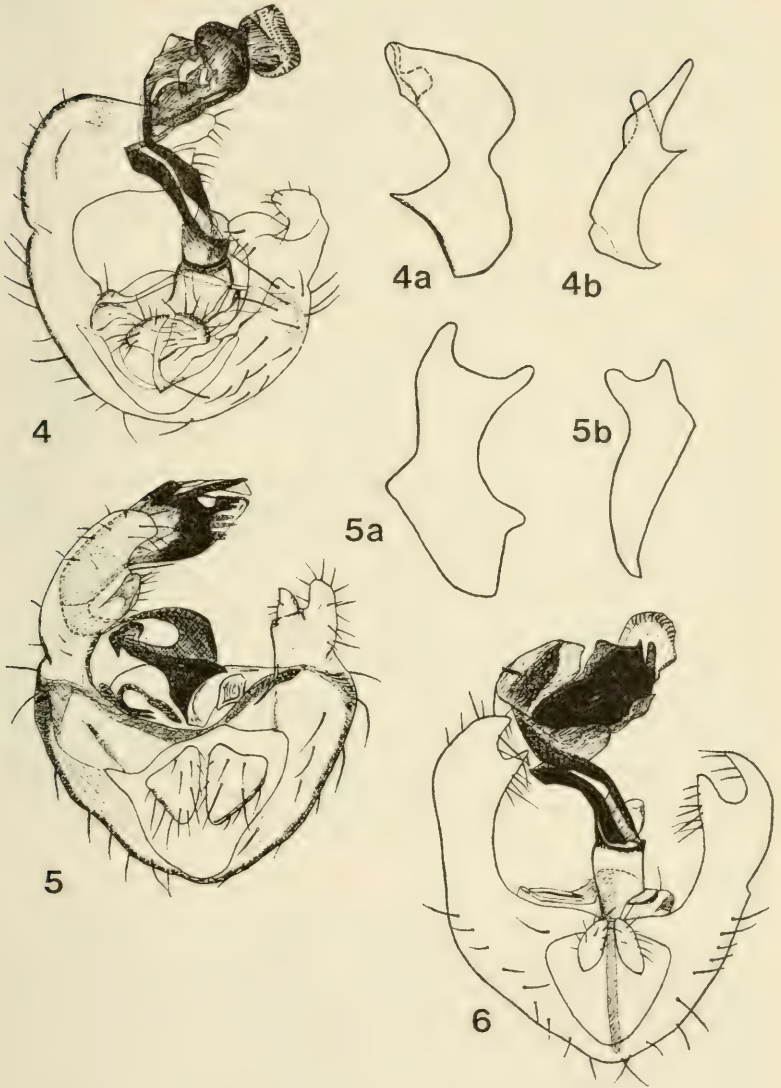
Male. Head quadrate, with frons slightly projecting on anterior margin. Eyes bright green in life, becoming dull reddish when dried. Frons broader than an eye, dull orange brown with a pair of shining gold patches apparent from some aspects, touching eye margins and narrowly separated



Figs. 2-3. *Astiosoma rufifrons* Duda, male; 2, dorsal view of thorax; 3, postero-ventral view of genitalia.

on mid line on either side of black ocellar triangle. Occiput largely dark brown but face and broad jowls pale yellow. Palpi yellow, a little darkened apically. Antennae brownish yellow, darker on basal segments and upper margin of third joint; arista with short fine pubescence.

Frons with short dark proclinate hairs on anterior part, denser on middle of anterior margin. No distinct orbitals but a row of six short fine reclinate orbital setulae, the last two a little stronger. Two short divergent vertical bristles near upper corners of each eye. No distinct vibrissae, only a row of fine hairs on lower margin of jowls.



Figs. 4-6. *Asteia*, male genitalia in posteroventral view: 4, *A. elegantula* Zett.; 5, *A. amoena* Meigen; 6, *A. concinna* Meigen. 4/5 a-b, lateral view of right (a) and left (b) claspers.

Thorax mainly brownish yellow but mesonotal disc mainly shining dark brown, three broad anterior stripes fused on dorsocentral lines for the greater part of their length, but the lateral stripes produced to stop at level of posterior dc, the median stripe more abbreviated. A narrow dark postsutural stripe parallel with the outer band anterior to the strong postalar bristle. Pleura with shining dark diagonal band on mesopleura, which also bears parallel diagonal to vertical scoring on the middle part; greater part of sternopleura and a patch of hypopleura also dark. Scutellum yellow, postnotum dark brown. Two pairs of strong dc, the anterior level with wing base, the dc row continued anteriorly by several very short fine hairs; similar rows of short uniserial ac and intra-alars. One pair of scutellars; two widely separated notopleurals; sternopleurals represented only by two short pale hairs and a similar short weak humeral. Halteres yellow with knob dark brown above. Legs entirely pale yellow, except slightly darkened last tarsal segment.

Abdomen pale yellow except for dark markings as follows: a light brown tergal patch on segment 3, sometimes very pale; a pair of reddish brown rectangular spots on apical two-thirds of tergite 4 and extensive dark reddish brown markings on 5-6, the area around these markings on 4-6 \pm suffused reddish. Male genitalia (fig. 3) constructed similarly to *Asteia*.

Wings clear whitish with pale yellow veins; shorter and broader than in other British *Asteiids*. Venation as in *Leiomyza* except for short second vein upturned into costa as in *Asteia*; costa distinctly thickened beyond junction with first vein, tapered before junction with third; alula present, reflexed, margined with long hairs. Body 2.1-2.5 mm., wing 2.1-2.7 mm.

Female. Generally similar to male but eyes dull red in life and ground colour of head and thorax reddish brown. Frons a little more produced anteriorly; dark brown on anterior half. Antennae more extensively darkened on third joint. Legs with slight darkening above apical half of fore and hind femora. Abdomen more elongate, bluntly pointed at tip, mainly whitish yellow (strikingly white ventrally in life) except tergites 1-4 which are reddish brown; a strongly reddish patch on the membranous sides of the abdomen adjacent to each side of tergal plates 2-3. Body 2.3-2.9 mm., wing 2.1-2.7 mm. (one very small ♀ with wing 1.9 mm.).

MATERIAL EXAMINED

BERKS.: Windsor Forest, 26.vi.1977, 1 ♀; 27.vi.77, 20 ♂, 19 ♀; 4.vii.77; 9 ♂, 6 ♀; 24.vii.77, 1 ♂, 1 ♀; Old Windsor Wood, 11.ix.77, 9 ♂, 3 ♀ (P. J. Chandler).

A. rufifrons was localised to one small area of the forest, where both sexes were equally attracted to cold wood ash spread out over the ground after bonfires. On 27.vi and 4.vii it was very numerous but could not be found elsewhere in the vicinity, although most flies were exuding a sticky material from their proboscis and it was concluded that they had been feeding at pine sap. It may be significant that my visits were during the evening from 7.0 p.m. to 8.30 p.m. On 24.vii only two examples could be found so it was assumed that the main peak of its flight period had passed; the male taken on this occasion was swept over damp fermenting wood chippings about one metre from the nearest area of ash. Then on 11.ix at Old Windsor Wood, *A. rufifrons* was found again about several still smouldering bonfires of elm branches, etc.

Nothing has been recorded previously of the habits of *Astiosoma*; the occurrence of some species on saw-mill windows in North America may have been fortuitous. The reason for the attraction to wood ash remains obscure but it is remarkable that such a distinctive (although small) fly which has not been collected in the British Isles before, should be found assembling in such large numbers in a circumscribed area while it could not be found by intensive collecting in the immediate surroundings. The discovery of *Astiosoma* as a British insect was a result of the previous find of the Empid 'Smoke Fly', *Hormopeza obliterated* Zett. (only the second British record) when the bonfires concerned were still smouldering. *Hormopeza* and other insects found during several visits to the site are discussed elsewhere (Chandler, in press).

Genus *Asteia* Meigen

Asteia is better developed in the Mediterranean region than in northern Europe, where only three of the nine described Palaearctic species (Duda, 1934; Sabrosky, 1956a; Lyneborg, 1969) occur, these three being found in Britain.

Sabrosky (1956a) commented that Mr. J. E. Collin was investigating a new species of *Asteia* near *elegantula*. Dr. C. W. Sabrosky kindly forwarded to me copies of his correspondence with Mr. Collin about this matter during 1955. Sabrosky had examined a British example of *elegantula*, which he found to differ from other European material (including Zetterstedt's type) in several respects. The latter had a mainly yellow occiput and a narrow black band near the upper margin of the sternopleura. Through the kindness of Dr. H. Andersson, I have been able to study the holotype male of *Asteia elegantula* Zetterstedt (Sweden: Västergötland) and compare it with British specimens.

The holotype is smaller than the British material (having wing length 2.8 mm.) but the sternopleural band, which is darker brown than the other dark thoracic markings, is the only significant difference that I can detect. Although there is no vestige of this band in the British examples seen, preparation of the male genitalia of the two forms failed to reveal any characters obviously of specific importance. Examination of a larger amount of material from throughout its range, would be necessary to establish the precise status of the British and continental forms of *A. elegantula*.

KEY TO BRITISH SPECIES

1. Mesonotum yellow with four brown stripes on anterior part, stopping short before posterior dc; outer interrupted by suture and expanded laterally before suture; also narrow lateral presutural stripe extending along lower margin of humerus and notopleural area but pleura and scutellum entirely yellow. Frons with a pair of brown patches leaving orbits, fore margin and a median area yellow; a brown-edged white band above mouth margin as in *amoena*. Abdomen yellow with lateral and median irregular black sutural spots on the apical margin of tergites 2-4. Halteres yellow with a brown spot above base of knob. Second costal sector about length of anterior cross-vein. Wing 3.2-4 mm. *elegantula* Zetterstedt
- Mesonotum including humeri entirely shining dark brown to black

2. Disc of scutellum also shining black but frons, face, antennae, palpi, pleura, abdomen and halteres pale yellow. Occiput, ocellar triangle, orbits and a triangular spot internal to vibrissa on each side of mouth margin shining dark brown to black. Second costal sector longer, about twice length of anterior cross-vein. Wing 2.7-3.3 mm. *concinna* Meigen
- Scutellum entirely yellow. Frons shining dark brown except yellow anterior margin. Face with a broad shining white transverse band edged with brown above and below. Antennae with basal joints brown but third joint yellow except around base of arista. Pleura yellow except brown markings on sternopleura and hypopleura. Abdomen yellow with curved dark lateral bands linked along sutures of tergites; in ♂ two brown spots on pregenital tergite and in ♀ pregenital segments darkened. Halteres with some darkening on knob. Second costal sector short, equal in length to anterior cross-vein. Wing 2.3-2.7 mm. *amoena* Meigen

Asteia elegantula Zetterstedt (Fig. 4)

The habits of *elegantula* have not been recorded; it is deduced from Jenkinson's (1904) comment when adding it to the British list that it was taken on a river bank but its other localities suggest at least a preference for wooded habitats.

MATERIAL EXAMINED

MORAY: Logie, 1.ix.1903, ♂; 2-25.ix.09, 12 ♂, 12 ♀; 9.ix.10, ♀; 6-22.ix.11, 6 ♂, 5 ♀; 19.ix.13, ♂ (F. Jenkinson, BMNH, Oxford and Cambridge Mus.); Grantown-on-Spey, 16.vii.45, ♂ (J. E. Collin, Oxford Mus.). ROSS: near Ardgay, 28.vii.36, ♀ (J. E. Collin, Oxford Mus.). HERFORD: Devereaux Park, 25.viii.1902, 2 ♀; Dingle, churchyard, 24.viii.09, ♂ (J. H. Wood, BMNH and Oxford Mus.).

Asteia amoena Meigen (Fig. 5)

Generally common in woods, 29.iii-28.x, and known to hibernate as an adult; it is frequently found amongst the branches of various trees, including yew and conifers, or sheltering among the foliage of shrubs such as *Buxus* or *Cupressus*. I have found it feeding at ivy flowers (*Hedera*) and it might also feed at sap exudations. It has been recorded as developing in wood detritus but the open habitats of *A. concinna* suggest that this cannot be a habit common to all species of *Asteia*.

Material has been seen from Kent, Surrey, Sussex, Hants., Isle of Wight, Berks., Bucks., Oxon., London, Herts., Essex, Suffolk, Norfolk, Cambs., Cornwall, Somerset, Hereford, Powys, Glamorgan, Lancs., Cumbria, Moray (Nairn, Falls of Tarnash, Glen of Drumloch), Wicklow, Dublin, Louth, Down, Scilly Is. and Jersey, but it is certainly not common in the north of its range. It occurs throughout Europe and also in the Canary Islands where I have found it commonly in the laurel and chestnut woods.

Asteia concinna Meigen (Fig. 6)

Local, chiefly in marsh (including saltmarsh), fen, dune slacks and other open habitats, 27.vi-18.viii. Most records are from the east coast but I have only found it at Cothill Fen, Oxon., where it was abundant in *Phragmites* beds on 1.vii.1976 and at Leckford, Hants., where one female was taken in chalk grassland, 4.vii.71, but near to the fens of the Test

valley. All localities known to me are listed; it has occurred commonly at several of them.

KENT: Deal; Oare; Sheppey; Lower Halstow; High Halstow; Gravesend. ESSEX: Frinton-on-Sea; Walton-on-Naze; Kirby-le-Soken. SUFFOLK: Flatford; Shingle Street; Felixstowe; Orford; Aldeburgh; Barton Mills; Newmarket, garden pond. NORFOLK: Waxham; Lodge Marsh; Beeston Common; Earlham; Blakeney; Ringstead Downs; Hunstanton. CAMBS.: Wicken Fen; Kirtling; Woodwalton Fen; Little Paxton, gravel pits; Hemingford Grey, gravel pits. HUMBERSIDE: Spurn Point. LONDON: Cripple-gate. OXON.: Cothill. HANTS.: Leckford.

Genus *Leiomyza* Macquart

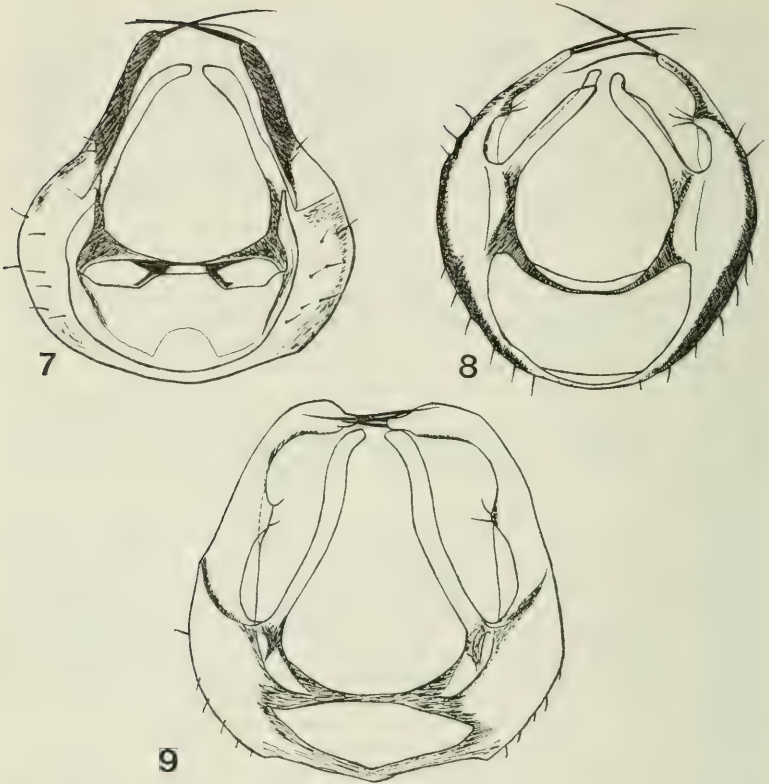
I previously discussed (1973) variation in British material of this genus which I had found in association with fungi. Unfortunately, I was then unaware of the work of Sabrosky (1956a and b, 1957) on the World Asteiidae in which he clarified the nomenclature in this genus.

Formerly, all specimens with dark halteres were referred to *laevigata* (Meigen) but Sabrosky (*op. cit.*) established that there were three species with this character, two of them European, and I have found that both occur in Britain; *L. dudai* Sabrosky is here introduced as new to the British list.

On the other hand, several names have been applied to *Leiomyza* with pale halteres, among which *scatophagina* (Fallén) has priority. Kloet & Hincks (1945) listed only *laevigata* and *scatophagina* as British species, with *flavipes* (Fallén) and *glabricula* (Meigen) as synonyms of the latter. In the revised edition of the British Check List (1975), *glabricula* is elevated to specific rank but this is evidently in error, Sabrosky (1956a) having placed it in synonymy with *scatophagina*, thus following earlier authors in this assessment. He recognised a second Holarctic species with yellow halteres, i.e. *curvinervis* (Zetterstedt) (= *opacifrons* Duda), distinguished by a duller frons and its dorsocentrals being arranged as in *laevigata* as well as small genital differences.

I have reared all of the three British species I can recognise from lignicolous gill fungi; visiting records include a soft Polypore and a terrestrial gill fungus. Sabrosky (1957) noted this habit in North America and it may be common to all members of the genus, although unknown elsewhere in the family. The published reference to the rearing of *L. scatophagina* from reeds attacked by *Lipara* (Séguy, 1934; Colyer & Hammond, 1951) is therefore considered unlikely and may have resulted from confusion with one of the smaller Anthomyzidae or Chloropidae.

Leiomyza are all very similar, shining dark brown to black flies of wing length 2-3 mm., with the face and jowls brownish yellow, anterior margin of frons, palpi and antennae yellow except dorsal and apical darkening of the third antennal segment, and the legs pale yellow except for the darkened apical tarsal segment of each leg. There is a sexual difference in the relative lengths of the fore tarsal segments in *scatophagina* where the male has the metatarsus distinctly shorter than the combined length of the remaining segments (as in both sexes of the other species) while the female has it about equal to the remaining segments. All material of *scatophagina* and many older specimens of the other species I have examined have the ground colour of the frons brownish yellow in contrast both to the black orbits and to the pale yellow fore margin; Sabrosky stated that it was generally blackish in all species except *curvinervis* but



Figs. 7-9. *Leiomiza*, male genitalia in posteroventral view (cerci and aedeagus omitted); 7, *L. scatophagina* (Fallén); 8, *L. dudai* Sab.; 9, *L. laevigata* (Meigen).

the frons is always distinctly shining in the British species which should enable recognition of *curvinervis* if it were subsequently found here.

KEY TO BRITISH SPECIES

1. Knob of halteres darkened 2
- Knob of halteres clear yellow. Dorsocentrals well in front of level of postalars and situated about opposite anterior edge of wing bases *scatophagina* (Fallén)
2. Dorsocentral bristles well forward as in *scatophagina*, their own length or more from scutellum. Orbitals nearly as strong as verticals *dudai* Sabrosky
- Dorsocentral bristles at the level of the postalars and obviously less than their own length from the scutellum. Orbitals relatively short and weak *laevigata* (Meigen)

Leiomyza scatophagina (Fallén) (Fig. 7)

Probably common throughout the British Isles, 12.v-15.x. All pale haltered British material has been found to belong here and this includes those I recorded (1973) in association with *Volvariella*, *Oudemansiella* and reared from *Armillaria*; I have also taken examples on rotten *Polyporus squamosus* and on *Coprinus radians*.

L. scatophagina has been seen from Kent, London (N.W. Kent), Sussex, Hants., Berks., Bucks., Oxon., Wilts., Gloucs., Devon, Hereford, Cambs., Suffolk, Powys (Cathedine Common), Moray (Logie, Brodie), Inverness (Aviemore), Tipperary (Woodrooff Woods, 22.vi.75, P. J. Chandler) and Mayo (Westport Demesne, 29.ix.77, P. J. Chandler) (there are two Irish females in Haliday's collection, probably from Co. Down).

Leiomyza dudai Sabrosky (Fig. 8)

Only seen from south-east England but apparently common there; 16.vi-14.ix; the dark haltered material I recorded (1973) from *Volvariella*, *Oudemansiella*, *Tricholoma* and *Hypholoma* belong here as do those reared with *scatophagina* from *Armillaria*. Males from all these fungal associations have been dissected and found to be conspecific and it is concluded that all species of *Leiomyza* are probably polyphagous. The material reared by Buxton (1960) from *Pleurotus* included both *dudai* and *laevigata*, the former predominating.

L. dudai has been seen from London (N.W. Kent), Surrey, Sussex, Hants., Berks., Bucks., Hereford, Cambs., Suffolk and Norfolk.

Leiomyza laevigata (Meigen) (Fig. 9)

This too is probably common throughout the British Isles, although again most records are from the south; dates range from 26.v-17.ix. The material I recorded (1973) rearing from *Pleurotus cornucopiae* were *laevigata* and Buxton's 1952 rearing from this fungus was also *laevigata*. Many were found about fungi on elms in his garden by Jenkinson but it appears probable that it will be found to attack other fungi.

L. laevigata has been seen from Kent, London, Surrey, Sussex, Hants., Berks., Bucks., Cambs., Norfolk, Suffolk, Hereford and Moray (Nairn, Brodie); a single female, labelled 'Ireland' in Haliday's collection (National Museum, Dublin), has been confirmed as *laevigata*.

ACKNOWLEDGEMENTS

I am indebted to the authorities of the British Museum (Nat. Hist.), the Oxford and Cambridge University Museums, the Norwich Museum and the National Museum, Dublin for the opportunity to examine the Asteiidae in their collections, also for the loan of examples of *Asteia elegantula*; to Dr. C. W. Sabrosky for information on *A. elegantula* and to Dr. H. Andersson for the loan of the type of that species. Mr. J. H. Cole and Mr. L. N. Kidd also kindly allowed the use of records from their collections.

REFERENCES

- Buxton, P. A. 1960. British Diptera associated with fungi. III. Flies of all families reared from about 150 species of fungi. *Entomologist's mon. Mag.*, **96**: 61-94.
- Chandler, P. J. 1973. Diptera and other insects associated with decaying elms at Bromley, Kent. *Entomologist's Gazette*, **24**: 329-346.
- Colyer, C. N. & Hammond, C. O. 1951. Flies of the British Isles. 383 pp. London.

- Duda, O. 1927. Revision der altweltlichen Astiidae. *Deutsch Ent. Zeitsch.*, **2**:113-147.
- Duda, O. 1934. Family 58b. Astiidae in Lindner, E. *Die Fliegen der Palaearktischen Region*. Vol. VI (I). 1-15, Taf. I.
- Griffiths, G. C. D. 1972. The phylogenetic classification of Diptera Cyclorrhapha, with special reference to the structure of the male postabdomen. *Series Entomologica*. **8**. 340 pp. The Hague.
- Hennig, W. 1965. Die Acalyptratae des Baltischen Bernsteins und ihre Bedeutung für die Erforschung der phylogenetischen Entwicklung dieser Dipteren-Gruppe. *Stuttg. Beitr. Naturk.* No. **145**. 215 pp.
- Hennig, W. 1969. Neue übersicht über die aus dem Baltischen Bernstein bekannten Acalyptratae (Dip., Cyclorrhapha). *Stuttg. Beitr. Naturk.* No. **209**. pp. 26-31.
- Jenkinson, F. 1904. *Asteia elegantula* Zett., a species of Diptera new to Britain. *Entomologist's mon. Mag.*, **15**:4.
- Kloet, G. S. & Hincks, W. D. 1945. A check list of British Insects. 483 pp. Stockport.
- Kloet, G. S. & Hincks, W. D. 1975. A check list of British Insects. Second Edition (completely revised). Part 5: Diptera and Siphonaptera. *Royal Ent. Soc. Lond.* 139 pp.
- Lyneborg, L. 1969. Two new species of *Asteia* (Diptera, Asteiidae) from Spain. *Ent. Medd.*, **37**:27-46.
- Sabrosky, C. W. 1956a. Additions to the knowledge of old world Asteiidae (Diptera). *Rev. franç. Ent.*, **23**:216-243.
- Sabrosky, C. W. 1956b. Diptera: Asteiidae in *Insects of Micronesia*. **14**, No. 2: 29-40.
- Sabrosky, C. W. 1957. Synopsis of the new world species of the dipterous family Asteiidae. *Ann. Ent. Soc. Amer.*, **50**:43-61.
- Sabrosky, C. W. 1977. 20. Fam. Asteiidae in La Faune terrestre de l'Île de Sainte-Hélène. 3^e partie. *Mus. Roy. de l'Afr. Centr. Tervuren, Belg. Ann.* No. **215**:96-100.
- Séguy, E. 1934. Faune de France, **28**. Muscidae Acalypterae et Scatophagidae. Paris.

OBITUARIES

DENZIL WALTER HUGH FFENNELL

On 16th August, 1977, Denzil Ffennell died suddenly while attending his moth traps in his grounds at Martyr Worthy, Hampshire, at the early age of 56. The son of a banker, Denzil spent his life in his beloved Hampshire apart from schooldays at St. Peters Court, Broadstairs, and Eton College, a year at Cambridge before the war, and wartime service with the Hampshire Carabiniers Yeomanry and Hampshire Regiment which took him to North Africa and Italy, where he served with distinction in the rank of captain. He was wounded, and during his convalescence he caught four Bath Whites on the sea front at Ramsgate armed, appropriately enough, with nothing more than a bath towel! That was in 1945, and after returning for a few more months service in Germany, he was able to settle down at Martyr Worthy. There he ran a successful market garden which claimed his undivided attention in the early months of the year, but left him fairly free after that to follow the pursuits of a country gentleman: he was an excellent shot, a keen and skilful dry fly fisherman on the nearby Itchen, a knowledgeable field botanist and, above all, a first class lepidopterist with a rapidly expanding knowledge of the smaller Lepidoptera, which made him pre-eminent in Hampshire and one of the leading microlepidopterists in the country.

Denzil's is a collector's collection. He was not particularly interested in local races of insects and seldom took more than half-a-dozen specimens

of a species; to him, entomology was a contest with Nature and, one suspects, with his fellow bug-hunters—every species added was a point scored, and he enjoyed a pleasant game of one-upmanship with his friends whenever he got a special rarity. The writer once received a postcard, written in green ink (!), announcing the capture of *Daphnis nerii* (Linn.) in the garden, with the comment that 'he was pleased to get it, as it was the commonest migrant he had not yet taken'. That same garden, in which native species abounded, also yielded in its time such rare migrants as *Euchromius ocella* (Haw.), *Diasemiopsis ramburialis* (Dup.), *Cyclophora puppillaria* (Hübner), *Hippotion celerio* (Linn.), *Eurois occulta* (Linn.), *Mythimna unipuncta* (Haw.), no less than three *Tathorhynchus exsiccata* (Led.), two *Eublemma ostrina* (Hübner) five *E. parva* (Hübner), a couple of *Trichoplusia ni* (Hübner) and *Catocala fraxini* (Linn.). This last was also the subject of a 'typical' Denzil story: he opened the trap and there was this large *Catocala* with a few *C. nupta* (Linn.); lifting a forewing with forceps, he noted the mauve hindwings and said to himself, 'Ah, *fraxini*', and sauntered back to the house for a larger pillbox. The moth was still there when he got back so, after another look at the hindwings, he duly boxed it! My *nupta* always fly off if I so much as glance at them. Most of the native species had fallen to Denzil's wiles, and he had visited most parts of the British Isles, doing good work in Shetland, parts of Ireland, the Scilly Isles and elsewhere. He was prevented from reaching the early spring Scottish species and had a few *bêtes noires*, the most notable of which was perhaps *Harpyia bicuspis* (Bork.), which evaded him to the last. Denzil was also interested in the Trichoptera, and had a good representative collection.

Denzil's greatest interest was in the Lepidoptera of his own county, and as his knowledge of the micros grew, he added species after species to the county list, and two, *Phyllonorycter dubitella* (H.-S.) and *Lampronia flavimitrella* (Hübner), which were new to Britain. 'The Butterflies and Moths of Hampshire and the Isle of Wight' is a monument to Denzil's energy. It was Denzil who persuaded the author to begin writing, Denzil who found support and financial backing, and Denzil himself who provided so many records—nearly fifty new county records and innumerable new records for each of the three vice-counties. It is understood that more records have come from Denzil's own grid square than from any other 10 km. square in the whole of Britain.

Denzil wrote beautifully—even his postcards were masterpieces of elegance—and his contributions to the entomological journals were always most readable. He wrote several attractive articles for *The Field* and *Country Life* which could have been used with great advantage in the English classroom. Occasionally he wrote to amuse rather than to instruct, always applying the same high standard of craftsmanship. All those who had the privilege of knowing Denzil will testify to his good nature and sense of fun. Not only did he enjoy life, he was seen to be enjoying it: a happy man, a kindly, generous man, a mine of information on country lore which he took pleasure in expounding, a lover of the countryside, a *raconteur* abrim with amusing tales of insects, places and people, yet totally devoid of smut or malice which are sometimes thought to be essential ingredients of a 'funny' story. Denzil was a man folk will wish to remember. To Jane, his wife, and to Simon and Diana, we offer our sincere condolences and share their untimely bereavement.

AN OBITUARY AND BIBLIOGRAPHY OF HENRY CHARLES HUGGINS, F.R.E.S.¹

by J. M. CHALMERS-HUNT

(St. Teresa, Hardcourts Close, West Wickham, Kent, BR4 9LG)

Henry Charles Huggins died on the 14th April, 1977, clinically from pneumonia following a relapse after an operation for prostatitis, though the real reason for his giving up was the realisation that he would lose his independence and never again be able to collect. He was born at Gravesend on the 17th May, 1891, the elder son of Henry Huggins, J.P., who was also an entomologist and contributed to some of the early volumes of *The Entomologist's Record*.

Very early in life H. C. Huggins showed a keen interest in natural history and especially the British lepidoptera, of which he started to form a collection at the age of eight and continued to add to it throughout his lifetime. He was fortunate in having as his chief mentors the Rev. C. R. N. Burrows (of whom he wrote an appreciation in 1954) and the renowned microlepidopterist Benjamin A. Bower. He was also helped in his youth by A. B. Farn (a second cousin of his grandmother, Mrs. Louisa Huggins née Farn).

For the first forty years or so much of his collecting was done in his native Kent, and he was probably the only man still surviving to have taken there the Marsh Fritillary (*Euphydryas aurinia* Rott.) and the Black-veined White (*Aporia crataegi* L.), the former at Ham Ponds in 1905, and the latter at Eastry in 1906.

For a while he collected British and Irish land and freshwater mollusca, publishing a paper on the Irish Limnaeae in 1918, in which he suppressed two so-called species, *L. involuta* Thomp. and *L. praetenuis* Bowell. However, his chief interest lay in the lepidoptera, particularly those of Ireland, to which country he undertook 36 visits, the first about 1913, and the last in 1973 in the company of the writer. Among a number of new Irish subspecies that he described were *Erynnis iages baynesi*, *Gonopteryx rhamni gravesi*, *Eupithecia vulgata clarensis* and *E. venosata plumbea*.

After 1922, Huggins concentrated on micros of which he was later to become one of the leading authorities in this country. Although a prolific writer on the subject of lepidoptera, it seems it was not until 1923 that his first entomological contribution appeared in print. He was then already 32, but during the next fifty years his output was to exceed 400 published communications. Many of these are of considerable interest, particularly his series 'Notes on the Microlepidoptera' which appeared at intervals from 1951-74.

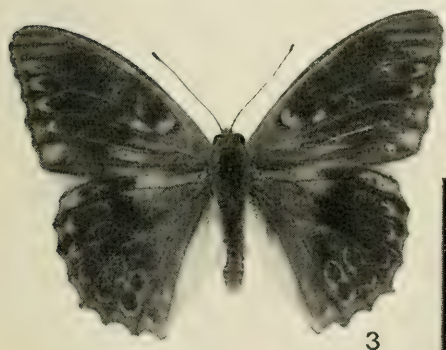
He joined the (then) South London Entomological and Natural History Society in 1934, reading in 1956 a paper on the Burren, and in 1959 one on Kerry, both of which were published (*see* bibliography).

Harry Huggins was a most interesting companion and entertaining raconteur with a fund of anecdote, much of it entomological reaching back to the beginning of the century. He was also an excellent correspondent and his letters no less than his published writings never failed to give enjoyment.

His fine collection of lepidoptera down to the Tortricodea (he did not collect Tineoidea) as well as his British and Irish land and freshwater mollusca have been presented to the British Museum (Nat. Hist.).

To his only son, who like his father became manager of a branch of Westminster Bank, we offer our sincere sympathy.

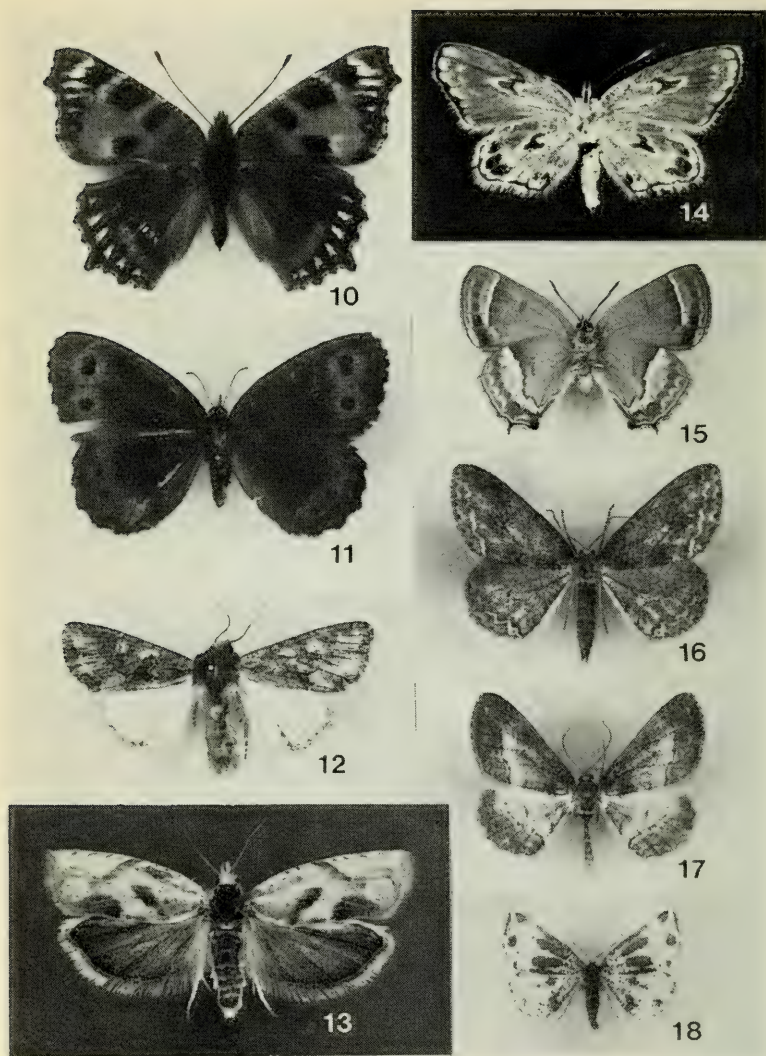
¹ For further particulars of the subject of this memoir see his obituary in *Ent. Rec.*, 89:223-224.



ANNUAL EXHIBITION (1977)

PLATE I

1. *Hipparchia semele* (L.) ♀ ab. *holanops* Brouwer, R. C. Revels. 2, 3. *Argynnis lathonia* (L.) abs., H. G. Phelps. 4. *Xestia castanea* (Esp.) ab., J. M. Messenger. 5. *Agrotis puta* (Hübner) ab. *nigra* Tutt, N. Horton. 6. *Syngrapha interrogationis* (L.) ab., A. D. A. Russwurm and H. G. M. Middleton. 7. *Eriopygodes imbecilla* (F.) ♂, B. Skinner. 8. *Ochropleura plecta* (L.) ab., B. K. West. 9. *Coscinia cribraria* (L.) *arenaria* (Lempke), G. Burton.



ANNUAL EXHIBITION (1977)

10. *Aglais urticae* (L.) ab., S. Imber. 11. *Erebia ligea* (L.), Arran Brown, T. J. Daley. 12. *Blepharita solieri* (Boisd.), E. Pelham-Clinton. 13. *Eucosma metzneriana* Tr. (x 4½), R. J. Revell. 14. *Plebejus argus* (L.) ab. *striata* Frohawk (x 4½), H. E. Chipperfield. 15. *Quercusia quercus* (L.) ab. *depuncta* Lempke, A. S. Harmer. 16. *Ectropis crepuscularia* (Hübner) ab. and 17. *E. consonaria* (Hübner) ab., both E. C. L. Simson. 18. *Pseudopanthera macularia* (L.) ab. *radiata* Loritz, B. R. Baker.



D. W. H. FFENNELL

PLATE IV

PROC. BRIT. ENT. NAT. HIST. SOC., 1978

PLATE IV



H. C. HUGGINS

BIBLIOGRAPHY

(A) *The Entomologist*

- 1923 Notes on Tortrices observed in 1922. **56**:15-16.
 1923 Variation in Lepidoptera. **56**:188-190.
 1923 Variation in Lepidoptera. **56**:238-240.
 1924 *Catoptria aspidiscana rubescana* (Constant) in Britain. **57**:13-14.
 1924 Tortrices observed in 1923. **57**:41-43.
 1924 A Few Notes on the habits of *Peronea hastiana*. **57**:281-282.
 1925 *Oxyptilus pilosellae* (Zell.) in Kent. **58**:6-18.
 1925 Notes on Tortrices, 1924. **58**:98-99.
 1926 Albinism in Tortrices in the Faversham district. **59**:115.
 1926 Notes on Tortrices, 1925. **59**:115-116.
 1926 Early Appearances of *Tephrosia punctulata*, etc. **59**:126.
 1926 The Pupation of *Cryptoblabes bistriga*. **59**:128.
 1927 Notes on Microlepidoptera. **60**:19-21.
 1927 Notes on Microlepidoptera. **60**:67.
 1927 Notes on Microlepidoptera. **60**:186-188.
 1927 Variation in the Genus *Tortrix* (= *Sciaphila*). **60**:211-212.
 1927 *Evetria purdeyi* in the Isle of Wight. **60**:232.
 1927 Northern Tortrices Double-Brooded in the South of England. **60**:232.
 1927 The Southern Food-Plant of *Penthina dimidiata*. **60**:233.
 1927 Migrants in East Kent in 1927. **60**:233.
 1927 A further Kentish Record of *Ephestia semirufa* (and other observations). **60**:257-258.
 1927 Variation in *Gymnancyla canella*. **60**:279-280.
 1927 The Scarcity of *Catoptria albersana*. **60**:282.
 1927 A Trap for the Turnip Flea (*Phyllotreta*). **60**:17-18.
 1928 The Habits of *Peronea fissurana* Pierce. **61**:17-18.
 1928 Late Immigrants in 1927. **61**:18.
 1928 Periodicity of *Aciptilia galactodactyla*. **61**:18.
 1928 Collecting in the Aran Islands. **61**:43.
 1928 The Possible Breeding of *Daphnis nerii* in England. **61**:67.
 1928 The Habits of *Bankia argentula*. **61**:81.
 1928 *Conchylis dipoltella* in Kent. **61**:112-113.
 1928 *Dioryctria splendidella* in Kent. **61**:113-114.
 1928 Breeding *Petasia nubeculosa*. **61**:114-115.
 1928 Immigrants in Early June. **61**:152.
 1928 *Brachytron pratense* in Kent. **61**:213-214.
 1928 *Laphigma exigua* in Kent. **61**:223.
 1928 The Tortrices of the Faversham District. **61**:224-230, 243-250.
 1928 *Argynnis lathonia* and *Colias croceus* in Hants. **61**:232.
 1928 Early June Immigrants in East Kent. **61**:232.
 1928 *Synanthedon flaviventris* Stdg. in Kent. **61**:233.
 1929 *Myelois neophanes* Durrant. **62**:20-21.
 1929 *Crambus alpinellus* on the Chalk Downs. **62**:44.
 1929 *Salebria obductella* in Kent. **62**:52-53.
 1929 *Percnoptilota fluviata* Hb. **62**:70-71.
 1929 Immigrants in East Kent in 1928. **62**:71-72.
 1929 Asymmetrical Variety of *S. lubricipeda*. **62**:83.
 1929 *Acherontia atropos* at Kingsgate-on-Sea. **62**:83.
 1929 The Food-Plant of *Catoptria aemulana* Schl. **62**:137-138.
 1929 A Few Notes on *Oxyptilia parvidactyla* Haw. **62**:138.
 1929 Emergence Date of *Oxyptilia parvidactylus*. **62**:161.
 1929 The Emergence of *Melanippe galiata*. **62**:230.
 1929 *Salebria obductella* (Lep. Pyralidae) as a Resident Species. **62**:162-163.
 1929 *Ephestia elutella* in the Open. **62**:207.
 1929 *Colias croceus* and *C. hyale* in East Kent. **62**:230.
 1929 The Pupa of *Homoeosoma cretacella* Rössl. **62**:232.
 1930 *Sericoris latifasciana* in Hants. **63**:88.
 1930 *Dichrorampha aeratana* Pierce in Kent. **63**:88.
 1930 *Polygonia c-album* in Kent. **63**:235.

- 1930 Immigrants in 1930. **63**:237
 1930 The Pupating Habits of *Eudemis euphorbiana* Frr. **63**:284-285.
 1931 *Dioryctria splendidella* H.S. in the South of England. **64**:18.
 1931 *Laspeyresia conicolana* Heylaerts: A Tortrix New to the British Isles. **64**:27-29.
 1931 *Peronea latifasciana* Haw. **64**:64.
 1931 The Food-Plant of *Sesia andrenaeformis*. **64**:64.
 1931 *Laspeyresia conicolana* (Heyl.). **64**:85.
 1931 *Laspeyresia conicolana* Heylaerts, in Kent. **64**:115-116.
 1931 *Tortrix viridana* in the New Forest. **64**:213.
 1931 *Myelois neophanes* Durrant in the New Forest. **64**:213.
 1932 The Habits and Distribution of *Laspeyresia conicolana* Heylaerts. **65**:12.
 1932 *Laspeyresia conicolana* Heylaerts in Sussex. **65**:37.
 1932 *Scoparia ulmella* Knaggs in Devon. **65**:86.
 1932 The Possible Occurrence of *Capua (Dichelia) gnomana* Clerck in the British Isles. **65**:104-105.
 1932 Further British Captures of *Phlyctaenia fulvalis* Hb. **65**:163.
 1933 *Peronea fissurana* Pierce and Metcalfe, in Essex. **66**:39.
 1933 The Habits of *Catoptria aspidiscana* Hüb. Var. *rubescana* Constant. **66**:88-89.
 1934 *Hemimene alpinana* Tr. (K.) in Essex. **67**:139.
 1934 *Catoptria rubescana* (Constant), a Distinct Species (Lep. Tortricidae). **67**:169-171.
 1935 Unusual Emergences of Insects in 1933-34. **68**:138.
 1935 A Gynandrous *Pieris rapae*. **68**:273.
 1935 Unusual Second Broods in 1935. **68**:289.
 1936 Unusual Food-Plant of *Sesia cynipiformis*. **69**:16-17.
 1938 A Black Variety of *Salebria hostilis* Steph. **71**:183.
 1938 *Pyralis glaucinalis*. **71**:200.
 1938 *Pyrausta nubilalis* Hübner (Lep. Pyralidae) in South Essex. **71**:241-242.
 1939 Obituary: W. S. Giles, F.R.E.S. **72**:80.
 1939 A Few Notes on *Platyptilia tessera-dactylus*. **72**:177-178.
 1945 A "Plague of Ladybirds" in Essex. **78**:32.
 1947 *Anania nubilalis* (Lep. Pyralidae) in South Essex. **80**:206-207.
 1947 *Grapholitha conterminana* in the Thames Estuary. **80**:245-246.
 1947 *Rhodometra sacraria* in South Essex. **80**:269-270.
 1948 *Margarodes unionalis* at Leigh-on-Sea. **81**:8.
 1948 Variation in Irish Insects. **81**:35-36.
 1948 *Schoenobius gigantellus* and *Nonagria sparganii* in South Essex. **81**:36.
 1948 Second Brood of *Melitaea athalia*. **81**:69.
 1948 *Limenitis camilla*. **81**:70.
 1948 A Further Record of *Anania nubilalis* in Kent. **81**:152.
 1948 *Calomotropha paludella* in Essex and Kent. **81**:172-173.
 (to be continued in Parts 3/4)

PROCEEDINGS

28th July 1977

The President, Mr. R. S. TUBBS, in the chair.

EXHIBITS

Rev. D. J. L. AGASSIZ. — *Parapoynx diminutalis* (Snellen), *Nymphula linealis* Moore, and an apparently unnamed *Nymphula* sp. (Lep., Pyralidae) all three introduced species from the Far East found breeding at Enfield, Middlesex.

Dr. A. A. ALLEN. — (i) A female of *Aphanistes xanthopus* Schrank (Hym., Ichneumonidae) which was obtained by sweeping moorland heather, 20.vi.1977, near Dawlish, Devon. The species is considered to be rare and is parasitic on noctuid larvae and possibly other families of Lepidoptera. The Anomalinae, to which sub-family *A. xanthopus* belongs, are solitary

endoparasites of lepidopterous larvae; the young larva is attacked, but the adult Anomaline always emerges from the host pupa. The group parasitises a very wide range of families, including 'Microlepidoptera'. (ii) A short series of *Clyphipteryx linneella* (Clerck) (Lep., Momphidae) found as adults on trunks of *Tilia* sp. (lime), 25-26.vi.1977, at Manor Park, London, E.12. Meyrick (1927) states that the species is 'very local, but common where it occurs'; certainly a number of imagines were observed flying around the trees in the midday sunshine. The larva feeds on the bark of *Tilia*. (iii) A specimen of *Stathmopoda pedella* (Linn.) (Lep., Stathmopodidae) disturbed from a well-established grove of *Alnus glutinosa* (alder) on Brownsea I., Dorset, 9.vii.1977. The moth is local and seems very uncommon; the larva feeds in the fruits of alder.

B. R. BAKER. — Ova of *Bembecia scopigera* (Scop.) (six-belted clear-wing). The larval habit of this species of tunnelling the roots of *Lotus corniculatus* is well known but details of the precise oviposition site appears to be missing from the literature; an investigation was therefore carried out on 19th July, 1977. Two males and two females were swept from a richly flowered chalk slope and these were subsequently placed in a large glass tank in which was planted some small clumps of *Lotus corniculatus*, Bird's Foot Trefoil, and associated small plants; the tank was situated outside in the garden. Under dull conditions the moths were entirely inactive but in bright sunlight on the afternoon of 20th July all four specimens flew vigorously and the females oviposited between 3 and 4 p.m. Eggs were laid on the leaves of *Lotus* and occasionally on the stems and exposed roots; a few were laid on leaves of other plants such as *Poterium sanguisorba*, Salad Burnet. One of the males died after three days, the remaining three specimens lived for 5 days. The eggs are black, with faint whitish reticulations (only discernible under high power), in shape they are ovoid discs with longest axis 0.57 mm.; broadest 0.36 mm. and 0.27 mm. depth. As a control to check whether leaves were a natural oviposition site, a return was made to the chalk slope on 27th July and a total of five eggs were found; two of these were on leaves of *Lotus*, two on *Polygala* and one on an undetermined leaf, but all within easy access of abundant *Lotus*.

A. M. EMMET. — A living imago, cocoons, and vacated mines of *Stigmella aceris* (Frey) from a locality near Edenbridge, Kent. The food-plant is Norway Maple (*Acer platanoides*). The first British specimen was bred by Lord Walsingham in 1914/15 and is unsexed, on a card, in the British Museum (N.H.). The second emerged earlier the same day as the example exhibited. Vacated mines had been found in Kent by S. N. A. Jacobs and S. A. Whitebread.

G. PRIOR. — (i) Larvae of *Eupithecia pulchellata* Steph. f. *hebudium* Sheldon, from the N.W. coast of Argyle, received from Dr. Edwards. The larvae are rather darker than the southern British form and when about to pupate become almost black. (ii) Larvae of *E. lariciata* (Freyer) from larch, Watlington Hill, Oxfordshire. (iii) A handsome but undetermined moth taken in Westminster Cathedral.

MATTERS ARISING FROM THE PREVIOUS MINUTES

S. N. JACOBS remarked that he wondered if the explosions at Denny Bog were connected with reported discoveries of dead New Forest ponies with broken limbs far from the roads.

MEMBERSHIP

The obligation book was signed by Miss Marrable, and Messrs. P. M. de Souza and D. C. Lees.

COMMUNICATIONS

R. F. BRETHERTON stated that *Heterographis oblitella* (Zeller) (Lep., Pyralidae) which had such a population explosion in Southern England last year, had reappeared this year at his light trap at Bramley, an inland locality, and was presumably breeding there. D. AGASSIZ said that its usual foodplant was *Chenopodium*, which was most persistent on salt marshes. Its captures had previously mainly been on such habitats, giving rise to the idea that they were immigrants from overseas.

R. DYKE reported having taken *Mythimna vitellina* (Hübner) on 13th-14th July, 1977 in Devon. R. F. BRETHERTON observed that this species was normally unable to overwinter in Britain and the examples were therefore most probably immigrants.

Dr. S. A. KNILL-JONES reported the capture of *Gonepteryx rhamni* (Linn.), a small female, in Shaftesbury Avenue, London.

C. HART reported that on 16th July, 1977 a male *Cossus cossus* (Linn.) had been taken at light at Sandwich.

M. W. F. TWEEDIE then gave a talk briefly describing his methods of photographing butterflies and moths, and then showed excellent slides of these taken in Britain, Spain, St. Vincent, W.I., Turkey, Malaysia and Sumatra. The audience showed its appreciation of these in the usual

OBSERVATIONS ON EXHIBITS

Dr. J. D. BRADLEY said that Mr. Prior's third exhibit was probably a South African Oecophorid moth of the genus *Cryptolechia* Zeller.

8th September 1977

The President, Mr. R. S. TUBBS, in the chair.

The President announced with regret the deaths of (i) Professor H. E. Hinton, aged 64, who was Head of the Zoology Department, Bristol University, where he had worked since 1949, President of the Royal Entomological Society 1969-70, and President of our Society for its Centenary Year; and (ii) Denzil W. H. Fennell, well known to most members as a lepidopterist, particularly a micro-lepidopterist; he died suddenly in the middle fifties while attending his moth trap near Winchester.

EXHIBITS

Rev. D. J. L. AGASSIZ. — A series of *Oligostigma angulipennis* Hampson (Lep., Pyralidae), new to Britain, from aquatic nurseries at Enfield, Middx.

Dr. A. A. ALLEN. — (i) Two parasitic species (Hym., Ichneumonidae), one primary, one secondary (true hyperparasite) of *Quercusia quercus* (L.) (Lep., Lycaenidae). The primary parasite was an unnameable species of the genus *Phobocampa*, the members of which are parasites of immature larvae of Lepidoptera. No keys exist for the majority of the *Phobocampa*, a problem which is also presented by the large genus *Mesochorus* to which the secondary parasite belongs. In an attempt to obtain the *Phobocampa* species, eleven young larvae of *Q. quercus* were collected by beating from oaks, 28.v.1977, in Vert Wood, East Hoathly, Sussex. Although nine of these were healthy and soon attained full size, two larvae remained rather small, an indication of parasitism. By early evening of 1.vi one larva had

become motionless, and became paler brown than its companions. During the evening it became almost colourless and transparent and the parasite maggot could be seen moving inside the host's skin. By 5 a.m. the following morning (2.vi) the parasite larva had appeared and spun its cocoon near to the empty skin of the host. The second affected larva underwent the same sequence of events, the parasite larva appearing and constructing its cocoon on 4.vi. The cocoons were dark purplish fuscous; had the humidity of the environment been lower they would probably have been lighter, approximately whitish-grey with blackish blotches. From the first-spun cocoon a female *Phobocampa* species hatched on 22.vi while the other cocoon gave rise on 26.vi to a male *Mesochorus* species, the primary parasite of this *Phobocampa* and in turn a secondary parasite of *Q. quercus*. The *Phobocampa* sp. has also been recorded from *Thecla betulae* (L.) (brown hairstreak) and appears to be a rare insect, perhaps only to be found in the south of England. Larvae collected at Salfords, Surrey, in late May, failed to give the parasite. (ii) A ♀ of *Paracystola acroxantha* Meyr. (Lep., Oecophoridae) captured in an actinic light trap during the night of 17-18.viii.77 outside the first floor of a guest-house at Dawlish, Devon. The moth was in fresh condition and was kept alive, mainly in the dark at room temperature, and during the night of 19-20.viii three ova were obtained, the moth unfortunately dying in the process. When laid, the ova were translucent and almost colourless, with a delicate pale yellow tinge. In shape they were oval (as opposed to elliptical), and slightly flattened top and bottom. They remained in this state until 31.viii when they became slightly darker and two larvae hatched during the night of 1-2.ix; an ovum was lost. The larvae, after hatching, were 2 mm. in length, and white with a shining mid-brown head. The body, clothed in some short fine, almost colourless hair, carried the usual number of legs; claw-legs on segments 2, 3 and 4, and pro-legs on ss. 7, 8, 9, 10 and 14 (adopting Meyrick's convention, with the head counted as the first segment). The larvae were very lively. The inevitable problem was the choice of food on which to rear the species, for no foodplant had, to the exhibitor's knowledge, been recorded for *P. acroxantha*; unfortunately this problem remains insoluble. As soon as the larvae had hatched, samples of the following were introduced to the receptacle: elm, apple, bramble, dandelion, ivy, gooseberry, strawberry (cultivated), thyme, box, and heather. Eight hours later the larvae were still wandering restlessly, so further food, yew, privet, holly and birch leaves, were offered and finally a bay leaf was supplied. Unfortunately the larvae found none of these attractive, but possibly they nibbled a holly leaf. In any event, the larvae were not seen again and it must be assumed they died of starvation. There is a theory that they feed on eucalyptus. The ova were stored in a cool place, so presumably in the field they hatch before winter as in captivity. Kloet & Hincks (1972) gives the status of *P. acroxantha* in Britain as uncertain. The present capture constitutes only the seventh authentic record of the moth in Britain (although a fore-wing may be counted as an additional half-record), the years of capture being 1908, 1917, 1925, 1970 and 1976, all in the South Devon area between Torquay and Ottery St. Mary. The usual month given for the flight season is August (Meyrick, 1927 and Jacobs, 1949-50, in *Proc. South Lond. ent. nat. Hist. Soc.*, p. 189) but the two specimens caught in 1976 by the present exhibitor were both in June. Although the summer of 1976 was very hot, the high temperatures had only just begun by late June, and it is possible that instead of a premature appearance being the explanation of the 1976 dates, the insect

may be bivoltine. Slight further evidence is supplied by a consideration of the wing-span of the species, given by the above authors as 13-15 mm. The female captured in 1977 measured 13 mm. across, but the 1976 female spanned 18 mm.; often first broods are of a larger size. The exhibitor had visited the area in June 1977 in an attempt to secure *P. acroxantha* but was unable to find it, either in Dawlish nor the not-too-distant moors which were the locality of the 1976 discovery. The exhibitor gratefully acknowledged the kindness of the proprietress of the guest-house at whose suggestion the light was run on a flat part of the roof outside his room. His earlier capture was referred to also in *Proc. and Trans. Brit. Nat. and nat. Hist. Soc.*, 9, 117 (1976) and the species, as exhibited in last year's annual exhibition, was illustrated in Plate IX of Vol. 10.

E. S. BRADFORD. — Four species of rather local microlepidoptera: (i) *Cydia molesta* (Busck) (Tortricidae): originally found in China and Japan but now found in many parts of the world. The larva bores into the shoots and fruit of peach and other fruit trees. It is usually imported into this country in fruit; this example was found flying in a house in Kent having probably emerged from some fruit on a bowl on the table in the living room and pupated somewhere in the house; the exhibitor had himself bred his first example of this species from a larva found in an imported peach. (ii) *Cydia conicolana* (Heylaerts), an example which had emerged from one of several cones of *Pinus sylvestris* picked up at Covert Wood, near Barham, Kent, first noted in this country in 1930 in the New Forest (by H. C. Huggins). (iii) *Scythris grandipennis* (Haw.) (Scythrididae) larvae were found rather sparingly in spun shoots of *Ulex* in Clowes Wood, Blean, Kent. (iv) *Nemapogon albipunctella* (Haw.) (Tineidae); a fresher specimen than the one previously exhibited; the larva is said to feed on decayed sticks.

G. R. ELSE. — Local and mostly uncommon aculeate Hymenoptera recorded from Leckford Estate, Stockbridge, Hants.: (i) Riparian species (riverbank, poplar plantation and carr vegetation adjacent to the Test). *Anoplus caviventris* Aurivillius (= *piliventris* (Morawitz); *cardui* Perkins). 1 ♂, 1 ♀, 12.vii.1977, G. R. Else. An uncommon spider-hunting wasp at present recorded from only three Hampshire sites. Females nest in dead stems and wood. *Symmorphus mutinensis* (Baldini) (= *sinuatissimus* Richards). 2 ♀♀, 12.vii.1977, G. R. Else. A common wasp, usually characteristic of damp habitats. Some Leckford females have been discovered nesting in the old reed thatch of riverside huts. *Crossocerus walkeri* (Shuckard). 1 ♂, 10.vii and 1 ♀, 30.vii.1977, G. R. Else. One of the specialties of the river bank, the wasp is rarely found more than a few yards from the water's edge. Nests in dead wood and provisions its cells with Ephemeroptera (mostly Baetidae), rarely Diptera. Nationally a rare species, but widely distributed. *Hylaeus pectoralis* Förster. 1 ♀, 30.vii.1977, G. R. Else. Until recently this bee was known in Britain only from the East Anglian fens and from an old (1901) specimen collected in the New Forest. Since 1972 it has been recorded from about 13 Hampshire localities, from Dorset, West Sussex and the Isle of Wight. Females are known to nest only in the vacated galls of *Lipara lucens* (Meigen) (Diptera, Chloropidae) on the apices of reed stems. Common in most Hampshire localities but only a pair have been recorded from Leckford. *Macropis europaea* Warncke (= *labiata* auctt. nec (F.)). Only one female has been recorded from Leckford, but the bee is no doubt established there. A local wetland species which provisions its subterranean nest with *Lysimachia vulgaris* L. pollen and nectar. The ♀ specimen exhibited was collected at Browndown

(fen), near Lee-on-Solent, Hants., 26.vii.1972, G. R. Else. (ii) Chalk downland species. *Andrena marginata* F. One record only from Leckford, probably a stray from an undiscovered colony on nearby downland. Visits scabious flowers. The example exhibited was collected at Martin Down, Hants., 28.vii.1976, G. R. Else. *Melitta tricincta* Kirby. 2 ♂♂, 20.vii.1977, G. R. Else. A local bee with a preference for the flowers of Red Bartsia, *Odontites verna* (Bell.). (iii) Nationally declining species. *Andrena rosae* Panzer. 1 ♂, 13.iv.1947, D. McCarthy. *Bombus ruderatus* (F.). 1 ♀ (melanic form — endemic in Britain), 28.iv.1947, D. McCarthy.

Lt. Col. A. M. EMMET. — (i) (on behalf of R. J. REVELL) a specimen of *Eucosma metzneriana* (Tr.) (Lep., Tortricidae), captured at light in a chalk-pit on the Gog-Magog Hills, near Cambridge, on 22.vii.77. The species is new to Britain, but is known to occur in France and Belgium and to range eastwards to Japan. The larva feeds in the terminal shoots of wormwood (*Artemisia absinthium*) and mugwort (*A. vulgaris*) from August until May. (ii) on behalf of I. SIMS an example of an exotic Noctuid moth later determined as *Agrotis deprivata* (Walker), bred from a larva found in a warehouse in England.

S. A. WILLIAMS. — Coleoptera from the Leckford Estate, taken 27.vi.1976: *Amarochara umbrosa* (Erichson) and *Borboropora kraatzi* Fuss., both in grass cuttings; *Gnathoncus schmidtii* Reitter, in tawny owl nest; *Epuraea distincta* (Grimmer), in fungus; and *Leptura fulva* DeGee, on flowers.

COMMUNICATIONS

The President reported that he had captured one *Ladoga camilla* (L.) f. *nigrina* in a wood near Winchester and failed to obtain ova from females flying at the same spot, but later found ova there which he hoped to rear, but it would be two years before he could hope to obtain from them the same form.

C. G. DE WORMS stated that this year had been rather thin for the migrants, but he had heard from Mr. Warren of Folkestone that the latter had seen both *Cynthia cardui* (L.) and *Aglais urticae* (L.) there in small numbers, and also a single *Polygonia polychloros* (L.). There were other reports of *C. cardui* from the south-west. G. PRIOR had found *Gonopteryx rahmni* (L.) and *Inachis io* (L.) numerous on the Chilterns recently, but no Pug larvae on low herbs. A general discussion regarding the frequency of larvae obtainable this year respectively in England and Scotland ensued, and also on the scarcity this year in England of some species common last year.

Dr. A. A. ALLEN stated that during an eight-day holiday in Dawlish, Devon, an actinic 6-watt light trap was run each night from 13-14 to 20-21.viii. The weather was usually dry and mild but rain fell throughout the night of 16-17.viii which was also very misty. Rain fell to a lesser extent on 20-21.viii. Forty-three species of Macro-lepidoptera were thus recorded in this residential area just outside the town; there were surprisingly few Micros, but for this the capture of *P. acroxantha* compensated. There appeared to be absolutely no second brood of *Mythimna pallens* (L.) and *M. impura* (Hübner), a strong contrast to their abundance on a similar date last year. Especially abundant species were *Pieris brassicae* (L.), *Noctua janthina* (D. & S.), *Apamea monoglypha* (Hufn.) and *Agrotis puta* (Hübner). *Euplagia quadripunctaria* (Poda) (Jersey tiger) was common during the week both night and day, and four examples of *Eupithecia phoeniceata* (Rambur) were taken; *Cryphia muralis* (Forst.) was also abundant. On his

return to Surrey he had found at rest on a shop front in Reigate on 26.viii.77 a specimen of *Mormo maura* (L.) (old lady moth) which had recently decreased in numbers in this district. G. N. BURTON reported that on the Isle of Sheppey *Euproctis chryorrhaea* (L.) (brown tail) had been a veritable plague, causing rashes on children; 250 examples came to light in a single night.

MESSRS. W. GILCHRIST, A. E. STUBBS, S. WILLIAMS and G. R. ELSE then gave an illustrated account of 'The Leckford Survey', both historical, ecological and with illustrations of some interesting species of animals, a plan and views. A duplicate list of the Lepidoptera of the Leckford valley and chalk hills (No. 4 in the Leckford Record), sponsored by the John Spedan Lewis Trust for the Advancement of the Natural Sciences, was circulated. A large attendance and the number of questions showed that this project evoked a lively interest.

22nd September 1977

The Vice-President, Mr. G. PRIOR, in the chair.

The Chairman welcomed Professor Ewan of Tulane University, New Orleans, as a visitor.

EXHIBITS

Dr. A. A. ALLEN. — (i) Two specimens, male and female, of *Banchus volutatorius* (L.) (Hym., Ichneumonidae), caught, along with a second male, flying by day, 23.vii.1977, at Funton, Kent. The genus *Banchus* belongs to the subfamily Banchinae, whose members are solitary endoparasites of lepidoptera larvae, especially Noctuidae; the larva is attacked before maturity but not killed until it has constructed its pupal chamber, within which the parasite larva spins a characteristic black elongate cocoon. The British species of *Banchus* are comparatively few in number. The exhibit provided a good example of the sexual dimorphism often encountered in the group; the black-bodied female contrasts markedly with the yellow and black male. (ii) One example (♂) of *Coelichneumon microstictus* (Gravenhorst) (Hym., Ichneumonidae) caught in a shop window, 22.vi.77, at Dawlish, Devon. This appears to be a coastal species and quite local, having been recorded from Cornwall, Devon and the Isle of Wight. In common with the rest of the sub-family Ichneumoninae, *Coelichneumon* attack mature larvae or prepupae of lepidoptera, in which they develop singly, but the adult always emerges from the host pupa. (iii) A series of *Cryphia muralis* (Forster) illustrating the wide variation of this moth, and all captured 14-18.viii.77 at actinic light, Dawlish, Devon, the light being run on the roof of a house covered with lichens.

Prof. J. A. OWEN. — Two specimens of *Phloeosinus thujae* (Perris) from *Cupressus macrocarpa* at Tooting, London, SW17, on 17th July, 1977; first discovered in Britain on Cypress in Kew Gardens.

G. PRIOR. — Two larvae of *Eupithecia simplicata* Haworth (plain pug) on common orache (*Atriplex patula*) from a salt-marsh at St. Helens, Isle of Wight, now in final instar. They had undergone startling changes in colour markings and skin-texture in earlier moults.

NOMINATIONS

The following, their names having been read a second time, were declared elected members: Messrs. A. R. Barton, T. W. Wildridge, M. R. Brown, M. R. Love and T. J. Daley. Mr. T. J. Daley signed the obligation book.

ANNOUNCEMENTS

The Vice-President announced that the widow of Mr. George Holroyd, a previous member, had presented a book belonging to her husband, viz. W. E. Kirby *Butterflies and Moths of the U.K.*, and Miss Wakely had given Bradley, Tremewan, and Smith: *British Tortricoid Moths Vol. 1*; Miss Wakely, daughter of the late Mr. Stanley Wakely, had also promised to present a second album of photographs of field meetings, etc., compiled by her father.

COMMUNICATIONS

Dr. C. G. DE WORMS reported having seen, last week, *Lysandra bellargus* (Rott.), the adonis blue, commonly; and also fresh *L. coridon* (Poda), the chalk-hill blue, at Ranmore Common; both Messrs. FAIRCLOUGH and HILLIARD reported having seen *Colias croceus* Fourc., the clouded yellow, in Surrey recently, but not in great numbers; Mr. R. F. BRETHERTON mentioned that *L. bellargus* had in recent years made a recovery in the North Downs and regained nearly the whole of its former territory there, reaching Pewley Down in the extreme west. Mr. CHALMERS-HUNT had seen a single *Cynthia cardui* (L.) (painted lady) at West Wickham in early September.

Dr. SATTLER then gave an illustrated talk: 'A lepidopterist in Hawaii', showing habitats and among other Lepidoptera, some remarkable photographs of *Eupithecia* larvae, which genus had speciated richly in that group of islands and evolved unusual larval habits.

Numerous questions showed that the audience had been greatly interested and the talk was applauded vigorously.

13th October 1977

The President, Mr. R. S. TUBBS, in the chair.

EXHIBITS

Dr. A. A. ALLEN. — (1) Two examples of *Enicospilus tournieri* Snell (? = *ramidulus* L.) (Hym., Ichneumonidae) caught, along with several others, at actinic light, 14.viii.77, at Dawlish Warren, Devon. Although the testaceous colour of the species is indicative of nocturnal flight, the exhibitor caught a specimen on the wing at noon the following day. In common with others of the sub-family Ophioninae, *E. tournieri* is a solitary parasite of lepidopterous larvae; the host is attacked when immature but not killed until it has constructed its pupal chamber. (2) A single ♀ of *Barichneumon lepidus* Gravenhorst (Hym., Ichneumonidae) bred 11.v.74 from a lepidopterous pupa dug 18.iv.74 from under *Salix caprea* at Salfords, Surrey. The species is of the sub-family Ichneumoninae and is not uncommon overall, but the exhibit was of interest as the female is very much less common than the male; Perkins (1960) gives the status of the former sex of *lepidus* as rare. This presents something of an anomaly for the disproportionate sex-ratio of parasitic Hymenoptera usually gives rise to a predominance of females over males. The exhibitor has however frequently obtained males of the genus *Mesochorus* (Hym., Ichneumonidae) in much greater numbers than the relatively scarce females. (3) A specimen of *Evergestis extimalis* (Scop.) (Lep., Pyralidae) which was one of two examples caught at actinic light, on a windy night at Funton, Kent. The species is local and uncommon; Beirne (1954) gives its British headquarters as the Breck district of Norfolk and Suffolk. (4) *Ostrinia nubilalis* (Hübner) caught the same night as the preceding species, two imagines, both male, being obtained. As the larva of this moth hibernates, the exhibit resulted from

a larva having survived the drought of 1976, and this is of interest as Beirne, 1954, p. 152, states that 'dry summers, at the time of hatching [of the larva] are said to be very injurious to the species'. See also S. Wakely, 1939, in *Ent. Rec.*, 51: 1-5.

A. M. EMMET. — A specimen of *Pulicalvaria piceaella* (Kearfott) (Lep., Gelechiidae) taken at Woodham Walter, Essex, on 10.vii.77. It is believed to be the fourth British example. The species is a native of N. America and appears to have been introduced accidentally into this country. The larva mines the leaves of spruce (*Picea abies*) in the autumn, overwinters in a hollowed-out needle, and completes its growth in the spring. A search was made at Woodham Walter on 2.x.77 and three tenanted spinings were found, presumed to belong to this species; one of these was exhibited.

ANNOUNCEMENTS

The Secretary confirmed to the meeting the Council's decision to appoint Dr. A. A. Allen Acting Librarian until the end of the year as Miss V. Dick was unable to continue. Dr. Allen accepted. Lt.-Col. Emmet appealed to members having annotated copies of the *Guide to the Smaller British Lepidoptera* by L. T. Ford to submit their notes to him to enable fullest possible new data to be included in the projected revised edition.

COMMUNICATIONS

Col. D. H. STERLING reported having taken *Mythimna vitellina* (Hübner) at Winchester on the night of 9th/10th October, and a specimen of *Lithophane léautieri* (Boisd.) there the previous week. Mr. R. F. BRETHERTON also reported having taken the latter species in Surrey, the moth occurring in places where *Cupressus macrocarpa* was established. Dr. C. G. M. DE WORMS and Mr. J. BROWN also reported this moth's capture in Surrey. Mr. E. S. BRADFORD reported disturbing specimens of the following Lepidoptera whilst clearing out a shed in a garden: *Agonopteryx alstroemeriana* (Clerck), *A. heracliana* (L.), *A. nervosa* (Haw.), *A. arenella* (D. & S.), *A. propinquella* (Tr.), *Endrosis sarcitrella* (L.), *Mompha fulvescens* (Haw.), *M. substrigella* (Haw.), *Hofmannophila pseudospretella* (Stainton) and a Tineid sp.

Dr. A. H. B. RYDON reported having seen numerous Rhopalocera in his garden on Michaelmas daisies and Sedum flowers, including *Vanessa atalanta* (L.).

Dr. A. A. ALLEN reported that the poor summer of 1977 seemed to have retarded the appearance of the parasite *Charops cantator* de Geer (Hym., Ichneumonidae) by about two months; this may have been caused by the delayed development of its hosts: *Zygaena* sps Cocoons of *Z. filipendulae* (L.) collected at Dawlish, Devon, in late June 1976 produced a few specimens of *cantator* in mid-July 1976 and a small number of freshly emerged imagines of *filipendulae* were seen at the same time. However, on returning to the site in late June 1977 neither cocoons nor adults of the moth could be found; the former stage had always been well in evidence at this time in previous years in a local area on the cliffs. The cocoons were however obtained there in mid-August 1977 and examples of *cantator* were bred from these at the end of the month. This provides an example of how parasites are able to adapt to the behaviour of the host; sometimes the parasite deliberately modifies the rate of the development of the host. *C. cantator* attacks young larvae of *Zygaena* sps. but the host larva is not killed until it has constructed its cocoon, inside which the parasite spins its own.

Other members also reported their recent light trap captures and discussed the comparative frequency of some species.

COMMENTS ON EXHIBITS

Mr. S. N. JACOBS stated that *Ostrinia nubilalis* was established in this country where it fed on the roots of *Artemisia* (mugwort), and Lt. Col. A. M. EMMET confirmed that he had noted it as established on the banks of the Thames estuary.

Mr. E. S. BRADFORD reported having taken an example of *P. piceaella* at light in his garden in Elstree in 1968 and had been given another taken in 1967 by Mr. P. Goddard; the only other previous record was one taken at Blackheath by Mr. Minnion.

Then followed a selection of excellent and varied colour-slides of birds, plants and insects shown by Drs. A. A. Allen and W. H. Wain, and Messrs. E. S. Bradford, Merrifield, G. Prior and R. W. Uffen.

10th November 1977

The President, Mr. R. S. TUBBS, in the chair.

EXHIBITS

Dr. A. ALLEN. — (i) Two females of *Agriotypus armatus* Curtis (Hym., Ichneumonidae), a solitary ecto-parasite of Trichoptera, of which the genera *Silo* and *Goera* are selected as hosts. These two examples were obtained from the host cases found in the R. Pang, Bradfield, Berks., in the late winter of 1976. The adult *armatus* failed to appear at the expected time of the summer months and were only obtained by resorting to opening the cases and removing the perfectly formed insect from its cocoon. The wings were fully developed, and the examples, although dead, were readily mounted. The species parasitises the pupae and pre-pupae of Trichoptera. In order to oviposit onto the host, the female *armatus* enters the swiftly running water (the environment in which *Silo* and *Goera* occur) and seeks out the hosts, which are usually attached to stones on the stream-bed. The body-pubescence of the parasite traps air and enables the insect to remain submerged for up to thirty minutes (Askew, 1971). Parasitized cases may be recognised by the presence of a flattened, blackish, ribbon of about 30 mm. length issuing from the affected host case; it is formed when the parasite larva spins its cocoon inside the caddis-case, and serves as the respiratory apparatus of the developing adult. Oxygen from the water diffuses into the ribbon and ensures the parasite of a constant supply; the insect dies if the ribbon is removed. The species appears local but can apparently occur in large numbers at certain times (see Perkins, 1960); the exhibitor could not find the species during the winter 1976-7 in this locality, in spite of finding many cases of the host. (ii) Two specimens (♂ ♀) of *Agrypon flexorius* Thunb. (Hym., Ichneumonidae) bred 6.vii (♂) and 13.vii.1977 (♀) from pupae of the Phycitinae (probably *Phycita roborella* (D. & S.)). The hosts were obtained as larvae, being beaten from oak, 28.v.1977, in Vert Wood, East Hoathly, Sussex, and they pupated before 15.vi. Although the identity of the host was not definite, some imagines of *roborella* were bred mid-July from the larvae of which there were about eight. The Anomoloniinae sub-family attack the host larva when young but emerge from the host pupa. *A. flexorius* has been recorded from *Phycita* sp. before; the exhibitor obtained a third example, ♂, from a third parasitized pupa.

R. FAIRCLOUGH. — A live specimen of *Palpita unionalis* (Hübner) found on 10.xi.1977 outside the light-trap at Leigh, Surrey. The exhibitor had not seen this migrant since the early 1960's when it was fairly frequent.

C. HART. — A specimen of *Hippotion celerio* (L.), the silver-striped hawk, which was reared from a batch of ten young larvae (not British); the exhibitor had four other pupae still to hatch. The larvae were obtained from Mr. B. Betts at the AES Exhibition on 1st October, and the larvae were reared on a mixture of *Fuchsia* and willow-herb. At a temperature of 78° F., an average of 26 days were spent as larva and 14 days as pupa (slides of these larvae were shown later in the evening).

P. A. SOKOLOFF. — A short but variable series of the local moth *Acleris hastiana* (L.) recently bred from sallow at Dungeness, Kent.

S. A. WILLIAMS. — A single specimen of *Anthicus bifasciatus* (Rossi) (Col., Heteromera), a very local beetle, sieved from compost on the Bristol municipal allotments.

NOMINATIONS

Their names having been read a second time, the following were declared elected members: Messrs. L. J. R. Day, K. H. Halstead, R. D. Tilt, P. E. Barton, R. G. St. Leger and J. M. Walters, Rev. S. C. Pittess, Dr. J. C. A. Craik and Dr. A. N. Simpson, and Mrs. D. R. Rees.

ANNOUNCEMENTS

The President announced that a letter had been received from a visitor to the Annual Exhibition expressing high appreciation of the work done by the ladies responsible for catering. This sentiment was warmly echoed by all present. The Hon. Secretary announced that the Chelsea Town Hall had been booked for the Annual Exhibition next year on 28th October, it having proved so satisfactory two years in succession.

COMMUNICATIONS

The President reported that on a visit to Fingringhoe Centre, south of Colchester, he had been fortunate enough to see a pair of bearded tits in the reeds there.

Dr. C. G. M. DE WORMS commented on the diminished numbers of Lepidoptera appearing at light recently, and Lt. Col. A. M. EMMET stated that *Oporophtera brumata* (winter moth) was already out in Essex. Other members similarly reported recent observations of Hymenoptera and Lepidoptera, showing the season was drawing to a close, though *Aglaia urticae* (L.) (small tortoiseshell) and *Inachis io* (L.) (peacock) were today still to be seen around London on the wing, and this evening a *Tinea palescentella* Stainton was taken indoors at the Alpine Club itself. J. Heath said that the furthest north locality recorded for *Lithophane leautieri* (Boisduval) was North Bucks.

Lt. Col. A. M. EMMET reported on a Field Meeting following the Annual Exhibition, at Banbury Ridge and Woodham Walter, Essex.

A discussion of the 1977 Annual Exhibition then followed. The overall attendance was higher than last year, despite the poor season that preceded it.

Dr. A. A. ALLEN then exhibited slides, mostly on parasites of Lepidoptera. MESSRS. C. HART and P. HAMMOND also exhibited excellent slides showing various insects and flowers.

24th November 1977

The President, Mr. R. S. TUBBS, in the chair.

EXHIBITS

Dr. A. A. ALLEN. — Of twenty-one larvae of *Cucullia chamomillae* (D. & S.) (Lep., Noctuidae), all taken on *Tripleurospermum maritimum* (scentless chamomile) at Dawlish Warren, Devon, on 19th June, 1977, eight

contained parasites belonging to two species of Ichneumonoidea, four of each parasite species; these, exhibited, were (i) two examples (δ , ♀) of a *Rogas* sp. (Hym., Braconidae) in the *circumscriptus* Nees species group; the four young host larvae of *chamomillae* were killed (mummified) by the solitary endoparasite 1-2.vii, and the adults were bred 10.vii (2 δ) and 11.vii. (♀); the fourth mummified host failed to produce a parasite. Both the males hatched in the normal manner from a hole chewed in the posterior end of the mummy, but the female was of exceptional interest, making its exit from a hole at the front end of the mummy, just behind the head, the first such case in the exhibitor's experience. *Rogas* sp. are often reared from young larvae of Noctuidae, and a species of this group has been recorded from *Cucullia verbasci* (L.). (ii) two specimens (both ♀) of *Campoletis annulata* Gravenhorst (Ichneumonidae) from a total of four females obtained from four young *chamomillae* larvae. The host larvae were killed 22-25.vi.77 (one killed each day) when only about 12 mm. in length. The parasite-maggot devoured the entire host's contents before constructing its brownish, rather elongate, cocoon among the vegetation, attaching the skin of the host to its exterior. The adults were bred on 3-5.vii.77. *Campoletis* sp. number about a dozen in Britain; the present is one of the more widespread but most records are for the adult. The exhibitor had not heard or seen mention of any host for *C. annulata*.

R. F. BRETHERTON. — A couple of graphs of moth attendances at his moth-trap at Bramley, Surrey, for 1976 and 1977.

Lt. Col. A. M. EMMET. — Mined leaves and statistics illustrating the abundance and scarcity in 1977 of certain species of Nepticulidae (Lep.) mining leaves of oak. Four leaves were shown: (i) from Madingley, Cambs., collected on 19.xi, a leaf containing about 38 mines of *Ectoedemia quinquella* (Bedell) and three of *E. subbimaculella* (Haworth); (ii) from the same locality and date: a leaf containing 18 mines of *E. quinquella*, 30 of *E. subbimaculella*, one of *Heliozela sericeella* (Haworth), three of a *Phyllonorycter* sp. and the external feedings of three other larvae belonging to two species of Microlepidoptera; (iii) from Mistley, Essex, collected on 26.x.77, a leaf containing 30 mines of *E. subbimaculella* and one of *E. quercifoliae* (Toll); (iv) the statistics, covering 784 mines in 116 leaves from three localities where the exceedingly local and scarce *E. quinquella* occurs, showed that in 1977 that species comprised 51% of the mines, *E. subbimaculella* 46.7% and *E. quercifoliae* only 2.3%; in most years *E. quercifoliae* and *E. subbimaculella* are found in more or less equal numbers. It was suggested that in 1977 there could be anything up to a million mines of *E. subbimaculella* on a single mature oak in numerous favoured localities, and the same was true of *E. quinquella*, but only in its very restricted haunts. *E. quercifoliae*, however, had been scarce everywhere. A table was also shown of the leaf-mining species which had been unusually common or scarce in 1977, together with their larval season in relation to the drought of 1976. The table showed that many species whose larvae had fed during the summer while the drought was at its height, were more scarce than usual this year, and that others whose larvae had fed in the autumn after the drought had broken were common; there were, however, exceptions to these generalisations.

J. HEATH. — Old cases of the psychid *Narycia monilifera* (Geoffroy) from crevices in the bark of a sycamore tree in Ramsey Road, St. Ives, Huntingdon, Cambs. (VC.31). These were found by Mr. Brian Elliott who drew the attention of the exhibitor to them. A new vice-county record. It is found in adjacent Cambridgeshire (VC.29) and Bedfordshire (VC.30), as well as in much of south and south-east England.

P. A. SOKOLOFF. — A dwarf example of *Xanthorhoe fluctuata* (L.), taken at light on 15.viii.76, wingspan only 16 mm. (typical range of wingspan: 27-31 mm.): Perhaps attributable to the drought.

R. W. J. UFFEN. — A series of *Coleophora machinella* Bradley with their larval cases, from Botley Wood, South Hampshire, found by Dr. J. R. Langmaid. The specimens had been reared from *Achillea ptarmica* (sneezewort) and constituted the second British record of the species.

NOMINATIONS

The name of Mr. D. A. Chambers was read for the first time.

The following were duly declared elected members, their names having been read for the second time: Messrs. P. Arak, R. W. Crowthers, R. H. Cummings, A. J. Edmunds, J. M. Guthrie, W. Lockyer, M. J. Noble, C. G. Penny and I. Platt; the Drs. P. J. Edwards and C. S. Robinson; Mrs. D. J. Burns, Mrs. J. Dyke and Mrs. R. Oates, and Miss J. A. Burton.

Mrs. Doreen Burns, Mrs. J. Dykes and Mr. J. H. Clark signed the obligation book.

COMMUNICATION

Mr. Roche produced a memorandum from Dr. P. J. L. ROCHE, a resident of Andorra on a valley in that country in which 67 different species of Rhopalocera had already been taken and suggesting that a survey of it might be a long-term project. Members interested were invited to read the memorandum and get into touch with one of the brothers Roche with a view to holding European field-meetings at this site, and Dr. Roche could organise hotels, etc.

The main event of the evening was a discussion of the 1976 drought and its after-effects. Some of the exhibits had illustrated this subject. The President began the discussion with a few meteorological statistics, e.g. on the January to August rainfall in the years 1976 and an average year were respectively 5.27 in. and 17.25 in., but in the month of September 1976 alone 6.2 in. fell. The last four months of 1976 brought up the annual total to about 1 in. only less than the yearly average. Not only was there a drought, there was a heatwave; in August the temperature had stood at 90° F. day after day.

Lt. Col. A. M. EMMET's contribution is summarised under his exhibit above. The next speaker, J. HEATH, said that 1976 was the last and worst of a series of drought-years; for the last three or four years walking in Monks' Wood in light shoes had become possible owing to the drying out of the soil, though previously this had not been so. Probably the local extinction of *Carterocephalus palaemon* (Pallas) (chequered skipper) was attributable to this cause. A decline in numbers in members of the genus *Micropterix* Hübner was also probably due to the same recent climatic tendency.

E. S. BRADFORD opined that such fluctuations must have occurred several times during the last thousand years. A. E. STUBBS mentioned the very extensive heath fires, particularly those that had devastated Chobham and Thursley, Surrey. Although fire was a regular feature in the formation of heathland, as heather grew again on burnt ground, there was a fear that, when they were so extensive, not enough high heather would be left for the survival of some insect species. Some species of Diptera had been affected by the drought, the crane-flies having suffered; certain flies associated with dung seemed to have extended their range further north

in Britain than usual and this probably was due to the south becoming less favourable.

G. PRIOR. — Larvae of the genus *Eupithecia* (pugs) reacted variably to the drought: early-feeding species seemed unaffected, and rather surprisingly their oval stage was not desiccated. The leaf and needle-feeding species were also unaffected, at least they appeared in equal numbers in 1977. However, late summer feeders, particularly those on ragwort and other herb-flowers, were less numerous in 1977 though these included the very commonest of our pugs, e.g. *E. centaureata* and *absinthiata*. In 1977, owing to the drought ragwort flowers all dried up by August instead of remaining fresh and edible into autumn.

A general discussion then followed; Mr. J. HEATH thought that numbers at light traps did not necessarily indicate numbers of a given species surviving, as cold conditions inhibited moths from flying to light, contrasting with the abundance of arrivals in very hot weather. Dr. C. G. M. DE WORMS remarked on the greater numbers of moths coming to light in Western England than in Eastern England in 1976; both regions were affected by heat but the west less affected by drought.

Opinions differed on whether *Argynnis paphia* (L.) (silver-washed fritillary) had had an equally good year in 1977 as in 1976.

R. FAIRCLOUGH had counted 2,600 examples of *Acleris cristana* (D. & S.) in 1976, but much fewer in 1977. He thought the reduction in 1977 might be rather due to rain and cool conditions than to the drought in 1976.

A discussion on the mortality of bees in hives ensued: its causes were thought to be the exhaustion of honey supplies combining with a cool, late spring in 1977.

Many other members contributed to what proved to be a highly interesting debate.

8th December 1977

The President, Mr. R. S. TUBBS, in the chair.

EXHIBITS

A recently received review copy of P. Hammond's book of dragon-flies was passed round for members to see.

Dr. A. A. ALLEN. — (i) Two pairs of *Apanteles* sp. (Hym., Braconidae); each pair consisting of a common species and a closely related species only recently separated from its partner. The new species were described by Nixon, *Bull. ent. Res.*, 63, 169-230 (1973). (a) *A. fulvipes* Haliday and *A. acasta* Nixon: both are gregarious species. *A. fulvipes* is one of the most frequently encountered sp. of *Apanteles* and usually obtained from the Noctuidae. The exhibited examples represented a fraction of a brood of about 70 individuals bred 5.vi.1974 from a larva of *Allophytes oxyacanthae* (L.) (Lep., Noctuidae) obtained when young on hawthorn at Salfords, Surrey. The host was killed as a pre-pupa on 22.v.74, on which date the *Apanteles* spun their cocoons. The exhibitor had also obtained *fulvipes* in abundance in the mid-sixties from mature larvae of *Diloba caeruleocephala* (L.) near the same locality. In recent years, however, larvae of this latter moth did not appear to be attacked by *fulvipes*; they were however parasitized by other Ichneumonoidea. *A. acasta* resulted when twelve cocoons, attached to which was the dead host, were taken on hazel, 30.iii.74 at Reigate, Surrey, and the adults bred 11.iv.74. Since the species has only been described recently its distribution is not certain; it has

probably been overlooked as *fulvipes*. Hosts from which *acasta* has been recorded include *A. oxycacanthae* and *Diarsia mendica* (Fabr.). (b) *Apanteles vitripennis* Curtis and *A. mygdonia* Nixon: these are both solitary parasites. *A. vitripennis* attacks a wide range of immature larvae of Lepidoptera and is widely distributed. The exhibit showed (a ♀) bred on 4.vi.77 from a young larva of *D. caeruleocephala* found on 24.v.77 at Salfords. The parasite larva appeared 27.v, and the host died a few days later. *A. mygdonia* is very similar to *vitripennis* and, as before, has probably been mistaken for it in some instances. The ♀ displayed was bred 3.iv.77 from an immature larva, probably of *Alcis repandata* (L.) (Lep., Geometridae), beaten from privet in a wood at Salfords, Surrey, 6.iii.77. The parasite larva spun its cocoon 15.iii.77. (ii) A female specimen of *Zimmeria dirus* Wesmael (Ichneumonidae) bred 20.v.1967 by Mr. P. Cordell from a larva of *Eriogaster lanestris* (L.) (Lasiocampidae). Two such larvae were found, both full-grown, at Wareham, Dorset, 12.vii.1966 and they pupated about a week later. One cocoon produced the expected moth the following spring. *Z. dirus*, bred from the other, is a rare species, sec. Perkins, 1959; this may in part be attributable to the scarcity of *E. lanestris* the only host, from which *dirus* has been obtained. The exhibitor expressed his thanks to Mr. Cordell for the gift of the set parasite. (iii) A selection of biscuits, mainly plain chocolate wheatmeal, infested with larvae and larval working, of probably *Plodia interpunctella* (Hüb.) and/or *Ephestia elutella* (Hüb.) (Pyralidae). The biscuits arrived in fresh condition at a clerical laboratory in Reigate, Surrey, vi.1977! a few were stored away and forgotten until 5.xii.77, whereupon their present condition was discovered. On 15.vi.1977 the exhibitor had caught adult specimens of *P. interpunctella* (especially) and *E. elutella* in the very same laboratory and had encountered both species on previous occasions there. The moths were evidently breeding in the laboratory and the biscuits would afford suitable nourishment. A specimen of each moth caught on 15.vi was also exhibited, together with one of the larvae extracted from the fouled biscuits. Recourse to Beirne (1954) revealed the larva was almost certainly *interpunctella*.

K. GUICHARD. — Some insects to illustrate his talk that evening, with a ♂ *Qaboosia splendens* Popov (Orth., Acrididae), the largest grasshopper in Arabia; observation of the former had revealed the hitherto unknown purpose of its Krauss's organ, namely stridulation.

B. C. JACKSON. — Unidentified beetles found at Barking, Essex, but imported in containers from abroad, the smaller of two types feeding on ginger from India.

NOMINATIONS

The name of Mr. D. A. Chambers having been read for the second time, he was duly elected a member. The obligation book was signed by Mr. Day.

COMMUNICATIONS

With regard to the oak-leaf mines mentioned at the previous indoor meeting, Mr. S. N. A. JACOBS stated two oaks in his garden had no mines at all this autumn, as he had been able to inspect fallen leaves; however, these oaks had last year had an abundance of cynipid galls. Lt. Col. EMMET observed that this year galls were everywhere scarcer than last year; he had heard from an observer in Bournemouth, Mr. S. C. S. Brown, that *Ectoedemia subbimaculella* (Haw.) was very common there too, but *E. quercifoliae* (Toll) was absent.

Mr. K. GUICHARD then gave a talk, illustrated with transparencies, entitled 'A naturalist in Oman'. This described his recent expedition made with Mr. P. Granville White in September and October to Oman, and the previous visit made in April of the preceding year to a different part of the same country. The landscape photographs of the two regions showed a striking contrast; the Jebel Akhdar, Musandam Peninsula, and Jebel Aswad, near Muscat in Eastern Oman were dry, whereas the seaward slopes of the Qara mountains at Dhofar in south-west Oman were completely verdant with grass and short trees, due to an exceptional climatic conjuncture, the monsoon favouring Dhofar every summer. Photographs were however also shown of the northern, desertic slopes of these mountains, where the frankincense trees grew in a restricted area. Transparencies showed some characteristic habitats, vegetation, flowers, butterflies, larvae, and other interesting creatures of all these localities. Appreciation was shown by the audience in the usual way of the lecturer's most interesting talk.

12th January 1978

The President, Mr. R. S. TUBBS, in the chair.

EXHIBITS

Rev. D. AGASSIZ. — A series of *Acleris hastiana* (L.) (Lep., Tortricidae) from County Cork, Ireland.

Dr. A. A. ALLEN. — Two females of the species *Argypon clandestinum* Gravenhorst (Hym., Ichneumonidae), obtained on the wing in the daytime at Salfords, Surrey, on 23.vii.1976, and at Plaistow, Sussex, on 31.vii.1976. The sub-family, Anomaloninae, to which it belongs, are all solitary endoparasites of lepidopterous larvae; the young host is attacked but the adult parasite emerges from the host pupa. *A. clandestinum* appears to be moderately common in the southern half of Britain and, to judge from published host lists, seems to be particularly attached to the genus *Eupithecia*. Also two examples (♂ and ♀) of the common species *Amblyteles armatorius* Forster (Hym., Ichneumonidae). The ♂ was caught by the exhibitor at Teignmouth, Devon, on 20.vi.1977, while the ♀ was bred on 1.vii.1977 by Mr. P. Cordell from a larva of *Noctua pronuba* L. (Lep., Noctuidae) that he found at Nutfield, Surrey. The species belongs to the sub-family Ichneumoninae, all of which emerge, as adult parasites, from the host's pupa. The exhibit also served to illustrate the degree of sexual dimorphism often found within this sub-family.

Lt. Col. A. M. EMMET. — A leaf of alder (*Alnus glutinosa*) collected by Dr. Daphne Levinge at Whinnying, Portlick, Glasson, Co. Westmeath, Eire, on 13.ix.77, containing a mine and subsequently spun fold considered to have been made by *Caloptilia falconipennella* (Hübner), a species of moth not previously recorded from Ireland. A second alder leaf, collected by the exhibitor at Ballynahinch, Co. Galway, on 16.x.76, containing two mines and a spun roll made by *Caloptilia elongella* (L.) was shown for comparison. The differences between the larval feeding habits of the two species were described.

Col. D. H. STERLING. — A specimen of *Epischnia banksiella* (Richardson) (Lep., Pyralidae), taken to light on Durlleston cliffs, near Swanage, Dorset, at the field meeting of 18th September 1976, only recently identified. The exhibitor suggested that this rather late date might mean that the species was bivoltine, at least in 1976. It is a rare and local species.

NOMINATIONS

The following was declared elected to membership, his name having been read a second time, P. J. Hodge.

ANNOUNCEMENTS

The President announced that the Council had unanimously decided to elect Mr. Eric Classey to honorary membership. The Librarian announced that the library would be open in future at the end of indoor meetings until 8.45 p.m., and that the period for which a book might be kept without being returned was extended to two months; he reminded members, however, that the bye-laws provided that a fine of 2p per day over the permissible period which a book might be kept was payable by a person taking it out. The President announced the receipt from a donor, Mr. W. Parker, of 200 transparencies of lepidoptera.

COMMUNICATIONS

Dr. C. G. M. DE WORMS mentioned that there were again records of the moths *Apocheima pilosaria* (D. & S.) and *Agriopsis leucophaearia* (D. & S.), both more usually captured after the New Year, coming to light before Christmas in Southern England. The capture of the rare *Trigonophora flammea* (Esper) by Dr. Peak in Jersey was especially noteworthy among other interesting captures which he had recently made. Mr. L. K. EVANS reading a cutting from the *Daily Mail* regarding a new law introduced in Belgium by the City Council of that country's capital penalising any person who failed to destroy 'caterpillars, their eggs and their nests'. Col. D. H. STERLING reported that the capture at Winchester of a single specimen of *Epiphyas postvittana* (Walker) (Tortricidae), only the second known record from Hampshire. The species is now somewhat commoner in Devon and Cornwall. Circumstances seemed to indicate that it had bred up on Coleus plants, some of which having been reared from seed in a near-by greenhouse, were growing in the window-box of Mr. George Else. He also reported an example of *Idaea seriata* (Schrank) found on 7th January, an exceptionally early date. Other members reported having seen umbellifers flowering in January.

Mr. C. G. ROCHE then gave an illustrated talk entitled 'An Island called Australia', describing his own three-months' travels single-handed in a small car from West to East and from South to North of the continent, and concentrating on lonely and unspoilt habitats of which there were many excellent transparencies; also some good pictures of flowers and a few of animals and birds. The number of questions at the end showed that the lecturer had greatly interested his audience.

In comments on exhibits afterwards, some members doubted whether the above mentioned capture of *Epischnia banksiella* Richardson really meant that the species was bivoltine, but rather that it had a single extended emergence. Mr. CHALMERS-HUNT stated that the larva was slow-growing and he had bred some and found that small larvae found in May were full-grown at end of June or early July; and Mr. R. F. BRETHERTON recalled having taken several examples of the moth at Portland on 10th August, 1972.

26th January 1978

106th ANNUAL GENERAL MEETING
(with which was combined the Ordinary Meeting)
The President, Mr. R. S. TUBBSJ in the chair.

EXHIBITS

Dr. A. A. ALLEN. — (i) A few specimens of the gregarious endoparasite *Apanteles inclusus* Ratzeburg (Hym., Braconidae), bred from two larvae

of *Euproctis similis* (Fuessly) (Lep., Lymantriidae). The larvae were captured by Mr. G. King around late June 1977 in Lichfield, Staffordshire. In mid-July the hosts spun their cocoons in the usual way, but on 26.vii.1977 several larvae of the parasite appeared from each of the host pre-pupae, spinning their rather satiny-white cocoons within that of the hosts. The adults were bred 31.vii-3.viii.1977. *A. inclusus* is of interest as it closely resembles its near relative *Protomicroplitis connexus* Nees; both attack *Euproctis* spp. and both kill the host as a pre-pupa, spinning their cocoons in that of the host. *A. inclusus*, however, appears to be considerably less common than the often abundant *P. connexus* and as these are the only examples of *inclusus* the exhibitor has seen, he was most grateful to Mr. King for sending the cocoon. (ii) Two examples (♂ and ♀) of one of the commonest ichneumonids, *Pimpla instigator* (Fabricius) The ♀ was obtained in the light-trap (probably as a casual visitor) of Mr. P. Fairclough on 14.ix.1977 at Leigh, Surrey, while the exhibitor swept the ♂ from rough grass at Dawlish Warren, Devon, 15.viii.1977. Points of interest of the exhibit were the absence of the constricted gaster (present in many Parasitica), the entirely reddish legs, and the filiform antennae, providing a marked contrast to the overall stout build of the insect. An additional point of interest was that in captivity, *P. instigator* exudes a pungent repelling odour, perhaps of a protective nature. *P. instigator* parasitises pupae of a wide range of Lepidoptera.

J. T. DALEY. — An example of *Erebia ligea* (L.) (Lep., Satyridae) (the Arran brown) captured among many *E. aethiops* (Esper) by the exhibitor on 5th July 1969 on a desolate moor in Scotland near a wood (shown at the 1977 Annual Exhibition but not identified as this species then), only authoritatively determined as such quite recently. The exhibitor had only twice been abroad to collect butterflies and each time had done so in S. European localities where this species did not occur, so a possibility of confusion of locality was ruled out.

B. GOATER. — (i) A series of the red aberrations of *Tyria jacobaeae* (L.) (Arctiidae) presented to the Society by our member, Mr. R. W. Weston, who developed the strain. (ii) Two males and two females of *Eriopygodes imbecilla* (Fabr.) (Noctuidae) bred *ab ovis*. They are the first specimens to have been bred in Britain; a female was obtained flying by day in July 1977, which laid six eggs. From these six moths were bred in late October, the larvae feeding at room temperature on withering leaves of dandelion (*Taraxacum*). A pairing was obtained and about 250 eggs were laid and larvae distributed to a number of members of the society, some of whom have already obtained moths. The exhibitor's own larvae, again kept at room temperature, are pupating at the present time. (iii) Two full-grown larvae of *E. imbecilla*. In reply to questions, the exhibitor stated that he surmised that in a wild state the larva was nocturnal and polyphagous and would hibernate, the moth being univoltine; the favoured wild foodplant, however, might be *Viola hirta*, which was common on the breeding-ground in Monmouthshire.

OBSERVATIONS ON EXHIBITS

Mr. C. HART remarked on the bulky abdomens of the freshly hatched females of *Eriopygodes imbecilla* (F.) and wondered whether they succeeded in flying. Mr. GOATER replied that the females had on several occasions been taken on the wing, but that when this happened the abdomens had contracted, doubtless due to having laid many eggs. Mr. J. HEATH reported

that Bohemian reports on the habits of this moth were that the males were exceedingly abundant but did not mention capture of females. Mr. Goater repeated that he himself had taken females on the wing by day; at night it appeared that a second flight occurred not until 2 a.m. and only males came to light; he would not like to say that this observation constituted an absolute rule.

After the reading of the minutes of the previous Annual General Meeting, the President referred to the resolution passed at the Special General Meeting and stated that this matter would be raised in the Treasurer's Report.

COUNCIL'S REPORT

During 1977 61 new members were elected, while in the same period the Society suffered the loss of six members by death and 14 by resignation. 19 members were also struck off membership under the provisions of Bye-law 14(b). We have thus a welcome net increase of 22 to the membership which now stands in the region of 700. We have elected two of our most distinguished members to the Honorary membership: Dr. H. B. D. Kettlewell in February 1977 and Mr. E. W. Classey in January 1978. The Annual Dinner was again held at Imperial College; it was attended by some 79 members and their guests, five more than last year.

The Annual Exhibition was once more held at Chelsea Town Hall. It was well attended, some 350 members and guests signing the attendance register. It was felt by most of those present that this year the exhibits were outstanding, they included some insects new to the British Isles.

A new Christmas Card was produced and for its design we are again indebted to Mr. R. Dyke. The sale of the cards was once more the responsibility of Mr. M. Ventom and it is thanks to his energy and that of his helpers that all our stocks of past cards, as well as a large proportion of this year's cards, have been sold.

Nineteen Indoor Meetings on varied subjects were organised by Mr. G. R. Else and were well attended. Mr. E. H. Wild arranged 15 well distributed and interesting Field Meetings, six of which were two day meetings.

During the year substantial progress has been made towards the publication of a new and up-to-date edition of Ford's 'Guide to the Smaller British Lepidoptera'; it is hoped that this will be published in the Autumn of 1978. The Council feels that a great help towards its early publication has been the generous financial donations made by some of our members and would welcome further financial assistance from the membership for this most worthwhile enterprise.

The Council wishes to thank Mrs. Lois Parker and Mrs. Bettina Prior, and the wives and daughters of members, for again organising and providing the excellent refreshments at the Exhibition; these again contributed to the success of the event and helped to defray its cost. The Council also wishes to thank Dr. B. J. MacNulty and Mr. K. G. Evans for their untiring efforts in once more organising the two successful events, the Annual Dinner and Exhibition.

TREASURERS REPORT, 1977

The Accounts for 1977 have been approved by our auditors, Mr. Messenger and Mr. Stoughton-Harris, and copies are available here for inspection. I thank them warmly for completing the audit so promptly, and also Mr. L. J. D. Wakely for his untiring management of the subscriptions side of the work.

We have had another good year. The Income and Expenditure Account shows a surplus of £484; and in addition we have received a legacy of £100 from our late member Sir Eric Ansorge, and gifts of £500 and £100 from members who wish to remain anonymous. These I have placed to reserve, in order to help to pay for the forthcoming revised edition of Ford's 'Guide to the Smaller British Lepidoptera', to which Council has decided to devote them.

The surplus on Income and Expenditure Account is due to several circumstances, not all of which are likely to be repeated; we have had a year with no unexpected expenditure but much unusual income. Though postage and other administrative costs have continued to rise steeply with inflation, the cost of printing the Proceedings, which is by far our largest single item, has gone up much more slowly, while there has been a boom in sales of back numbers. As a result, the grant needed by the Publications Account has fallen by £140 for the first time for many years, though it was still over £1,000. Christmas Cards showed a useful profit of £43, after covering the cost of printing a new card, which we did not have in 1976. We also covered the cost of the Annual Dinner, though the surplus of £57 shown in the account was largely due to recovery of an over-charge which caused a loss in 1976. As in 1976, a good part of the hire of Chelsea Town Hall for the Annual Exhibition was met from the gain on sale of refreshments skilfully managed by Mrs. Prior and her team. The Exhibition also provided the opportunity for a sale of unwanted cabinets, boxes and equipment which contributed no less than £163. Finally, subscriptions were up by £72: this is a balance between the welcome increase in membership and the very unwelcome continuance of excessive arrears in payment by some 50 other members.

Turning to the balance sheet, we have added 500 Imperial Metal Industries shares to our investments, at a cost of £260; and the Standard Investment Trust was taken by the Prudential Assurance Company, in which we therefore now hold 843 5p shares, whose market value is considerably greater than that of our old holding. I have not invested the large bank deposit balance, £1,821, in view of the expected need to use most of it during 1978 to finance the new edition of Ford's 'Guide', which I have already mentioned. On the liabilities side, the Housing Fund has increased by receipt of interest to nearly £1,700, and Reserve Fund, with added interest and the gifts I have mentioned, to over £2,000. The balances of the Library and Hering Memorial Funds have also grown slightly because they spent rather less than their income.

I make no prophecies about results in 1978. Some of the windfall income of 1977 is not likely to be repeated. Administrative costs will certainly go on rising. Much extraordinary expenditure is also needed: for shelves and binding for the Library, on Hills unit cabinets if we can get them, on duplicating equipment which we at present lack, and biggest of all, for the new edition of Ford's 'Guide'. We aim to recover from sales the cost of this, as we have done very handsomely on the first edition published in 1949; but it will certainly be some years before we break even. Because of these uncertainties, Council considers that the power which was given to it last year to vary subscription rates for a calendar year ahead without summoning a Special General Meeting should be retained, subject to further review a year hence. As things are, I think it unlikely that we shall need to use this power in 1979; but prudence requires that we should be able to act quickly if later action on this becomes necessary.

British Entomological and Natural History Society
BALANCE SHEET — 31st DECEMBER 1977

Statement of Accounts

58

PROC. BRIT. ENT. NAT. HIST. SOC., 1978

LIABILITIES

	1976	1977	1976	1977
	£	p	£	p
<i>Special Funds:—</i>				
<i>Housing</i>				
Balance at 1st January	1429	19	1554	19
add: interest transferred from				
Income and Expenditure Account	125	00	140	00
			1694	19
<i>Library</i>				
Balance at 1st January	335	10	335	37
add: entrance fees and interest				
transferred	40	00	59	50
deduct: expenditure in the year	39	73	30	55
			364	32
<i>Hering Memorial Research Fund</i>				
Balance at 1st January	2140	75	2257	25
add: interest transferred	220	55	198	67
Gain on sale of securities	68	48		
deduct: expenditure in the year	172	53	180	00
			2275	92
<i>Reserve</i>				
Balance at 1st January	917	77	1292	77
add: interest transferred	80	00	116	00
Legacy and donations transferred	295	00	700	00
			2108	77
Subscriptions paid in advance	93	75	136	00
Sundry creditors	1027	22	677	34
<i>General Fund</i>				
Balance at 1st January	3611	14	3909	70
add: excess of income over expenditure in the year	222	07	483	64
Profit on sale of securities	144	97		
			4393	34
			10470	25

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

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

ASSETS

	1976	1977	1976	1977
	£	p	£	p
<i>Investments at cost:—</i>				
£112 I.C.I. Ordinary Stock	260	27	260	27
150 Unilever 25p Ordinary Shares	248	45	248	45
843 Prudential Assurance 5p Shares	712	10	712	10
1010 Drayton Premier Investment Trust 25p Ordinary Shares	1398	21	1398	21
£455 General Electric 7½% Convertible Stock	541	58	541	58
£800 Agricultural Mortgage Corporation 9½% Stock 1985-88	646	49	646	49
£1150 Finance for Industry 13% Stock 1981	1153	71	1153	71
£1250 Gt. London Council 9½% Stock 1980-82	1100	14	1100	14
450 Distillers Ordinary 50p Shares	708	09	708	09
£500 Imp. Metal Industries (Hering Trust)			291	97
£300 Gt. London Council 9½% Stock 1980-82			646	48
£800 Agricultural Mortgage Corporation 9½% Stock 1985-88	303	81	303	81
240 Distillers Ordinary 50p Shares (Hering Trust)	294	04	294	04
75 Shell Transport Ordinary Shares (Hering Trust)	357	36	357	36
158 Midland Bank £1 Shares (Hering Trust)			8923	51
			379	09
Sundry debtors			1821	16
Cash at Bank			526	12
Deposit Account				
Current Account (Ladger Balance)				
The value of the Society's library, collections, stocks of publications, Christmas cards and ties is not included.				
			11649	88

R. F. BRETHERTON, Hon. Treasurer.

British Entomological and Natural History Society
PUBLICATIONS ACCOUNT

EXPENDITURE

1976
 £ p

To Printing and blocks for Proceedings and Index for 1977 1586 55
 Reprinting supplement to Ford's 'Guide' 10 40
 Postage (share) 73 62
 Shortfall on provision in previous year 68 53

£1739 10

INCOME

1976
 £ p

By Sales of Publications, blocks, etc. 546 73
 Less refunds of discount 1192 37
 Grant from Income and Expenditure Account 59 41

£1739 10

1977
 £ p

Sales of Publications, blocks, etc. 677 70
 Grant from Income and Expenditure Account 1055 22

£1732 92

INCOME AND EXPENDITURE ACCOUNT

To

Rent 356 00
 Insurance 52 60
 Officers' expenses (mainly postage) 165 87
 Stationery 114 03
 Subscriptions to other Societies 43 25
 Indoor meetings, lectures and exhibition (net) 9 25
 Cabinets and Collections 20 00
 Bank charges and miscellaneous 31 92
 Publications Account: charge 1192 37
 Interest transferred to Special Funds 450 55
 Legacy and donations: transfer to Reserve Fund 295 00

222 07

Excess of Income over Expenditure

£3700 22

1976

By Subscriptions 1755 51
 Interest on investments 783 16
 Interest on bank deposit 98 35
 Sale of cabinets and equipment 356 40
 Legacy and donations 42 85
 Annual dinner: surplus 21 23 *loss*
 Sales of Christmas cards: profit 93 07
 Sale of ties: profit 112 35 *loss*

1827 17
 786 77
 82 46
 174 61
 700 00
 57 66
 44 55
 27 00

3700 22

£3700 22

EDITOR'S REPORT

Our 1977 Proceedings were again printed in two double parts, appearing this time in May and October. The index for the year is in the press and will be distributed shortly. We have continued along similar lines to those of 1976; in both years there have been 128 pages of text and a liberal and varied supply of illustrations. About one-tenth of the year's matter dealt with foreign lepidoptera; the other nine-tenths dealt with British insects or general matter. Lepidoptera received more attention than any other order, with diptera a good second, and parasitic hymenoptera particularly well expounded in the indoor meeting reports. Reports on indoor and field meetings together occupied about one-third of the volume. Short notes, contributed as such, have been lacking this year; but the reports on the indoor meetings continue to give abstracts about exhibits and communications by members; these together with the field meeting reports have provided a great variety of observations, so that our publication cannot be said to lack this feature except in a formal sense. An innovation was made in introducing a feature entitled 'Entomological Misadventures', to consist of light-hearted short narratives. Further contributions to this series are invited and if few or none are received one must conclude that our members are invariably fortunate and pursue their hobby or profession most uneventfully; or alternatively cannot bring themselves to tell of their misadventures. It appears from comments received that readers are satisfied with our Proceedings as now published and it is therefore proposed to continue along the same lines for another year at least. Thanks are again due to the editorial assistants Prof. T. R. E. Southwood, and Messrs. T. G. Howarth, M. Tweedie and R. W. J. Uffen, and to our printers Messrs. Charles Phipps Ltd.; and not least the contributors without whom the editor would edit in vain and the printers have less employment.

CURATOR'S REPORT

The past year has been one of satisfying progress in nearly all spheres of activity. A further re-arrangement of cabinets and equipment allows members more space and makes things easier for everyone.

Work on most orders is progressing very well. The lepidopterous larvae, which are in fine order, have been completely re-housed in two Hill units by the energy of Mr. W. Parker. The re-organisation of the British and European Rhopalocera is gradually taking place. Members now travel and collect abroad much more frequently, and the Society, in line with this, hopes to have the Palaearctic lepidopterous fauna well represented. We have been very fortunate in the donation to the Society of a collection of Scandinavian lepidoptera, both Rhopalocera and Heterocera, by one of our members, Mr. S. Torstenius, who lives in Sweden. The negotiations and transport of the specimens is being undertaken by Mr. C. B. Ashby. The first selection of lepidoptera, in beautiful condition, were shown at the Annual Exhibition at Chelsea Town Hall on 29th October 1977. I would like to thank Mr. Torstenius and Mr. C. B. Ashby for their efforts on behalf of the Society. I must also thank another of our members, Mr. L. McLeod, who kindly presented the Society with four store boxes of Microlepidoptera, amongst which were some uncommon and rare species.

The response made during 1977 for duplicate specimens and sub-species of the British Rhopalocera has been very poor, and I appeal once again to members for duplicate specimens. Those species most required are: *Luperina nickerlii* (Freyer) s.sp. *Knilli* Boursin, *Trisateles emortalis* (D. & S.), *Eupithecia phoeniceata* (Rambur), and *Spargania luctuata* (D. & S.).

Work is continuing on the new Diptera cabinet, which is being laid out with more space allowed for new species and more specimens. The

Tipulidae especially, have been much enhanced over the past year by the admirable work of Mr. P. J. Chandler and Mr. A. E. Stubbs.

The incorporation of the Masee collection of Coleoptera is progressing well in the capable hands of Mr. R. D. Weal, and when completed a start will be made on the re-housing of the Joy collection of Coleoptera. I am grateful to Mr. Weal who also collected and brought back from the National Museum of Wales some store boxes containing coleoptera belonging to the Society.

Three small cabinets, a number of store boxes and various items surplus to requirements were sold at the Annual Exhibition by Mr. W. Parker, who I must thank once again for undertaking the task of selling the same and realising the handsome sum of £145.

A microscope placed on loan by the late Mr. A. E. Gardner and of no known whereabouts has, I am pleased to report, been returned by the person whom it was loaned.

Members have taken advantage of the number of duplicate specimens made available during the year and some specimens of a few species have been loaned to specialists for research.

The thanks of the Society are due to the following members for donations to the collections: Prof. J. Owen (Coleoptera), Mr. R. D. Weal (Coleoptera), Mr. P. Sokoloff (Coleoptera), Mr. S. A. Williams (Coleoptera) and Mr. E. S. Bradford (Microlepidoptera). Also, thanks must go to Mr. M. Tweedie, Mr. W. Parker and Mr. A. A. Allen for the contribution of a number of colour transparencies on various subjects to the Society's collection. This increasing stock of transparencies is now being catalogued by Mr. E. H. Wild.

Lastly, I must thank the assistant curators who have borne the brunt of the work on collections during the year.

LIBRARIAN'S REPORT

During the year Miss V. Dick resigned and in October I was appointed her successor.

I am pleased to say that considerable progress has been made towards sorting out the library, an exercise which at first seemed insurmountable. In particular, many of the interesting journals received by the Society have been classified and shelved and are now readily accessible to members, who, it is hoped, will take advantage of the more spacious arrangement.

There still remains a considerable amount of work to be done, and the offer of one or two members to act as assistants during the course of this year would be very welcome. Two matters of immediate concern are, firstly, the requirement of more shelves, and secondly the need to bind certain of the journals.

For a library to be run efficiently, books must be returned by the stipulated date; far too many members have borrowed books and failed to return them on time, despite annual requests at each AGM. In some cases the books are literally years overdue. The matter is serious, for while depriving other members of the opportunity to read the books, the misconduct strikes a distinctly discordant note with the standards set by the Society. I would remind offenders that under the bye-laws, a fine is chargeable on overdue books.

Before naming some of the books generously donated to the library, I should like to thank Messrs. G. Prior and E. Bradford for their invaluable guidance and assistance during my induction period to this office. In reading out some of the books donated, I must apologise for any omissions and trust that the donors are not unduly offended. Omitting some reprints of some value, the books include: *British Tortricoid Moths*, Vol. 1, by J.

Bradley, W. G. Tremewan and A. Smith, donated by Miss Wakely. *Butterflies and Moths of the U.K.*, by W. G. Kirby, donated by Mrs. Holroyd. *An Atlas of the Marine Mollusca of the British Isles*, by National Environment Research Council, donated by Mr. J. Heath. *Dragonflies of the British Isles*, by C. Hammond, donated by the author. *The Scientific Results of the Oman Flora and Fauna Survey 1975*, by various authors, donated by Mr. E. P. Wiltshire. I must also mention receipt of *Alexanor* and other publications, regularly donated by Mr. S. N. A. Jacobs.

REPORT ON THE HERING MEMORIAL RESEARCH FUND IN 1977

No reports have been received from recipients of awards in the year 1976-77.

A sum of £200 was available for grants for the year 1977-78. A request early in the year for an immediate payment to defray the cost of the publication of a paper was rejected, since awards are not normally made for this purpose or ahead of the closing date for applications.

Subsequently there were three applicants, all of whom are receiving awards of £160, they are follows: —

(i) S. Trifourkis, for travel expenses to study Mycetophilidae (fungus-gnats) in the field. Since receiving his grant, Mr. Trifourkis has had a Ph.D. degree conferred on him for his work on this project. He is continuing his research and is currently writing a paper on the taxonomy of the group.

(ii) M. R. Wilson, of the Department of Zoology, University of Cardiff, for travel expenses to collect larval mines of the British *Phyllonorycter* (Lep., Gracillariidae). He is working on a key to the pupae, which he will make available to Dr. I. A. Watkinson for inclusion in the section on that genus in *The Moths and Butterflies of Great Britain and Ireland*, Vol. 2. The purpose of the key is to help lepidopterists to record species from the early stages alone. It will also be of value to students of the parasitic Hymenoptera wishing to identify hosts which have been killed in the pupal stage.

(iii) A. M. Emmet, towards the cost of travel to the extreme north of Scotland to study lepidopterous leaf-miners restricted to that area. Three of these, *Bucculatrix capreella* Kogerus, *Parornix alpicola* (Wocke) and *P. leucostola* Pelham-Clinton, have life-histories which are unknown or imperfectly known and which need to be described in *The Moths and Butterflies of Great Britain and Ireland*, Vol. 2. There are also four species of Nepticulidae requiring further study and there is a possibility of finding certain Scandinavian species not yet recorded from Britain.

The Council's report was read by the Hon. Secretary and Vice-President, its approval being proposed and seconded by Messrs. Baker and Jacobs respectively. The Hon. Treasurer moved the adoption of his report, and this was seconded by Mr. Bowden. The editor similarly moved the adoption of his report, and this was seconded by Lt. Col. Emmet. Messrs. Chalmers-Hunt and Jacobs seconded the approval of the reports of the Curator and Librarian respectively, which those officers moved; Lt. Col. Emmet proposed and Mr. J. Heath seconded the acceptance of the Hering Memorial Report. All the above were passed without opposition.

Under Bye-law 25(b) the meeting was thrown open for queries and suggestions, and Mr. Bowden asked whether the older slides were being copied on to smaller size transparencies. The Hon. Secretary explained the situation and Mr. J. Heath undertook to see whether this task was practicable at his laboratory.

The President then declared the following elected for 1978: President, G. Prior, F.L.S., F.R.E.S.; Vice-Presidents, R. S. Tubbs, O.B.E., F.R.I.B.A., F.R.E.S. and Rev. D. J. L. Agassiz, M.A.; Treasurer, R. F. Bretherton, C.B., M.A.; Secretary, E. H. Wild, L.Inst.Biol.; Curator, E. S. Bradford; Librarian, Dr. A. A. Allen, Ph.D., B.Sc.; Lanternist, S. A. Knill-Jones; Editor, E. P. Wiltshire, C.B.E., B.A., F.R.E.S., M.L.I.; Ordinary Members of Council: P. A. Sokoloff, M.Sc., M.I.Biol., A.I.S.T., F.R.E.S.; R. Dyke; B. F. Skinner; W. G. Tremewan, M.I.Biol.; Col. D. H. Sterling, F.R.E.S.; B. J. Jackson; C. G. Roche, F.C.A.; A. E. Stubbs, B.Sc.; Mrs. F. M. Murphy, B.Sc.; R. Fairclough.

The President then gave his address, illustrated by beautiful transparencies made by R. Revels. He then inducted the new President into the chair. The latter proposed a vote of thanks to his predecessor for the work on the Society's behalf he had done during the year and also for the address. Dr. C. G. de Worms then remarked on the healthy finances of the Society and thanked the Treasurer in this connexion; he proposed a vote of thanks to all the officers. These motions were passed *nem. con.*

ANNOUNCEMENTS

The President said that a secretary of field meetings and a recorder, who would attend to chairs and books at indoor meetings, were needed and asked for members to volunteer for these positions. He also asked that the auditors, Messrs. J. L. Messenger and A. G. Stoughton-Harris, should be re-elected, which was done.

FIELD MEETINGS

SWANAGE—14th May 1977

Leader—Mr. P. J. BAKER

This meeting was the first in the series in which it was intended to produce a detailed survey of the Lepidoptera and other insect orders to be found in the Durlston County Park.

Four members and two guests attended on a sunny though cool day. A light breeze moderated at dusk and a rapid fall in temperature discouraged any intent to work with lights after dark.

Pieris rapae (L.) and *Parage egeria* (L.) were the only butterflies noted. Larvae of *Endothenia gentianaeanana* (Hübner) were found in the heads of the previous year's teasles (*Dipsacus* spp.) and *Myelois cribrella* (Hübner) in the dried stems of thistles.

Holm oak and hawthorn were worked for larvae, which proved to be few in number and small in size. Those which were large enough to permit identification included: *Nola cucullatella* (L.), *Operophtera brumata* (L.), *Euproctis similis* (Fuess.) and *Allophytes oxyacanthae* (L.)—all on hawthorn.

The following imagines were flushed or otherwise seen in flight: *Pseudoswammerdamia combinella* (Hübner), *Ancylis comptana* (Frölich), *Incurvaria masculella* (D. & S.), *Cydia succedana* (D. & S.), *Elachista rufocinerea* (Haw.) and *E. argentella* (Clerck).

Professor Owen kindly provided the following Coleoptera records with the comment that though no rarities are included, several species are quite local: *Harpalus ardosiacus* Lut., *H. smaragdinus* (Duft.), *Metabletus trun-*

catellus (L.), *Brachinus crepitans* (L.), *Astenus gracilis* (Payk.) f. *lyonessius* Joy, *Drusilla canaliculata* (Fabr.), *Timarcha goettingensis* (L.), *Phyllostreta diademata* Foudras, *Psilothrix viridicoeruleus* (Fouc.), *Apion fuscirostre* (Fabr.), *Otiorrhyncus clavipes* (Bonsd.) and *Phyllobius oblongus* (L.).

A feature of the area was the relative profusion of orchids in flower — these were: *Orchis sphegodes* (Mill.), the early spider; *O. mascula* (L.), the early purple; *O. morio* (L.), the green winged, and *O. fuchsii* (Druce), the spotted orchid.

BROXBOURNE WOODS, HERTS. — 28th May 1977

Leader — Rev. DAVID AGASSIZ

The scheduled leader, Mr. J. Reid, was prevented from attending by a family bereavement, so a substitute was found at short notice with a consequent lack of preparation. However, the fine weather did much to compensate, with cloudless skies and warm sunshine it was about the hottest day so far in 1977. Six members, with members of their families making up a party of 12, met at Broxbourne Station and proceeded by car to the woods near Hoddesdon.

Seven butterfly species were noted on the wing: *Erynnis tages* (Linn.) (grizzled skipper), *Pieris rapae* (Linn.) (small white), *P. napi* (Linn.) (green-veined white), *Anthocharis cardamines* (Linn.) (orange tip), *Callophrys rubi* (Linn.) (green hairstreak), *Lycaena phlaeas* (Linn.) (small copper) and *Lasiommata megera* (Linn.) (wall). Other macrolepidoptera seen by day were *Cyclophora albipunctata* (Hufn.), *Xanthorhoe montanata* (D. & S.), *Asthena albulata* (Hufn.), *Petrophora chlorosata* (Scop.), *Pseudopanthera macularia* (Linn.) and *Callistege mi* (Clerck). Among the 'micros' were *Ectoedemia argyropeza* (Zell.), *Incurvaria masculella* (D. & S.), *Nemato-pogon swammerdamella* (Linn.), *Adela reamurella* (Linn.), *Psyche casta* (Pallas), *Esperia sulphurella* (Fabr.), *Cydia jungiella* (Clerck), *Epiblema scutulana* (D. & S.), *Syndemis musculana* (Hübner) and *Eulia ministrana* (Linn.).

Larvae of the following species were noted and some were subsequently bred. 'Macros': *Alsophila aescularia* (D. & S.), *Anticlea badiata* (D. & S.), *A. derivata* (D. & S.), *Apocheima pilosaria* (D. & S.), *Bupalus piniaria* (Linn.), *Diloba caeruleocephala* (Linn.) and *Cosmia trapezina* (Linn.); 'micros': *Paraswammerdamia lutarea* (Haw.), *Coleophora hemerobiella* (Scop.), *Epiblema roborana* (D. & S.), *Croesia bergmanniana* (Linn.), *Eurhodope advenella* (Zinck.), *Stenoptilia pterodactyla* (Linn.) and *Cnaemidophorus rhododactyla* (D. & S.). This last-named species was the most interesting, but larvae in their characteristic spinings were scarcely half grown. It was noted that this species seems to be very selective about the type of rose it chooses to feed on, but none of the members was able to name the species with any confidence.

Among the more noteworthy birds in evidence the President recorded the following: Nightingale, Willow Warbler, Chiffchaff, Cuckoo, Reed Bunting and Great spotted Woodpecker.

Two members stayed on for night collecting and were joined by another local member. The night was clear and cold and the catch consequently disappointing, but one member was rewarded with a specimen of *Selenia lunularia* (Hübner); other species added to the daytime list were: *Nemapogon cloacella* (Haw.), *Tinea trinotella* (Thunb.), *Pseudotelphusa scalella* (Scop.), *Epiblema cynosbatella* (Linn.), *Lobesia abscissana* (Doubl.), *Capua vulgana* (Fröl.), *Crambus pratella* (Linn.), *Scoparia ambigualis* (Treits.), *Epirrhoe alternata* (Müll.), *Eupithecia vulgata* (Haw.), *Cerura vinula* (Linn.), *Clostera curtula* (Linn.) and *Colocasia coryli* (Linn.).

CANEWDON SALT MARSH AND HOCKLEY WOOD — 11th June 1977

Leader — Mr. R. W. J. UFFEN

Messrs. Uffen, Hammond, Lindsley and Tomlinson went to Hockley Station for the start of this meeting, but as the leader was unaware of the existence of two entrances to this small station, the party split into two at once. In view of the blustery weather and threatened showers the first three members sought the protection of Hockley Wood, whilst the fourth went to the marsh towards Creeksea Ferry Inn, an area visited at the end of the day by the leader.

Hockley Wood is a fine, mixed deciduous wood, approaching a square mile in area. The canopy is open in parts, allowing a rich, continuous ground flora with much grass. Within 200 m. of an entrance to the north-west of the wood *Luzula pilosa* (L.) Willd., *Chamaenerion angustifolium* (L.) Scop., *Stellaria holostea* L., *Endymion nonscriptus* (L.) Garcke, *Urtica dioica* L., *Rumex* sp., *Melampyrum pratense* L., *Melica uniflora* Retz., *Poa nemoralis* L., *Rubus fruticosus* agg. and *Sarothamnus scoparius* (L.) Wimmer were noted. The oak standards had produced an abundant crop of seedlings.

Holly, honeysuckle and nut accompanied saplings of the main trees in the understory, with aspen in the lower, damper south-east. An area of chestnut here had been cut to leave one standard from each neglected stump of coppice. An examination of the abundant wood mould in the crotches of these coppice stumps revealed no obvious signs of insect inhabitants. The trunks provided a crop of cases of the psychid moth *Taleporia pseudobombycella* (Hübner) and many adult *Ectoedemia argenti-pedella* (Zeller) nepticulid moths.

Groups of small Service trees (*Sorbus torminalis* (L.) Ehrh.) were noted in the eastern part of the wood. Formica ants abounded in the higher, drier parts and diverse common insects appeared there between the showers.

The leader drove through Canewdon to end the afternoon at Creeksea Ferry. On the way marsh vegetation in the bottom of a worked-out gravel pit looked worth further attention before the active programme of filling in destroys it. Adjacent was a large area of willow, some shrubs carrying dense clusters of bud-like galls up to 3 cm. diameter growing from axils on their twigs.

Near Creeksea *Malacosoma castrensis* larvae were sought where they have been found in recent years, but none were seen. Much time was spent searching for insects on *Artemisia maritima* L. along a causeway and beside the road, but only one species could be found: a homopteron covered in white, waxy filaments and feeding mainly on the woody stems at the base of the plants. Several were maintained in captivity until July, when they became nomadic and drowned after long periods of immersion in the water keeping their foodplant fresh. Baby individuals appeared at this time, but they too failed to settle.

DENNY BOG, NEW FOREST — 18th June 1977

Leaders — Col. D. H. STERLING and Mr. M. J. STERLING

Seven members and three visitors attended; the day was cold and overcast. Nothing was on the wing, and the morning was spent working the heath and bog on the Lyndhurst side of the railway towards Matley. *Perconia strigillaria* (Hübner), the grass wave, *Ematurga atomaria* (L.), the heath moth, and *Phytometra viridaria* (Clerck), the small purple bar, were

quite easily disturbed from the heather. *Chlorissa viridata* (L.), the small grass emerald, was fairly common, but more inclined to sit than be disturbed. All members requiring this species obtained it, including females for breeding. Micros found included *Plutella xylostella* (L.), *Pleurota bicostella* (Clerck), *Cochylis nana* (Haworth) and *Lampronia fuscaella* (Tengström). A single penultimate instar larva of *Dasychira fascelina* (L.), the dark tussock, was found.

The afternoon and early evening were spent working the heath and bog adjoining both sides of the railway, and some time was devoted to close searching of the heather. This produced large numbers of newly hatched larvae of *Saturnia pavonia* (L.), the Emperor moth, and also some unhatched egg-batches. Egg-batches of *Macrothylacia rubi* (L.), the fox moth, were also very common, and a dead female was found. A further larva of *D. fascelina*, this one in its last instar, was also taken, as were a number of fully grown larvae of *Pachynemia hippocastanaria* (Hübner), the horse chestnut. Two pupal cases of the large Psychid, *Pachythelia villosella* (Ochs.) were found on heather and a number of another, *Taleporia tubulosa* (Retzius), on near-by pine-trunks. Three more species of macrolepidoptera and some micros were added to the imagines taken in the morning.

The party left the heath and bog for an area dominated by ancient woodland oaks, near Denny Lodge, at about 9 p.m. A mixture of eight mercury-vapour and actinic lamps were set up and an area sugared. Insects appeared, but only in ones and twos. One large and very persistent visitor to an actinic lamp was a very large queen hornet, *Vespa crabro* (L.), which finally had to be boxed for later release. In all, some 20 different species of Lepidoptera were identified, including *Acrionicta alni* (L.), the alder moth, both marbled browns: *Drymonia dodonaea* (D. & S.) and *ruficornis* (Hufn.), *Ectropis extensaria* (Freyer), the brindled white spot, *Dipterygia scabriuscula* (L.), the bird's wing, and *Aethes smeathmanniana* (L.). Some micros are still to be identified.

The weather turned colder about 1.30 a.m. and the meeting ended after a long day thoroughly enjoyed by all, even if the catches were rather small.

SANDWICH BAY, KENT — 18th/19th June 1977

Leader — Dr. I. A. WATKINSON

A wet and windy night greeted the eight or nine people who attended the evening-half of this joint field meeting with the Kent Field Club. In the few hours before dusk, a considerable effort was put into searching for larvae, mainly of micros and several of the area's specialities were recorded, often in numbers. The larvae of *Stenodes alternana* (Steph.) were very common in the unopened flower heads of *Centaurea* exuding characteristic piles of frass from their entry holes and a number of these were subsequently reared. Larvae of *Agonopterix cnicella* (Treit.) were as usual very common on sea holly. Spinnings in sea buckthorn later produced a series of *Spilonota ocellana* (D. & S.) whilst the bulk of all the other spinnings subsequently produced adults of *Cnephasia longana* (Haw.), *C. interjectana* (Haw.) and *C. incertana* (Treit.). The other larvae of note were a number of *Marasmarcha lunaedactyla* (Haw.) well camouflaged on the shoots of the rest harrow, a few *Mesotype virgata* (Mufu) feeding at night on bed-straw and *Cochylis atricapitana* (Steph.) feeding in the heads of *Senecio*, all of which were subsequently reared.

By kind permission of Princes Golf Club, a convoy of six cars were allowed to drive across the links in heavy drizzle to the edge of the nature reserve where we were able to set up some nine mercury vapour and actinic lights in what little shelter could be found. The light in the lee of the small pine plantation produced an unexpectedly high catch and boosted the list of species considerably. Several species typical of the area were recorded including *Sideridis albicolon* (Hübner) *Pyrrhia umbra* (Hufner), *Cucullia umbratica* (Linn.), *Deilephila porcellus* (Linn.) and *Arctia villa* (Oberer.) In addition, a fine fresh *Thisanotia chrysonuchella* (Scop.) was netted at dusk by Paul Sokoloff.

The leader left sometime in the early hours to arrive back the next morning as the last of the night's collectors were departing after having stayed on the golf links all night. Five more entomologists gathered in dryer but still windy conditions and several of the species seen the night before were gathered. The breeding reports from these activities are still not complete, but in addition to those previously mentioned, a series of *Gypsonoma* sp. were reared from larvae feeding commonly in the terminal shoots of *Populus alba* and one *Anacamptis populella* from leaves of the same plant. Many of the sea buckthorn plants were being defoliated by full grown larvae of the brown-tail *Euproctis chrysorrhoea* (Linn.). Several Gelechiids were taken by Eric Bradford flying in sheltered spots out of the breeze but these need confirmation. A number of Coleoptera and other orders were swept in small numbers by two other members of the society, of which Martin Newcombe supplied several records which include *Platyarthrus hoffmannseggii* Brandt, a local species of woodlouse recorded from the nest of an ant believed to be *Lasius flavus*. Amongst the Orthoptera were taken *Chorthippus parallelus* (Zett.), *Conocephalus discolor* Thunb. and *Tettigonia virridissima* Linn. A specimen of *Ectobius panzeri* Steph., one of our native cockroaches, was tentatively identified from a nymph taken under marram grass. The Hemiptera-Heteroptera were represented by *Anthocoris nemorum* Linn., *Kleidocerys resedae* (Panz.), *Liocoris tripustulatus* (Fab.), *Notostira elongata* (Geoff.), *Pithanus maerkeli* (H.-S.), *Podops inuncta* (Fab.) and *Scolopostethus affinis* (Schill.). A balanced afternoon was rounded off by finding a young leveret crouching in long grass by the road.

On the way home, the leader stopped near Ashford to check for larvae of *Acleris sheperdana* (Steph.) in *Spiraea* shoots. Several spinings were taken and from these a very good series was later reared. Altogether a most enjoyable weekend.

NORTHWARD HILL N.N.R., KENT—25th June 1977

Leader—Mr. M. J. NEWCOMBE

Apart from the leader, the only other member to attend this meeting was the curator, Mr. E. Bradford, despite weather conditions which proved almost ideal for collecting. Whilst waiting at the church for the arrival of other members, a look was taken at the churchyard, which contained a number of lichen-encrusted memorial stones, from one of which a rather melanic specimen of the dipteron *Tabanus bromius* L. was taken.

The reserve was rich in species, and Mr. Bradford collected a number of new records for this site, of which *Alabonia geoffrella* (L.), *Scoparia ambigua* (Treits.), and *Anthophila fabriciana* (L.) were especially abundant, the latter especially so amongst stinging nettle. The most impressive find of the day was that of *Ectoedemia subbimaculella* (Haw.), several thousand of these tiny moths being seen resting on the trunks of oak trees in a particularly sheltered part of the wood. A single larva of

Quercusia quercus (L.) was taken from beneath a log. Other species recorded included *Hepialus lupulinus* (L.), *Nemophora degeerella* (L.), *Tinea semifulvella* (Haw.), *Argyresthia curvella* (L.), *Epinotia trimaculana* (Don.), *Orthotaenia undulana* (D. & S.), *Hedya pruniana* (Hübner), *Pseudargyrotoza conwagana* (F.), *Chrysoteuchia culmella culmella* (L.), *Scoparia arundinata* (Thunb.), *Udea olivalis* (D. & S.), *Camptogramma bilineata bilineata* (L.), and *Hypena proboscidalis* (L.).

The leader examined the heteropterous fauna and recorded the rather local bug *Legnotus limbosus* (Geoff.) which was extremely abundant amongst moss and litter covering a small heap of discarded tarmacadam. On stinging nettles *Eysarcoris fabricii* Kirk., *Heterogaster urticae* (F.), *Scolopstethus affinis* (Schill.), *S. grandis* Horv., *Himacerus mirmicoides* Costa, *Anthocoris nemorum* (L.), *Orius niger* (Wolff), *Psallus varians* (H.-S.), *Heterotoma merioptera* (Scop.), *Liocoris tripustulatus* (F.), and *Calocoris norvegicus* (L.), were recorded. The oak fauna was equally rich, with bugs such as the shoot-sucking *Calocoris quadripunctatus* Villers abundant on solitary oaks, whilst *Phylus melanocephalus* (L.), *Cylloceria histrionicus* (L.), and a single late adult of *Dryophilocoris flavoquadrimaculatus* (Deg.), were found in oak stands. Other bugs noted were *Podops inuncta* (F.), *Kleidocerys resedae* (Panz.), *Drymus sylvaticus* (L.), *Cymus melanocephalus* Fieb., *Tingis ampliata* (H.-S.) and *T. cardui* (L.) (both on spear thistle, *Cirsium vulgare* Ten.), *Nabis rugosus* (L.), *Deraeocoris scutellaris* (F.), *Plagiognathus arbustorum* (F.), *Dicyphus epilobii* Reut. (unusually scarce on the willowherb, *Epilobium hirsutum* L.), *Phytocoris dimidiatus* Kirschb., *Capsus ater* (L.), *Notostira elongata* (Geoff.), and *Leptopterna dolabrata* (L.).

Finally, the assistance of the warden, Mr. R. E. Scott, in so kindly allowing us to visit all parts of the reserve, must be most gratefully acknowledged.

CURRENT LITERATURE BOOKS

The British Butterflies: their origin and establishment by R. L. H. Dennis.

E. W. Classey Ltd., 1977, 318 pp. Price £10.00.

Pioneer studies on this subject were made by E. B. Ford and B. P. Beirne more than thirty years ago, and up-dating and re-examination are long overdue. Mr. Dennis devotes the first section of his book to a comprehensive survey of recent research into the glacial and post-glacial geography, climate, flora and remains of coleoptera in the British Isles and northern Europe, both on a national and regional basis, in order to set the framework within which he believes that the present species of butterflies arrived and established continuous existence here. The evidence which he uses is, though detailed, still very incomplete, and much of it is uncertain or contradictory on the vital point of dating; and his handling of it is marred by excessive use of technical terminology which is not well explained and is hard to follow. His conclusions, however, are in startling contrast to those of the earlier writers. Though he does not deny that butterflies may have existed here earlier, he states categorically that none could have survived the maximum of the last main glaciation, either on the present land surface or, as Ford and Beirne suggested, on ice-free land since submerged as sea levels rose with the melting of the ice sheets. This maximum, which he calls Devensian in the British Isles, Weichselian in Europe, he dates to about 15,000 to 18,000 years ago. Indeed, he goes further, arguing that one at least of the cold periods ('Zone III') which followed the initial warming of the climate and withdrawal of the ice

would have made the establishment of all but a handful of our present species improbable until the pre-Boreal period about 12,000 years ago, after which the climate became for a time better than at present. If these conclusions are correct, they have much biological significance, since they allow vastly less time than previously for the development of British and Irish subspecies and local races, which is dealt with in Section C of the book. But the conclusions are not beyond question. Mr. Dennis himself finds difficulty in discovering for so recent a date a land connection with Ireland, which is necessary to explain the presence there today of nearly half of the British species. Further, he endorses both in text and map the view that in England Devensian ice sheets did not extend south-east of the Humber/Severn line; yet his contention that the country between it and the present shores of the North Sea and English Channel was climatically uninhabitable for butterflies seems to overlook the fact that some twenty species on the British list now breed in Fenno-Scandia within the Arctic Circle.

Section B deals competently with the distribution of species within the period of record, discussing both their discontinuities and apparent changes in recent times; and there is interesting discussion of the forces governing the adaptation of several species to different or changing environments. Subspecies and local races are treated in Section C, subject always to the argument that their existence or non-existence gives little or no clue to the dates of which species became established in Britain. The long last Section suggests a new arrival sequence, which is compared in tabular form with the sequences provided by Beirne and Ford, from which it differs greatly. In building up his own argument the author gives much weight to the large oscillations of climate, both as regards temperature and humidity and sunshine, since the maximum of the Devensian ice age. His picture is one of a general arrival and extensive spread of most species during the warm pre-Boreal and Boreal periods, followed by contractions of range in the British mainland and probably by extinctions in Ireland, outlying islands, and even Britain itself during one or other of the cooler or damper periods which followed, or resulting from man-made changes in environment. Once considerable barriers of sea had appeared between the British Isles themselves and between Britain and Europe, further colonisation or recolonisation became almost impossible for any butterfly species except those now recognised as migratory.

This book is full of interesting material and stimulating interpretation of it. Much of both is, however, more uncertain and controversial than the author seems to recognise. He could with advantage have written it in simpler language and with more thought for presentation to the many non-technical entomologists who may try to read it. The bibliography is excellent, and the printing is good and accurate, although more conspicuous and larger type for the numbering and captions of the many figures and tables would have been an improvement.

R.F.B.

Insect Photography for the Amateur by P. E. Lindsley. Amateur Entomologists' Society.

In the pursuit of insects, both as trophies and as objects of research, the camera is already an established rival of the net. Mr. Lindsley takes us right through the whole subject of insect photography, including basic principles, choice of camera and other equipment and the numerous accessories designed for close-up work. Throughout he does not simply

lay down the law, but explains why this accessory is useful in photographing insects and that one can be dispensed with. Lighting, with the emphasis on electronic flash, is treated in the same way.

In his chapter 5, 'Getting Down To It', he makes it clear that he is writing from experience, and the first paragraph ends with the words: 'I cannot emphasise too strongly that the key to success is practice and experimentation, coupled, particularly in early days, with keeping meticulous details of every picture you take.' Good advice indeed. He distinguishes between the 'record shot', usually taken indoors to show the subject's visible characteristics, and the 'natural history shot' which is taken in the field to show some aspect of its behaviour. Each of them is as important and valid a branch of insect photography as the other, and useful advice is given on both.

The final section on photographing mounted or set specimens is contributed by Mr. D. Carter and completes a practical and valuable summary of the subject.

M.W.F.T.

The Dragonflies of Great Britain and Ireland by C. O. Hammond. Curwen Press. £9.75.

The British list of Odonata numbers no more than 44, and all are relatively large insects. Nevertheless, identification of the species is by no means easy. The separation characters, largely of pattern and colour, are difficult to describe verbally, often variable and frequently as distinct between conspecific males and females as between the same sexes of allied species. An added complication is the change in coloration that often takes place as newly eclosed or 'teneral' specimens grow to imaginal maturity.

By means of keys and descriptions carefully correlated, item by item, with numbered drawings and diagrams, all in colour, this beautifully produced and illustrated book provides, for the first time, a means of confidently determining specimens of dragonflies and damselflies in the British fauna. Mr. Hammond, who is both author and artist, deserves congratulations and thanks from us all, and his book will do much to stimulate interest in our native Odonata.

The well known keys and drawings by the late A. E. Gardner, illustrating the aquatic early stages, are incorporated as a final chapter. It is a matter for deep regret that Mr. Gardner's untimely death prevented him from contributing an expanded version of this section of the book. Distribution maps from John Heath of Monk's Wood provide a valuable appendix.

Many beginners in entomology are dismayed and put off by the standard 'key', in which one, or at the most two, characters are selected to serve for separation and are supported by quite inadequate illustrations or none at all. Books modelled on Hammond's 'Dragonflies' are laborious to produce and expensive to publish, but surely they are worth while. Let us hope that some other suitable categories of British insects will before long receive similar treatment.

M.W.F.T.

Naamlijst van de Nederlandse Lepidoptera by B. J. Lempke. Koninklijke Nederlandse Natuurhistorische Vereniging, Amsterdam, 1976, 99 pp. No price stated.

This list complements the 'Check List of British Insects' as revised by Bradley, Fletcher and Whalley in 1972. Like that, it lists all taxa at sub-specific level, and it follows it closely in arrangement and nomenclature.

Changes to take account of later published work are most evident in the Nepticulidae, which have been recast, and in the Oecophoridae, which have been split into three sub-families with revision of generic names. In the Papilionoidea no less than fifteen more sub-families have been introduced, without apparent profit to anyone except the printer. It is interesting that in the Noctuidae *Actinotia polyodon* (Clerck) has returned to Boursin's place for it among the Amphipyrinae, while another taxonomic lost soul, *Axilia putris* (Linnaeus), is retained among the Noctuinae at the price of a change in generic spelling. The foreword, introduction, and commentary on special points in families are in Dutch, but there is a one-page epilogue in English. This reviewer regrets that numbering of the taxa has not been used for the text and index: this would be of much help in finding them quickly and in references.

The two lists together provide an easy means of comparing the lepidoptera of the two countries. The epilogue tells us that, after excluding extinct, doubtful, and casual species, which are marked by symbols, the British list counts 2,247, the Dutch 2,109. However, much of the British superiority comes from the larger number counted as separate sub-species. Thus in the Hesperoidea and Papilionoidea the British list counts 100 taxa (? not all worthily), of which only 66 represent separate species, while the Dutch count is 86, of which all but one are specific: so by the usual standard the Netherlands wins easily after all!

The Naamlijst is very clearly printed on excellent paper, and it has an attractive colour picture of *Arctia caja* (Linnaeus) on its cover. It deserves a place in all entomological libraries.

R.F.B.

Die Schillerfalter by Ekkehard Friederich. Die Neue Brehmbücherei, A. Ziemsen - Wittenberg Lutherstadt, 1977, 112 pp., 2 colour plates, 64 figs. Price 12 DM.

This attractively presented paper-back summarises what has been published on the three *Apatura* species *iris* (L.) (our Purple Emperor), *ilia* (D. & S.), and *metis* Frr.), of which only the first inhabits Britain, and the third is probably known to our readers, if at all, from the British Museum's fine material, or the pages of *Seitz*, Vol. 1. It is a group of perennial popular appeal.

The morphology of all stages is illustrated and described, the figures including electron-scanning microphotographs of the eggs and the wing scaling. However, the details for *A. metis* refer mainly to the Far Eastern form *substituta* Butler studied by Takakura, rather than the East European *metis metis* of which, apart from good black and white photographs of Hungarian adults, there is comparatively little. On the vexed question of its specific distinctness from *ilia*, the author, after a literary-historical review, concludes that this has been established, thereby differing from Niculescu 1977, reviewed in our Vol. 10 (3/4): 125. It may here be added that the British Museum's arrangement of the forms also presents *metis* as a distinct species. A black and white figure shows the underside differences between *A. metis* and *ilia*; these would appear to be greater than the male genitalia of the two forms. The female genitalia are not illustrated.

Details and photographs of the eggs, larvae their foodplants and habitats, in Europe and Japan, are reproduced; not unexpectedly, observations from intermediate Asiatic localities are lacking. Heslop's well-known notes are quoted at some length in the section on the habits of *A. iris*. A detailed section on breeding, hand-pairing and hybridisation appears to contain the

results of considerable original work by the author, whose other personal contribution of interest concerns *A. iris* ab. *iole* D. & S., which he bred and subjected to temperature experiments; these tended to disprove an earlier supposition that this aberration was the consequence of unusual temperatures affecting the pupa. The numbering of the hindwing veins in fig. 24 is decidedly unorthodox; after counting the two anals as 1 & 2, the author arrives at a figure 9 for the costal!

On the whole we warmly recommend this most useful guide and summary to all students of Rhopalocera who can read and understand German.

E.P.W.

A Guide to the Butterflies of Central and Southern Africa by E. Pinhey and I. Loe. 1977, Causton, London and Eastleigh. Long 8vo., 106 pp. with 29 coloured plates in watercolours depicting 135 species, together with a further 64 species in colour photographs taken in the field and numerous line drawings. Price £4.95.

This is an excellent book and should prove most popular with those interested in the more common and spectacular butterflies of this area of Africa. The 280 life-size watercolour illustrations of adults are truly outstanding in their detail and accuracy. The 144 colour photographs of adults and sometimes larvae are extremely interesting subjects and help to convey the charm of these insects in their natural surroundings.

There is a brief introduction and chapters on features of a butterfly, life cycle, variations in form and colour, warning coloration and mimicry, habits, collecting, preservation, rearing, names, families and some of their characteristics, a glossary, entomological dealers, African reference collections, further reading and an index of scientific and common names. The various families are dealt with in their systematic order and each has a brief introduction with colour photographs and line drawings to illustrate various points. These are followed by the excellent life-study photographs arranged six to a page. The captions of these are placed in the page gutter and give brief details of habitat and distribution where these are not given in the main text. If these are mentioned in the text then a number is given which refers to the species, each of which is numbered consecutively throughout. The figures on the plates are also given these numbers so that cross references are easily found. It would have helped if reference numbers could have been given to illustrate various points in the introductory chapters and in the captions of the figures immediately associated with them.

As is pointed out by the authors, the book is primarily intended for the beginner who should be able to identify his or her specimens quite easily from the excellent illustrations and at the same time to learn a little about the insects themselves from the necessarily brief text.

In the reviewer's opinion it would have been better if the scientific names were *italicised* throughout rather than use roman capitals in the captions of the plates and photographs. On page 13 the names *Precis* and *Colotis* should be in italics and also *bohemani* on page 24 line 8. In the section dealing with names no mention is made of author's names and the significance of the brackets sometimes used with them, though the names themselves are used in the main text. It would have helped had the author's name been separated from the common name by an extra space, for one is confronted with such strange combinations as Neave Marshall's Highflier (69), Dixey Paradox (87), Trimen Bowker's Hairstreak (68) and many others. Apart from these few minor criticisms, the authors and publishers are to be congratulated on a well produced book which is well worth its price for the illustrations alone.

T. G. HOWARTH

Collecting and Studying Dragonflies (Odonata) by David Keen. A.E.S. Leaflet No. 12. Revised Edition 1977. £1.60.

The title suggests an essentially practical approach to the subject which David Keen has tackled admirably, presenting a wealth of information in the compass of 24 pages.

Sections deal with habitats, life-history, collecting equipment, rearing, killing, pinning and setting and arrangement of the collection; amply helped by useful illustrations and followed up by suggestions for further studies.

In dealing with the nymphs the author is careful to emphasise the importance of replacing in the water unneeded pond weed and debris and to leave the locality as it was found, and Appendix I gives a code of insect collecting. He rightly suggests ethyl acetate as the most suitable killing agent for adults but this is very difficult to obtain from local chemists. However, a similar product under the name of 'Killing Fluid' can be purchased at the A.E.S. Exhibition annually. Ammonia should never be used as this quickly removes the powder-blue pruinescence from adult males of *Libellula* and *Lestes* species.

Limitation of space has precluded the inclusion of classification, though Appendix II gives a loose check-list for labelling the collection. There is a useful bibliography which will enable the student to continue the study after he has made himself familiar with this very readable booklet.

C.O.H.

OUR CONTEMPORARIES

Lepidoptera, 3 (2/3), 1976/77

The Lepidoptera Society of Copenhagen has for several years been producing a new series under this title of high quality, with plentiful illustrations, particularly good of larvae, on good paper and with subject matter of interest to British lepidopterists. The latter will find the text entirely Danish and the final summaries in English, present in most articles, very short. The illustrations usually make up for those disadvantages and our readers are therefore recommended to watch out for this magazine for helpful material. In the current number we single out for mention a fine colour plate of a remarkable aberration of *Mesoacidalia charlotta* (L.), a report by J. E. Jeines on the discovery of *Eriopygodes discalis* (F.) in Denmark, in the shape of a single male at Charlottenrud, 'probably a migrant from Sweden', and an article by Michael Fibiger on the group of grey *Cucullia* species.

Applied Entomology and Zoology, 12 (2), 1977 (Tokyo)

Sometimes a journal of applied entomology has matter of general entomological interest, and in such cases we single out for mention here the articles; in the present case, this well produced review, produced by the Japanese Society of App. Ent. and Z., Tokyo, entirely in English despite its Japanese origin, contains eleven longer articles of which we select one, and eight shorter articles, of which we mention another. The longer is by K. Nakamura and K. Kawasaki and is entitled 'The active space of the *Spodoptera litura* (F.) sex pheromone' (pp. 162-177). This gives account of experiments involving the release and recapture at pheromone traps of moths of this species, to determine the range of effectiveness of the scent released by the living female or the synthetic pheromone. The maximum range down-wind for one virgin female was estimated at about 80 metres for a wind velocity of 0.50 m./sec. This distance decreased with an increase in wind velocity but decreased greatly with a decrease in wind velocity. The reason for the decreased range at low wind velocity was said

to be deposition of the pheromone. In a windless greenhouse, the active space was limited to a small area close to the attractant. Quite apart from its relevance to recent controversies on the mode of assembling males of lepidoptera, which the authors do not comment on, they point out that this characteristic of pheromone diffusion, dependence on wind-velocity, will seriously affect the application of pheromone as a sampling tool of insect population and as a method of insect pest control. Secondly, and more briefly, Harushisa Wago (pp. 203-5), describes 'Mating behaviour of *Zizeeria maha argia* in connection with visual stimuli from *Zizina otis*'. These are two allopatric but rather similar Japanese blues, differing mainly in upperside colouring. The optical properties of the wing undersurface of both species are shown by the experiment to be similar and probably to play an indispensable role in the male's attraction and its attempt to copulate. In figure 1 the author shows a photograph of an *argia* male attempting to copulate with the undersurface of 'a dummy of *otis*' male. Dummies of pinned specimens of both sexes of *otis* placed on a leaf were used in these experiments, which compared the number of *argia* males approaching *argia* in similar conditions. The author states that mating in these butterflies occurs most frequently when males respond to motionless individuals with the undersurface exposed. The author certainly seems to have discovered a hitherto unsuspected factor in the courtship of blue butterflies, which ought to be possible for experimentalists in many parts of the world to confirm, or to disprove, with their own local species.

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological and Natural History Society announces that awards may be made from this Fund for the promotion of entomological research with particular emphasis on

- (a) Leaf-miners,
- (b) Diptera, particularly Trypetidae and Agromyzidae,
- (c) Lepidoptera, particularly microlepidoptera,
- (d) General entomology,

in the above order of preference, having regard to the suitability of candidates and of the plan of work proposed.

Awards may be made to assist travelling and other expenses necessary for field work, for the study of collections, for attendance at conferences, or, exceptionally, for the costs of publication of finished work. In total, they are not likely to exceed £200 in 1978/79.

Applicants need not be resident in the United Kingdom, and research in any part of the world may qualify.

Applicants should send, if possible in sextuplicate, a statement of their qualifications, of their plan of work, and of the precise objects and amount for which an award is sought, to A. M. Emmet, M.B.E., T.D., M.A., F.L.S., F.R.E.S., Hon. Secretary, Labrey Cottage, Victoria Gardens, Saffron Walden, Essex, CB11 3AF, as soon as possible and in any case not later than 30th September, 1978.

HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS

Recent additions to this series include parts on the Thysanoptera, two families of aphids, and a completely new edition of Kloet and Hincks Checklist of the Coleoptera and Strepsiptera. Thirty seven other Handbooks are currently in print.

A full list of available Handbooks can be obtained from the Royal Entomological Society, 41 Queens Gate, LONDON, SW7 5HU.

The Society's Publications

THE NEW AURELIANS

By Dr. M. J. JAMES

A Centenary History of the Society

with an account of the collections

by A. E. GARDNER, F.R.E.S.

Price £1.00

A GUIDE TO THE SMALLER BRITISH LEPIDOPTERA

by L. T. FORD, B.A.

This important work on the British Microlepidoptera is still available.

Price £2.50

SUPPLEMENT TO THE GUIDE TO THE SMALLER BRITISH LEPIDOPTERA

by L. T. FORD, B.A.

Printed on one side of the page only so that it can be cut up and inserted into the correct place in the Guide.

Price £0.50

A CATALOGUE OF BOOKS IN THE LIBRARY OF THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

Compiled by T. R. EAGLES and F. T. VALLINS

£0.25

THE NATURAL HISTORY OF THE GARDEN OF BUCKINGHAM PALACE

(Proceedings and Transactions 1963, Part 2)

Compiled by a team of specialists.

£1.00

A LEPIDOPTERIST'S HANDBOOK

The Amateur Entomologist's Society is pleased to announce the publication of its latest Handbook, written by Richard Dickson. It is intended as a 'vade mecum' for both beginners and initiated lepidopterists and deals with all aspects of the subject in a series of eleven chapters and four appendices. There are 34 line illustrations and 13 photographs to augment the text and the binding has been sewn to meet constant use.

It is a practical book on the various facets of breeding, collecting, storing, conservation and photography of lepidoptera and should appeal to most lepidopterists. Although the various techniques relate to the British fauna, most are valid for lepidopterists anywhere.

The price is £3.00 plus postage and is available from A.E.S. Publication Agent, 137 Gleneldon Road, London, SW16 2BQ. (An invoice will be sent with orders, including postage.)

CONTENTS

Annual Exhibition, The 1977	2
Chandler, P. J., A revision of the British Asteidae (Diptera) including two additions to the British list	23
Current Literature	68
Editorial	1
Field Meetings	63
Gardiner, B. O. C., Instar number and pupal colouration in Palestinian <i>Pieris brassicae</i> (L.)	21
Hering Memorial Research Fund, The Professor	74
Hering Memorial Research Fund, Report on the	62
Obituaries: (i) D. W. H. Ffennell	34
(ii) H. C. Huggins (and biblio- graphy)	36
Officers Reports for 1977	56
Proceedings	38

MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place 28th October, in Chelsea Old Town Hall.

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

The current Programme Card can be had on application to the Secretary.

1
B8521
Ent.

OCTOBER 1978

Vol. 11, Parts 3/4

Proceedings and Transactions of
The British Entomological and
Natural History Society



Price: £3.00

Past Presidents

1872-4	J. R. WELLMAN (dec.)	1939	H. B. WILLIAMS, LL.D., F.R.E.S. (dec.)
1875-6	A. B. FARN, F.E.S. (dec.)	1940	E. A. COCKAYNE, D.M., F.R.C.P., F.R.E.S. (dec.)
1877	J. P. BARRETT, F.E.S. (dec.)	1941	F. D. COOTE, F.R.E.S. (dec.)
1878	J. T. WILLIAMS (dec.)	1942	S. WAKELY (dec.)
1879	R. STANDEN, F.E.S. (dec.)	1943	R. J. BURTON, LL.D.S., R.C.S.ENG. (dec.)
1880	A. FICKLIN (dec.)	1944	STANLEY N. A. JACOBS, F.R.E.S.
1881	V. R. PERKINS, F.E.S. (dec.)	1945-6	Capt. R. A. JACKSON, R.N., F.R.E.S. (dec.)
1882	T. R. BILLUPS, F.E.S. (dec.)	1947	L. T. FORD, B.A. (dec.)
1883	J. R. WELLMAN (dec.)	1948	Col P. A. CARDEW (dec.)
1884	W. WEST, LL.D.S. (dec.)	1949	J. O. T. HOWARD, M.A. (dec.)
1885	R. SOUTH, F.E.S. (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.)
1886-7	R. ADKIN, F.E.S. (dec.)	1951	T. G. HOWARTH, B.E.M., F.R.E.S., F.Z.S.
1888-9	T. R. BILLUPS, F.E.S. (dec.)	1952	E. W. CLASSEY, F.R.E.S.
1890	J. T. CARRINGTON, F.L.S. (dec.)	1953	F. STANLEY-SMITH, F.R.E.S.
1891	W. H. TUGWELL, PH.C. (dec.)	1954	STANLEY N. A. JACOBS, S.B.ST.J., F.R.E.S.
1892	C. G. BARRETT, F.E.S. (dec.)	1955	F. D. BUCK, A.M.I.PTG.M., F.R.E.S. (dec.)
1893	J. J. WEIR, F.L.S., etc. (dec.)	1956	Lt.-Col. W. B. L. MANLEY, F.R.E.S.
1894	E. STEP, F.L.S. (dec.)	1957	B. P. MOORE, B.SC., D.PHIL., F.R.E.S.
1895	T. W. HALL, F.E.S. (dec.)	1958	N. E. HICKIN, PH.D., B.SC., F.R.E.S.
1896	R. SOUTH, F.E.S. (dec.)	1959	F. T. VALLINS, A.C.I.I., F.R.E.S. (dec.)
1897	R. ADKIN, F.E.S. (dec.)	1960	R. M. MERE, F.R.E.S. (dec.)
1898	J. W. TUTT, F.E.S. (dec.)	1961	A. M. MASSEE, O.B.E., D.SC., F.R.E.S. (dec.)
1899	A. HARRISON, F.L.S. (dec.)	1962	A. E. GARDNER, F.R.E.S. (dec.)
1900	W. J. LUCAS, B.A., F.E.S. (dec.)	1963	J. L. MESSENGER, B.A., F.R.E.S.
1901	H. S. FREMLIN, M.R.C.S., L.R.C.P., F.E.S. (dec.)	1964	C. G. ROCHE, F.C.A., F.R.E.S.
1902	F. NOAD CLARK (dec.)	1965	R. W. J. UFFEN, F.R.E.S.
1903	E. STEP, F.L.S. (dec.)	1966	J. A. C. GREENWOOD, O.B.E., F.R.E.S.
1904	A. SICH, F.E.S. (dec.)	1967	R. F. BRETHERTON, C.B., M.A., F.R.E.S.
1905	H. MAIN, B.SC., F.E.S. (dec.)	1968	B. GOATER, B.SC., F.R.E.S.
1906-7	R. ADKIN, F.E.S. (dec.)	1969	Capt. J. ELLERTON, D.S.C., R.N. (dec.)
1908-9	A. SICH, F.E.S. (dec.)	1970	B. J. MACNULTY, B.SC., PH.D., F.R.I.C., F.R.E.S.
1910-11	W. J. KAYE, F.E.S. (dec.)	1971	Col. A. M. EMMET, M.B.E., T.D., M.A.
1912-13	A. E. TONGE, F.E.S. (dec.)	1972	Prof. H. E. HINTON, PH.D., B.SC., F.R.S., F.R.E.S.
1914-15	B. H. SMITH, B.A., F.E.S. (dec.)	1973	J. M. CHALMERS-HUNT, F.R.E.S.
1916-17	Hy. J. TURNER, F.E.S. (dec.)	1974	C. MACKECHNIE JARVIS, F.L.S., F.R.E.S.
1918-19	STANLEY EDWARDS, F.L.S., etc. (dec.)	1975	M. G. MORRIS, M.A., PH.D., F.R.E.S.
1920-1	K. G. BLAIR, B.SC., F.E.S. (dec.)	1976	W. G. TREMEWAN, M.I.BIOL.
1922	E. J. BUNNETT, M.A. (dec.)	1977	G. PRIOR, F.L.S., F.R.E.S.
1923-4	N. D. RILEY, F.Z.S., F.E.S.		
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.		
1934	T. R. EAGLES (dec.)		
1935	E. E. SYMS, F.R.E.S. (dec.)		
1936	M. NIBLETT (dec.)		
1937	F. J. COULSDON (dec.)		
1938	F. STANLEY-SMITH, F.R.E.S.		

Editorial

Editor: E. P. Wiltshire, C.B.E., F.R.E.S.

Address: Wychwood, High Road, Cookham, SL6 9JS, Berks.

With the assistance of:

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

T. G. Howarth, B.E.M., F.R.E.S., F.Z.S.

M. W. F. Tweedie, M.A., F.Z.S.

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

Published at the Society's Rooms, The Alpine Club, 74 South Audley Street, London, W.1, and printed by Charles Phipps Ltd., 225 Philip Lane, Tottenham, N15 4HL

PRESIDENTIAL ADDRESS

(Read on 26th January 1978 by RALPH TUBBS, O.B.E., F.R.E.S.)

I. TOPICAL REMARKS

From the Report of the Council, which has just been read, you will know that the Society is still flourishing. The membership continues to increase and there are now about 700 members. Sixty-one new members elected during 1977 is a most encouraging sign. There is no doubt that a further increase in membership would add to the influence of the Society, increase the scope of its debate and make financially possible more illustrations in our already excellent *Proceedings and Transactions*. I would, therefore, ask all members to encourage any keen entomologist whom they know and who is not already a member to join at once.

There is one action taken by your Council this year to which I would like specially to draw your attention—and that is the decision to publish as soon as possible a new and completely revised edition of L. T. Ford's most valuable book *A Guide to the Smaller British Lepidoptera*. It is nearly thirty years since this Society first published this book and during those years there has been a great deal of work done on the 'micros'—work partly inspired by the book itself. The text will now be brought completely up-to-date with much new information and the very distinguished team of authors, under the expert leadership of Col. A. M. Emmet, have already made very good progress. I would like to thank all who are co-operating in this work. We have obtained a very reasonable price for printing and I hope publication will be achieved this summer. I feel that this Society, which already has pre-eminence in field entomology, has a special responsibility to share the knowledge obtained in the field and thereby make its own contribution to science.

Our Annual Exhibition is another form of communication by which we share our knowledge. This year there was a record attendance and the standard of exhibits was remarkably high.

Links with other societies are also valuable. In 1977 the Lancashire and Cheshire Entomological Society celebrated their Centenary. I had the honour and pleasure of attending their Centenary Exhibition and *Conversazione* at the Adelphi Hotel in Liverpool at the invitation of their President, Mr. R. C. R. Crewdson. We were also glad to welcome Mr. W. A. Watson, their Vice-President, at our Annual Dinner at Imperial College, which again was well attended.

It is now my sad duty to remember with you those of our members who have died during the past year.

Professor H. E. Hinton, F.R.S. died on 2nd August 1977 at the age of 64. He joined our Society in 1945 and was our President in 1972. Born in Mexico in 1912, he went to university in Berkeley, California. Then in 1934 he came to England and took a Ph.D. under A. D. Imms at Cambridge. In 1939 he was appointed a taxonomist in the Department of Entomology at the British Museum (Natural History). Ten years later he joined the staff at the Zoology Department of Bristol University, where he continued to work, becoming Head of the Department in 1970. He was elected to the Royal Society in 1961 and President of the Royal Entomological Society 1969-70. He always worked immensely hard, continuously publishing the results of his research. It was typical of him that, when he learnt he had only a short time to live, he worked harder than ever, completing his long-planned three volume work on the biology of insect eggs just before he died.

H. C. Huggins died at Westcliff-on-Sea, Essex, on 14th April 1977, in his 86th year. Before retirement he had worked with Westminster Bank, becoming a branch manager. At the time of his death, he had been a member of the Society for forty-three years. He began collecting when a boy of eight and was helped in his early years by A. B. Farn, who was a relative. During his long entomological career he encountered such knowledgeable entomologists as J. W. Tutt, Charles Fenn and Richard South. He was primarily a lepidopterist, concentrating after 1922 largely on micros, at a time when the knowledge of these was much more limited than it is today. He had a special interest in the *Pyrilidae* and *Tortricidae*. At one period, however, he took a serious interest in British land and freshwater mollusca, publishing in 1918 a significant paper on 'The Lymnaeae of the Alpine Lakes of the Glengarriff District, West Cork'. Indeed Ireland always had a great appeal for him and he made collecting trips there nearly every year. He was a considerable writer and made regular contributions to the entomological journals, many of them on new subspecies and aberrations. His fine collection has been given to the British Museum (Natural History).

D. W. H. ffennell died in August at the age of 56, beside the moth-trap in his garden. He was educated at Eton College, where he was a fellow pupil with E. C. Pelham-Clinton, and at Cambridge University. He joined the Society in 1940. He inherited a fine country house and a large garden, part of which he converted into a market garden. Although he had a special interest in Microlepidoptera and Neuroptera, his interests were wide and there are few people who have had a more comprehensive knowledge of the Lepidoptera. He recorded approximately 1,000 species from his estate, Martyr Worthy Place, near Winchester. He added to the British List, *Phyllonorycter dubitella* (Herrich-Schaffer) (Lep.: Gracillariidae) and *Lampronia flavimitrella* Hübner (Lep.: Incurvariidae). He played a considerable part in the preparation of Barry Goater's 'Butterflies and Moths of Hampshire', especially for the Microlepidoptera, and was engaged in the Oecophoridae for the next volume of the 'Moths and Butterflies of Great Britain and Ireland' and had done valuable preliminary work.

Clifford Crauford died on 23rd March 1977, at the age of 94. He joined the Society in 1918 and was made a Special Life Member in 1971. He was educated at Clayesmore School and Edinburgh Academy. His parents lived in British East Africa, where his father was Consul-General, so that many of his school holidays were spent at school where a master started his life-long interest in entomology. In the early 'twenties', when he was living at East Molesey, much of his collecting was done in Surrey. However, he moved to Bishops Stortford in 1925 and ten years later was a founder member of the Bishops Stortford and District Natural History Society. His principal interest was in the moths, keeping constantly a trap in his garden and compiling full statistical records. He was a friendly and helpful person and he held an oft-stated opinion that *all* entomologists are nice people!

Dr. D. Kyle, O.B.E., died in 1976. He lived in Brecon, Powys, where he was a distinguished doctor, receiving his O.B.E. in 1972. He specialised in Odonata.

You have already stood in memory of these members, so I will not ask you to do so again.

Finally, before coming to the subject of my address, I would like to express my thanks to the officers and members of Council who have not only worked so hard for the Society but also given me so much support and help during my term of office. Mr. G. Prior, your next President, has as Secretary given me invaluable assistance, and is one of those who come frequently to these premises on non-meeting days and work in the basement. There you will have seen how much better laid out is the room housing our collections, largely the work of our dedicated curator, Mr. Eric Bradford, and his assistants. The library is also better arranged and Dr. Allen is now working hard on this. Our Editor, Mr. E. P. Wiltshire, has produced excellent *Proceedings and Transactions* and has achieved the very difficult task of bringing them out on time, for which he must be congratulated. Our Treasurer, Mr. R. F. Bretherton, has as usual kept our finances in good shape. The Society is also much indebted to Mr. G. R. Else and Mr. E. H. Wild for arranging the programmes for the Indoor Meetings and Field Meetings respectively. I should also like to thank Mr. R. Dyke for his excellent drawing for the Christmas Card. All these and other members give their time and expertise. There is something about our Society which inspires not only loyalty, but real affection.

I now come to the second part of my address, the title of which is:—

THE BREEDING OF BUTTERFLIES WITH SPECIAL REFERENCE TO THE
GENETICS OF ABERRATIONAL FORMS

(with Plates VI & VII and two text figures)

by RALPH TUBBS, O.B.E., F.R.E.S.

(9 Lingfield Road, Wimbledon Common, London SW19 4QA)

1. *Introduction*

For thirty years I have been breeding butterflies and have bred from the egg most of the indigenous species. It is only by breeding that you really get to know an insect. Although starting with typical insects, my interest soon turned to aberrations. I am an inquisitive naturalist: I am not satisfied with just having a set aberration killed on capture in the wild. I want to know how it came to be different. To kill an aberration without getting eggs or a pairing is killing the Golden Goose. I do not collect butterflies, I collect genes. Then if you have friends with similar interests you can exchange genes. For example, I am indebted to Mr. R. Revels for exchanging genetic material with me—sometimes an imago sent by post on the evening of capture, sometimes eggs. Of course, it is a gamble, the insect may ruin itself without laying eggs—but the prize, both in terms of knowledge and in bred specimens, is worth the risk. I shall be showing you later slides of many of the aberrations I have bred.

2. *Breeding techniques*

Although many members are themselves experienced breeders of lepidoptera, I feel it might be helpful if I give a brief description of the methods I use. Almost every person has a slightly different technique. As I need to breed several generations, I try to simulate fairly natural conditions. I do not use continuous breeding techniques with high intensity lighting for 24 hours a day to overcome diapause, as this frequently leads to failure to get pairings due to imagines emerging in the winter months and the whole strain may be lost. I would advise every breeder always to get an F₂ generation to see what this reveals. It is very wasteful of time only to breed one generation.

(a) *The horticultural problem*

Let us begin by considering the foodplant — no food, no butterflies! I try to pot up the foodplant well in advance, preferably in February or March. Some foodplants such as honeysuckle simply will not move in the summer months.

It is not easy to keep the plants healthy when there is fine netting over the plant as this reduces the enlivening movement of air. If the plant leaves are kept too dry, aphids will be a serious menace. I find it, therefore, useful to spray the leaves regularly. If the plant is too damp in the winter, mould is likely to grow. This especially applies to *Poa annua*, a plant also very susceptible to aphids, so, if you are breeding the 'grass feeders' I would strongly recommend the use of a grass less liable to mould, such as the creeping lawn grass (*Agrostis* species). Another horticultural problem occurs with *Hippocrepis comosa*, which is sometimes attacked by 'powdery mildew' in mid-summer. This is disastrous as the only treatment is a poisonous spray. I think this disease is again encouraged by keeping the leaves too dry.

(b) *Humidity*

Keeping the correct degree of humidity is indeed the key to success in the overwintering of larvae. After thirty years I still feel I do not know enough about this. I keep a light roof, covered with transparent plastic, over the pots containing the hibernating larvae. This frame used to have sides partially covered with plastic sheet, but I have now changed to completely open sides — open, that is to say, apart from fishing net provided to keep out cats and squirrels! The intent is to keep the larvae fully exposed to natural weather conditions, while not allowing rain to fall directly on the pots. Some entomologists are brave enough to leave their pots completely exposed to every rainstorm and they have considerable success. One must not think in anthropomorphic terms and it is better for the larvae to be too wet than too dry. In early years I lost a whole brood of *Boloria euphrosyne* (L.) as the little larvae desiccated. Humidity is not only important for larvae: those species which pupate just below the earth's surface, such as *Hipparchia semele* (Hübner), also need the soil to be kept moist if losses are to be avoided. I also spray my over-wintering eggs once a week.

(c) *Predators*

However, it is not sufficient to have the correct environmental conditions, for constantly waiting for their opportunity are the predators. The most devastating are the pale coloured carnivorous slugs, spiders and earwigs (Dermaptera). I keep all my pots on trestle tables to keep them further away from pests, but, alas, the slugs are introduced with the soil when the foodplant is dug up and slugs lay 300-500 eggs in batches under stones, in moss, etc. It is important therefore to put slug pellets around the edge of the pot. I am not aware that these do any damage to the larvae but, to be on the safe side, I place them as far from the plant as possible.

As for spiders, I must be one of the finest spider breeders in the country! They also come in with the foodplant. I immerse the plants in water at the time of planting to drive the spiders out, but this seems a totally inadequate precaution. Regular inspection seems the only answer. The same applies to earwigs.

3. Keeping records

I always keep very detailed records. These fall into two categories — an analysis of the forms of the imagines for genetical purposes and details of every event in the insect's life history. It is interesting to note, for example, that *Aphantopus hyperantus* (L.) usually emerge between 7.00 and 8.00 a.m., whereas *Lysandra coridon* (Poda) emerge between 10.30 and 11.30 a.m. Exact sizes of hibernating larvae will be useful in future breeding and so on.

4. The Genetics of Aberrations

Few things in Nature are entirely clear-cut — Nature is four-dimensional. Thus it is difficult to give a clear demarcation line between an aberration, a variety or an example of polymorphism. However, each of these deviations from the normal form have one thing in common — they are genetically produced. (I am excluding here those forms produced by drastic temperature change.) For breeding purposes, it is useful to consider the varying forms of butterflies under five categories: —

- (a) The distinct and definitive aberration — e.g. ab. *syngrapha* Kef. of *L. coridon*. This aberration is quite clear-cut; the butterfly is either ab. *syngrapha* or it is not. There are no grades.
- (b) Aberrations which graduate from one form to another, e.g. ab. *lanceolata* Shipp of *A. hyperantus* — in which there is every gradation from the slightly elongated dot to the extreme form with bold streaks across the wing.
- (c) Inconstant characters found in various populations which are due to genes regularly present in the gene pool, e.g. the variation in the extent of blue colour in female *Polyommatus icarus* Rottemburg.
- (d) Dimorphic species such as *Argynnis paphia* (L.) which has the two forms of the female — the typical and var. *valesina* Esp., or *Coleas crocea* Fourcroy which has the var. *helice* Hübn. form of the female.
- (e) Distinct local races such as the very striking form of *Maniola jurtina* (L.) found on the Isles of Scilly.

In addition to these five categories, mention should be made of those aberrations produced by drastic temperature change. Particularly striking forms have been produced artificially in this way with some of the *Nymphalidae*, especially *Aglais urticae* (L.) and *Polygonia c-album* (L.), in which the pattern is suffused and there is a considerable increase in the black areas. Some suffusion of the black markings in *Argynnis paphia* and the white markings in *Vanessa atalanta* have also been thus artificially induced. I have not tried this technique myself, but I understand that the pupa is put 5-6 hours after pupation in a refrigerator at a temperature of approximately 25°F. for between 6 and 12 hours. It is not certain whether temperature alone creates these aberrations or whether certain abnormal genes also have to be present.

I will now turn from a general study of the breeding of butterfly aberrations to the consideration of individual species, illustrating the argument with slides.

Every aberration which I am showing was either bred or caught by myself. I would like to express my gratitude to R. Revels for taking the photographs for me.

I will consider a number of species selected for their particular interest in variation in the order which proceeds from the most specialised to the

most primitive, starting with the *Satyridae*. The names used are those given in the new edition of Kloet (G. S.) and Hincks (W. D.) 'A Check List of British Insects' (1972).

Lasiommata megera (L.)

This species is subject to great enlargement of the 'eye' spot ab. *anticrassipuncta* Lempke. To my shame, I killed the fine female which I took at Beer, Devon in 1964. In the light of my experience in breeding other *Satyridae*, I think that it is likely that this form is caused by a single gene with modifying resistance from other genes and is therefore likely to breed with a gradation in the size of 'eye' spot.

Erebia aethiops (Esper). Bred female. Ova 13.8.62, imago 17.7.63

This specimen has unusually large spots and brilliant markings. There are two distinct colour forms of the female underside hindwings: —
(a) Ochre banded — which seems to constitute the form *ochracea* Tutt.
(b) Silver banded — as specimen taken at Morar, 12.8.61.

Further work is required to find out the relationship of the two colour bands.

Incidentally, there is no need to find Blue Moor Grass (*Molinia coerulea*) on which to feed the larvae, which feed happily on *Poa annua*.

This seems to be one of the few butterflies that needs neither foodplant nor sunshine to encourage it to lay eggs. On 12th August 1962, four females were brought by car from Aviemore. On arrival in Surrey it was found that 75 eggs had been laid in the tins during the journey.

Melanargia galathea (L.)

In July 1974, I was generously given by Robert Craske six living imagines (four male and two female) of an aberration which consists of a considerable enlargement of the forewing costal blotch. This new and very local aberration has been found since 1970 in two restricted localities in Sussex. I have been breeding it since 1974 in small numbers; unfortunately overwintering the larvae is not easy. They remain very small low down in the dead brown grass (in the winter they never sit on green blades), at almost soil level — perfect prey for slugs. By April (after eight months), they are still less than $\frac{1}{4}$ in. long! The aberration is quite distinct from ab. *valentini* H.B.W., another aberration involving enlarged black markings. As the aberration occurs in the F.1 generation in approximately equal numbers, it would appear to be a dominant gene. Pairing two aberrations produces some examples which are blacker than the others, but it would require a great deal of breeding to prove that these were the homozygotes, although this would seem likely. I propose to name this aberration ab. *craskei* (see Appendix).

Three examples were shown: —

Male aberration bred 30.6.76, F1 of male ab. x female ab.

Female aberration bred 6.7.76, F1 of male ab. x female ab.

Female aberration with pale russet tinting to hind wings, bred 27.7.75, F1 of wild caught female ab.

Hipparchia semele (L.) ab. *holanops* Brouwer

This aberration, which has a total absence of eye spots, occurs in the same quarry in Dorset nearly every year. In August 1976, R. Revels sent me some eggs which had been laid on the netting. No grass had been put in with the female as it had been found the previous year that this was not necessary. These eggs were an F2 generation from an ab. *holanops* taken in 1975. The larvae feed high up on the grass, coming up in the

summer in late evening as it is getting dark. This aberration is a simple recessive, not occurring till the second generation and even then below the numbers to be expected, so the gene may have a slightly debilitating effect. I only obtained one *holanops* out of thirteen bred.

A sister of the ab. *holanops* was also shown with striking bands in the hind wing.

Pyronia tithonus (L.) ab. *excessa* Tutt

This aberration breeds out so uncertainly that I feel that more than one gene is involved, or perhaps it would be better expressed as one gene with modifiers. It is clearly not recessive as specimens with additional spots occur in the F1 generation almost in equal numbers to the typical form (R. Revels, *Ent. Record*, Vol. 89, p. 43). Out of ten specimens in an F2 generation bred in 1976, in which both the parents had additional spots, I was disappointed to find that none had heavily marked additional spots, only one specimen had two extra spots and four had one extra spot.

Some localities have quite a high proportion of ab *excessa*, such a place being North Hill, Minehead, in 1952. Sometimes the extra spots occur on one forewing only.

Examples shown: —

Female ab. *excessa* taken at Slapton, Devon, 30.7.70.

Male ab. *excessa* with additional spots on right wing only. Taken Somerset, 20.7.52.

Female aberration, completely asymmetrical, both in size of wing and effect of fulvous colouring. Minehead, 18.7.52.

Male ab. *excessa*, underside. Slapton, 20.7.70.

I am now going to consider briefly the extreme racial forms of two satyrid species — *Maniola jurtina* (L.) and *Coenonympha tullia* (Müller) — which illustrate well the build-up of special genes where races are geographically separated.

Maniola jurtina (L.)

On the Atlantic coast from Scotland to Spain several fine local races have evolved.

I show first a male and a female taken in 1963 at Clifden, Connemara. *M. jurtina* in this district is larger and more strongly marked than the typical subspecies *iernes* Graves, originally described from specimens from Kerry. The two shown are remarkable for the size of their 'eye' spots, being good examples of ab. *anticrassipuncta* Leeds. It is indeed rare for a male to have such enlarged spots. Selective breeding from such specimens would not only reveal the genetics of these large spots but would no doubt produce some very striking specimens.

Females with very large 'eye' spots also occur on the Isles of Scilly, in the local race *cassiteridum* Graves. But it is the undersides of females from Scilly which are so magnificent — almost like a different butterfly. The males have far larger fulvous patches on the upperside. The fact that the Scillonian Meadow Browns have been totally isolated for many thousands of years has made this specialisation possible.

Coenonympha tullia (Müller)

The geographical races are familiar, the two extreme forms being the sub-species *scotica* Staudinger found in Scotland and the sub-species *philoxenus* Esper in Whixall Moss, Shropshire: the former being pale with reduced spots and the latter dark on the upperside and heavily spotted on the underside. In Scotland there occur specimens without any spots at

all. In Whixall Moss (and also Meathop Moss) aberrations occur with large elongated spots, this probably being caused by a recessive gene as in the case of ab. *lanceolata* in *Aphantopus hyperantus* (L.).

Aphantopus hyperantus (L.)

In recent years there has been considerable research into the genetics of aberrations of this species.

ab. *arete* Müller, New Forest, 18.7.65

Only small white dots remain on the underside of the wings. Almost certainly the same gene is responsible as in ab. *obsoleta* Tutt, in which there is not a trace of any spots, and ab. *caeca* Fuchs, which is intermediate between the two. It would appear to be another case of a recessive gene with modifying resistance from other genes—in this relationship I do not like to use the description 'multi-factorial' as this gives the wrong impression.

The best visual description which I can give of a recessive gene in these circumstances is as follows: Imagine the splash caused by a stone being dropped from a given height in a bucket full of liquid; the stone is the recessive gene, the extent of the splash is the extent of the aberration. Now the nature of the splash will be affected by the type of liquid in the bucket, e.g. petrol, water or oil, and also the shape of the bucket. You could say, therefore, that the nature of the splash is conditioned by three factors—the stone, the liquid and the bucket. But the liquid and the bucket cannot create a splash on their own, only the stone (in our simile—the recessive gene) can *cause* the splash.

Major A. E. Collier, who was one of the important pioneers in the breeding of aberrations, crossed ab. *caeca* with ab. *lanceolata* in 1964. The F1 generation specimens were typical but there was a wide range of aberrations in the F2 generation exhibited at our Exhibition in 1966. It included specimens with nothing but elongated white dots. Collier pointed out that ab. *caeca* is rarer in the female than the male.

ab. *lanceolata* Shipp

The genetics are similar to the previous aberration. Once again there is a very wide range in the extent of influence of the recessive gene, the elongation of the spot varying greatly. I have bred this aberration for four generations. Another form occurs with elongated spots, which is not ab. *lanceolata* and has a rather pale background. I took a female in the New Forest and, in an F1 generation of 31 specimens, six were similar to the parent.

I took a mixed gynandromorph at Lyndhurst in 1962, primarily male but in which on the underside streaks of the paler ground colour of the female occur.

When breeding *A. hyperantus*, the females must be provided with shade if they are to lay eggs. They hate high temperatures and fierce sunlight and if exposed to it soon die. The dark colouring means they absorb heat rapidly. In the heatwave of 1976, with temperatures day after day in the nineties, it was nearly impossible to keep them alive.

The breeding requirements of the members of the next family, the *Nymphalidae*, are very different from those of the species we have just been considering. Let us first consider the small fritillaries.

Boloria euphrosyne (L.)

On 29th May 1966, I put a female on a pot of violets over which there was netting supported on stout galvanised wire.

Within five days 150 eggs had been laid on the galvanised wire, a few on the netting and only three on the violets. By 20th July, a total of 153 larvae, now in their third instar, had stopped feeding, and were taking up their winter resting place beneath the dried leaves. It is not possible now to give a detailed report, suffice it to say that only one larva survived the winter to produce an imago. I am convinced that this was because the larvae were kept too dry, and I would recommend spraying at least once a week.

Two male aberrations were shown: ab. *pallida* Spuler, which has an almost white background, and ab. *albinea* Lamb, with pale yellow background. These were both taken in the same wood, within a few days of each other, which would suggest that the same gene, probably a recessive, is responsible.

We now come to best known British example of dimorphism—the two forms of the female of *Argynnis paphia* (L.)—the normal form and var. *valesina* Esper. The latter is a sex controlled dominant, the gene being carried equally by the male and the female, but having visual effect only in the female. I started breeding from var. *valesina* in 1964 when I obtained 250 eggs from three females. Do not use a large cheese tub with netting over it as sometimes recommended; this gets much too hot and there is a lack of ventilation. Make a netting cage about 3 ft. high and at least 18 in. in diameter, and provide ample fresh flowers, including thistle. Nearly all the eggs are laid on the netting. They can easily be lost as they fall off if the netting is knocked. In 1965, sixty-eight imagines were bred, including twenty-four var. *valesina*, in which there was considerable variation in ground colour. This varied from a very deep sea-green in the dark specimens, to a creamy colour in the lightest examples. I tried an F2 generation, but fertility of this inbred generation was apparently low as only 18 larvae emerged from 176 eggs. The slide shows a specimen of the F2 generation which again has a pale background.

Interested in this and finding a female in the New Forest in 1965 with almost white background, I tried breeding from this. Unfortunately I only succeeded in obtaining one var. *valesina* in this brood the next year, and this was unusually dark, so I failed in my intention. I now show a chart illustrating the relative emergence dates of typical males, typical females and var. *valesina*.

The next slide was of an underside aberration of *Mellicta athalia* Rottemburg, bred in 1949 when I bred 31 imagines from a single captured female. All the larvae, which were fed on Narrow-leaved Plantain (*Plantago lanceolata*), were hibernating by 25th September. On 13th February 1950, I brought the hibernaculum indoors, and all the larvae left the hibernaculum on 16th February.

Nymphalis polychloros (L.) usually shows little variation. There was a quite exceptional immigration of this butterfly in the spring of 1948, and it was common around Tunbridge Wells. On 12th March I saw as many as four specimens in one suburban road. Six weeks later I caged a female for egg-laying and she obliged with one batch of 110 eggs and one of 59 eggs, and from these I obtained 128 pupae. The only variation in the imagines was some extra black scaling on a few specimens. Although a number of the adults were released, not one was seen in the area of Tunbridge Wells the following year.

The next butterfly I would like to consider is *Polygonia c-album* (L.). This butterfly appears in two different forms—the typical form and f.

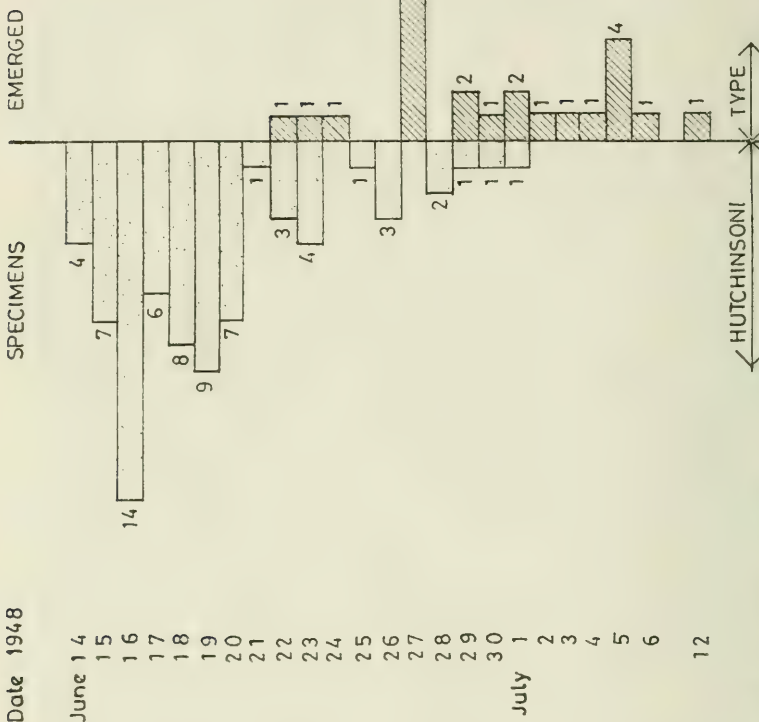
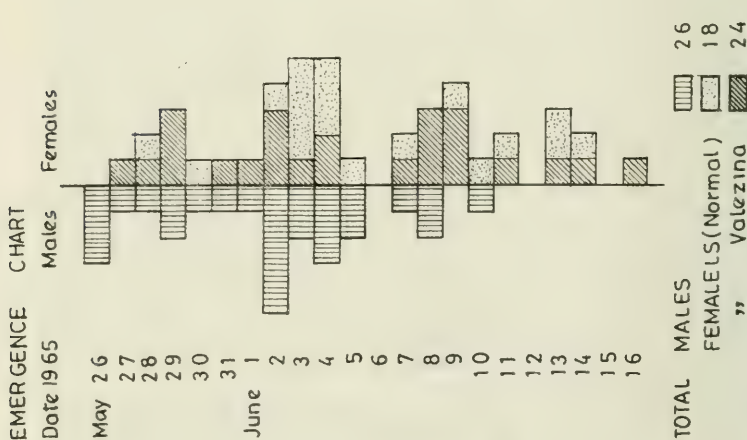


Fig. 2. *Polygonia c-album* (L.): relationship of emergence of the typical form and *hutchinsoni* form in the summer brood. Note that there are more *hutchinsoni* and that they emerge earlier.



TOTAL MALES 26
 FEMALE(S)(Normal) 18
 " Valesina 24

Fig. 1. *Argynnis paphia* (L.): relationship of emergence of males, normal females and var. *valesina* Esper.

hutchinsoni Robs. — and a slide was shown illustrating the differences. There is a lot of confused thinking about the relationship of these forms even in the most recent textbooks, so I bred large numbers to illustrate the relationship of the two forms. The hibernating imagines are of the typical form; these lay eggs and produce a summer brood, the majority of this brood are f. *hutchinsoni*, these emerging first, and some are of the typical form. The relative numbers and the date of emergence can be clearly seen in the emergence chart.

The f. *hutchinsoni* immediately pair and lay eggs and these produce the typical form seen on the wing in the autumn before hibernating. Those specimens of the typical form which emerge in the summer brood soon go into hibernation. Thus in the following spring there are both first generation and second generation butterflies from the previous spring's specimens.

Ladoga camilla (L.) is subject to varying degrees of obliteration of the white transverse bars by the black ground colour; specimens with partial obliteration have been named ab. *obliterae* Robson and Gardner and those with completely black uppersides are referred to as ab. *nigrina* Weymer. This is very artificial as there is every gradation of suffusion of the bar from slight black scaling to total blackness. It is very probable that the same recessive gene is responsible for all these aberrations, its effect being modified by other genes present — very much as in the case of ab. *lanceolata* in *A. hyperantus*.

In July this year I took a female ab. *nigrina* in a wood near Winchester. Two weeks after taking this aberration, I collected 20 eggs from honey-suckle within a few yards of where it was found and I now have 18 hibernating larvae. Attempts will be made to get several pairings and breed a second generation.

We now come to that family which provides such wide scope for genetic research — the *Lycaenidae*.

With regard to *Polyommatus icarus*, I have already referred to the wide variation in the colour of the female uppersides, from brown to almost pure silvery blue, as in the specimen illustrated taken on Tresco, Isles of Scilly, which resembles ab. *caerulea* Fuchs. Many females are of this colour in the local race found on these islands.

The genetics of the confluence or radiation of the spots on the underside is still very uncertain. Breeding from a female ab. *arcuata* Weym., taken on Tresco in May 1953, the autumn F1 generation consisted of 23 males all of which were normal, except two male *basijuncta* Tutt, and 20 females of which 14 were either *arcuata*, *costajuncta* or *basijuncta*, either separately or in combination. A smaller F2 generation produced rather similar results. Note the much greater susceptibility of the female to aberration compared with the male (see R. A. Fisher and E. B. Ford, 'The variability of species in the Lepidoptera, with reference to abundance and sex'. *Trans. Ent. Soc. Lond.*, 1928, p. 367 — a paper emphasising the greater variability of the female sex). It would appear, too, that the different confluent forms are not genetically separate, and that any genes governing this type of aberration are responsible merely for the tendency for confluence. L. D. Young breeding in 1977 from a female *Plebejus argus* (L.) ab. *basijuncta* Tutt obtained an F1 generation of five typical and one *basijuncta*.

Lysandra coridon (Poda) is a butterfly which I have bred extensively. In 1967 my wife caught an ab. *synggrapha* Keferst., and I have kept the stock

going ever since, that is for ten generations. This aberration is a sex-linked recessive, the *syngrapha* gene being attached to the x-chromosome in the female. Thus in the first generation all the males are heterozygotes and carry the *syngrapha* gene, while none of the first generation females carry the gene at all. In the F2 generation half the females are ab. *syngrapha*. In 1970, in the F3 generation, I bred an ab. *syngrapha* which was a somatic mosaic incorporating streaks of the normal brown female colour. There is some variation in the ground colour of this aberration and in 1974 I bred a *syngrapha/viridescens* Tutt with continuous dark fringes.

In ab. *fowleri* South the borders are white instead of black, the white band being intersected by black nervules. This aberration would appear to be the result of a simple recessive gene, which receives modifying resistance from other genes, so that there is every gradation from ab. *ultra-fowleri* B. & L. to ab. *punctata* Tutt.

In July 1971 I took a male ab. *infra-fowleri* in Dorset and paired it with a bred female ab. *syngrapha*. Three years later I bred from this stock two females which combined in themselves both ab. *syngrapha* and ab. *fowleri*.

In October 1972 R. Revels kindly gave me 105 eggs, being the F2 generation from an ab. *semi-syngrapha* Tutt, taken at Royston in 1971. I kept this stock going until last year. Ab. *semi-syngrapha* is, like ab. *syngrapha*, a sex-linked recessive. There is, of course, no relation between them. Again the ab. *fowleri* gene was introduced and I bred four abs. *semi-syngrapha* + *fowleri*. I am showing a slide of *L. coridon* ab. *marginata* Tutt, this being one of an F2 generation from a male ab. *marginata* taken in 1971 paired with a typical female. In this aberration the black outer border of the forewings extends over the blue as far as the discoidal cell. I bred this strain for three generations but found that you had to select very good males to get results. It would suggest that this is, therefore, a very genuine case of a multi-factorial aberration. When breeding the ab. *marginata*, an interesting form with dark nervules appeared.

In *Lysandra bellargus* (Rottemburg), the extent of blue scaling in the female varies greatly, the extreme blue form being known as ab. *ceronus* Esper. I have bred a number with considerable blue suffusion and so has L. D. Young, and for both of us the bluest females occurred in the spring brood. It may be that the blue is the product of a gene whose influence is modified by environmental conditions. More breeding is required.

Lycaena phlaeas (L.) is subject to two major aberrational forms — one in which the orange sub-marginal band in the hindwings is totally absent (ab. *obsoleta* Tutt) or reduced to a series of small streaks (ab. *radiata* Tutt) and one in which the ground colour is silvery white (ab. *alba* Tutt). L. D. Young who did very valuable work in a breeding programme between 1963 and 1965 in which he obtained continuous broods without diapause by the use of continuous fluorescent lighting at close range, showed that ab. *obsoleta* and ab. *radiata* are produced by the same recessive gene, the former merely being the more extreme expression. Ab. *alba* has been bred by Dr. J. W. O. Holmes who has shown that both this and the pale cream coloured ab. *schmidtii* (Gerh.) are controlled by recessive genes, although the exact relationship between the two seems still uncertain.

We now come to the *Pieridae*. From 1950 onwards a laboratory culture of *Pieris brassicae* (L.) was maintained by B. O. C. Gardiner, assisted by C. F. Rivers, at the Unit of Insect Physiology, Department of Zoology, Cambridge, the original stock having been collected in the Cambridge area.

After more than ten years of inbreeding, two aberrations appeared in this stock, each caused by a gene, later proved to be a simple recessive: an albino form named ab. *albinensis* Gardiner (1962) and a form with a blue tint to the hindwings named ab. *coerulea* Gardiner (1963). In May 1967, I was kindly given a batch of eggs of a pure strain of ab. *coerulea* and obtained 125 pupae, and also eggs of a strain of the double aberration *coerulea* + *albinensis* and obtained 115 pupae. Although I bred a number of perfect females of each type, the strain suffered from a serious scale defect, which was more serious in the males than in the females and almost all the males were unable to extricate themselves from the pupa-case. The very few males which did manage to do so, all showed large areas of scale defect, the scales having stuck to the inner surface of the case. It is extremely interesting that the aberrations occurred after so long a period of in-breeding and it would appear that they are classical examples of the mutation of genes.

In those years when *Colias crocea* Fourcroy appears in good numbers in this country (and many of us will remember 1947 when it was very abundant) quite a number of the pale form of the female (var. *helice* Hübn.) is seen. The gene is a sex-controlled dominant affecting the colouring of the female only, the male heterozygotes being normal in appearance. I have also bred a very much less common form in which the colour is intermediate between the rich orange of the normal form and the milky white of the var. *helice*, but I only obtained two in a brood of four. If a wild-caught female is on migration and has only recently arrived, it can be very difficult to get her to settle down and lay eggs. I do not know the genetics of this intermediate colour form.

In the last family, the *Hesperiidae*, occasional aberrations occur in some of the species, e.g. the ground colour of *Thymelicus sylvestris* Poda may be white (ab. *pallida* Tutt) instead of the usual copper-brown colour, but the most striking is that form of *Pyrgus malvae* (L.) in which the white spots of the forewing join together and form a large white blotch, known as ab. *taras* Bergsträsser. The example shown was taken in a wood in Sussex where this aberration quite frequently occurs—I have seen eight on one day. The extent of confluence of the white markings graduates from just two spots being joined together on the costal margin to specimens in which most of the centre portion of the wing is white. I have bred moderate examples of this aberration, but to achieve striking results I think that it would be necessary to do selective breeding.

I have now given you a brief glimpse of thirty years' work in sixty minutes. With only two minutes per year it has not been possible to give much detail and the review has had to be cursory, but I hope that I have given you the urge to breed from the next aberration you see instead of killing it and that you will then come back and tell us what you have found out.

APPENDIX

A new aberration of *Melanargia galathea* (L.) (Lep.: Satyridae)

from Sussex

by R. S. TUBBS, O.B.E., F.R.E.S.

ab. *craskei* ab. nov.

Since 1970 Mr. R. M. Craske has observed annually in two restricted localities, one in Sussex and one in Hampshire (now alas ploughed up), a

new form of *M. galathea*. He informs me that the ratio of the aberrant form to typical varies from 1 in 20 to 1 in 50. Mr. Craske has given a series of 27 specimens of this new aberration to the British Museum. It should be pointed out that this aberration is quite different from *ab. valentini* H. B. Williams, which was described in the *Entomologist's Gazette*, Vol. 2, No. 4.

In July 1974, Mr. Craske kindly gave me two living female aberrations and these produced a total of 180 eggs, 30 of which were given to Mr. R. Revels. These eggs produced only a few specimens the following year, but the aberration occurred in this first generation for both of us. Since then the stock has been kept continuously breeding. It would appear that this aberration is produced by a dominant gene. Indeed this year (1978) one brood of eleven specimens bred by Mr. Revels from a male aberration out-crossed with a wild fresh female consisted entirely of this aberrational form. This suggests that the male may have been homozygous for this aberration.

Description

On the upperside and the underside of the forewings of both sexes the central costal blotch is extended outwards along the costa and firmly joins the sub-apical bar. This blotch is also extended outwards distally to become confluent with the marginal markings.

The aberration is slightly variable in the extent to which the white area between the central costal blotch and the sub-apical bar is obliterated. In some examples this is almost total.

On the hindwings of both sexes (upper and under) the central band is broader than in typical *galathea*, in some cases markedly so.

Holotype ♂: Sussex, 21.7.73. (Figured bottom left-hand specimen on Plate VI.)

Paratypes:

17 ♂ and 4 ♀. Sussex, 1972-1977.

3 ♂ and 2 ♀. Hampshire, 1972-1975.

All the above were taken by R. M. Craske and are in the National Collection.

I have pleasure in naming this very distinct and constantly recurring aberration after Mr. R. M. Craske, who first discovered it.

NOTES ON THE LARGE TORTOISESHELL BUTTERFLY (*NYMPHALIS POLYCHLOROS* (L.)) OVERWINTERING IN CAPTIVITY IN ENGLAND

by HOWARD PHELPS

(Green Oak, Potter's Hill, Crockerton, Warminster, Wilts., BA12 8AD)

and E. P. WILTSHIRE

(Wychwood, High Road, Cookham Rise, Berks., SL6 9JS)

(*At the request of H.P., these lines are written by E.P.W., though all the credit goes to H.P. for obtaining the original larvae and resulting adults, for the successful overwintering of the latter and for obtaining pairing and a further batch of larvae, some of which E.P.W. reared to the butterfly stage.*)

Late in May 1977, larvae of *Nymphalis polychloros* (L.) were found on elm in Central Spain; they were then in their final instar. They duly pupated and imagines emerged in England about the middle of June. A few of these were kept for possible hibernation and were confined in a large half-barrel with netting over the top, and fed on a solution of sugar and honey. They showed no signs of pairing and stopped feeding in July.

Until then the barrel had been kept in a fairly sunny position out of doors, but thereafter H.P. kept it in a shed.

Having read E.P.W.'s notes (1967 and 1977), H.P. wrote to him on 5th September saying that as he gathered from these that there might be a reappearance on the wing in late summer, he wondered whether to encourage this by bringing them out again. They were keeping together 'in a tight huddle' at the time of writing, although occasionally one or two woke up and wandered round the barrel.

E.P.W. in his reply stated that he himself had twice taken the butterfly on the wing in late summer on the East Coast (September 1923 and August 1928) but these individuals were probably immigrants. He also mentioned having seen the butterfly after hibernation on 30.iii.1942 in Mazanderan, N. Iran; 9.iv.64, near Geneva, Switzerland; 18.iii.72, during an early heat-wave, in N. France; also in the same district on 7.v.72 and 30.iii.74; of midsummer individuals he had seen one, on 26.vi.70 in the East Pyrenees; and he had bred some others from caterpillars in Switzerland. He quoted a passage from Verity 1950: 352, not quoted in his 1967 notes: 'There are plenty of records from Central Europe of its appearance in mid-autumn and winter on sunny days, but irregularly; however, . . . during 50 years of observations he (Verity) had never seen it in Tuscany between August and March.' From which it appeared that Verity thought the aestivation of the butterfly would continue without interruption into hibernation; this might be the case, too, with Spanish *polychloros*, if the behaviour was not merely a reaction to local conditions. E.P.W. therefore recommended H.P. to keep the butterflies in natural conditions at Warminster. He presumed no pairing would take place until the next spring.

The barrel, with the butterflies inside, remained in the large airy shed for autumn and winter. At the end of February some of the butterflies were moving, so H.P. transferred the barrel to a greenhouse, where almost immediately they began to feed and bask in the sun. On the 2nd of March a pairing was observed (late afternoon) and the pair remained *in cop.* until the following morning. The ♀ was put on a small potted willow in the greenhouse and eggs were laid in a large batch around a twig on 25th March. The twig, with eggs attached, was removed from the bush and put in a small plastic box, where the larvae hatched in about three weeks and were fed on cut elm, pupating at the end of May.

E.P.W.'s batch of larvae gave no trouble feeding up on elm and pupated on 31st May, with one exception which lagged behind about a week. They emerged on June 10th (1), 11th (2) and 12th (5); the laggard duly appeared on June 19th. All were beautiful specimens.

The rearing thus confirmed the long imaginal life and vernal pairing habit of the Large Tortoiseshell. It would, however, be interesting to know whether immigrants to England leave Europe before or after aestivation; perhaps aestivation and emigration are alternatives in the life-cycle, and one or the other is taken probably depending on local conditions at the breeding place. A case of immigration after hibernation is reported in the Presidential Address in this number. There is very little evidence of migration in the southern part of its range, and I know of no reliable evidence of a second generation there, still less of such a thing in Northern Europe.

REFERENCES

- Verity, R. 1950. *Le Farfalle d'Italia*, 4.
 Wiltshire, E. P. 1967. *Ent. Rec.*, **79**: 243-5.
 Wiltshire, E. P. 1977. *Ent. Rec.*, **89**: 151.

PHORESY AND COMMENSALISM IN BRITISH PSEUDOSCORPIONS

by PHILIP E. JONES

(Natural Environment Research Council, Institute of Terrestrial Ecology,
Monks Wood Experimental Station, Abbots Ripton, Huntingdon)

Introduction

Phoresy has long been known to occur in pseudoscorpions and has been reported from various parts of the world besides Great Britain, including a large part of Europe, America, Africa and Australia. Pseudoscorpions have been found clinging (by one or both of their palpal chelae) to the legs of insects, especially Diptera, Hymenoptera and Coleoptera, and also harvestmen (Opiliones). They have also been recorded on the bodies of birds and small mammals. In Britain, most observations have been of them clinging to the legs of insects or harvestmen.

The attachment of pseudoscorpions to other, larger animals was first described by an Austrian, Poda, in 1761: 'Repertus in pedibus muscae, quos chelis suis firmissime apprehendit'. The first reference to its occurrence in Britain was made in 1787 by George Adams who recorded that the eminent coleopterist Marsham found one of these 'lobster insects' 'firmly fixed by its claws to the thighs of a large fly, which he caught on a flower in Essex the first week in August, and from which he could not disengage it without great difficulty, and tearing off the fly's leg'. The term phoresy was first used by Lesne in 1896. Since it was first described, phoresy by pseudoscorpions has been the subject of numerous notes and papers, especially extensive reviews in Britain by Kew (1901) and, abroad, by Vachon (1940) and Beier (1948).

This paper collates both published and unpublished references to phoretic behaviour in British pseudoscorpions. The records date from 1950, except where no records since then were available or where the use of older records contributed additional important information. (The administrative counties referred to are those in existence prior to the Local Government Act 1972.) Records of species from the nests of social insects, birds and small mammals are also included in this paper and are treated under commensalism. The data will be reviewed to determine the light they throw firstly on current views on phoresy and secondly on the nature of relationships with other animals.

I am indebted to the various museums and individuals who have sent me records or preserved specimens for identification and they are duly acknowledge after the appropriate record(s).

Records of Phoresy

Species found attached to the legs of insects:

Chelifer cancrivorus (L.). Two attached to legs of *Musca domestica* L. (Dipt.: Muscidae), Rathmines, Co. Dublin, October 1908 (N. E. Stephens).

Lamprochernes godfreyi (Kew). 1 ♀ on *Lonchaea* sp. (Dipt.: Lonchaeidae), Wytham Wood, Berks., July 1964 (Wytham Ecological Survey); one attached to leg of *Stomoxys calcitrans* (L.) (Dipt.: Muscidae), Bessacarr, Yorks., September 1970 (C. A. Howes).

Lamprochernes nodosus (Schrank). Numerous records of this species being found on the legs of flies have been received. Therefore, only a small selection of the records appear below.

One on *Eristalis arbustorum* L. ♀ (Dipt.: Syrphidae), Maidenhead, Berks., July 1950 (B.M. (N.H.)); one on lesser house-fly, *Fannia canicularis* (L.) (Dipt.: Fanniidae), London, August 1934 (B.M. (N.H.)); one on leg

of *Sargus iridatus* (Scop.) (Dipt.: Stratiomyidae), Berkhamsted, Herts., August 1937 (C. Oldham); one attached to *Musca (Eumusca) autumnalis* Deg. (Dipt.: Muscidae), St. Leonard's, Sussex, September 1906 (W. R. Butterfield); one on leg of *Musca domestica* L., Blewbury, Berks., October 1965 (Reading Museum); 1 ♀ attached to *Lonchaea chorea* (F.) (Dipt.: Lonchaeidae), Monks Wood Experimental Station, Hunts., August 1963 (E. Duffey); 1 ♂ on fly in laboratory, Haughley, Suffolk, August 1970 (P. T. Harding); 2 ♂, 1 ♀ on fly, *Lonchaea* sp., on window pane of house, Bramley, Hants., August 1975 (R. Cheke).

Lamprochernes chyzeri (Tömösvary). On *Lonchaea chorea* (F.), British Museum, Entomology Department, 1953 (B.M. (N.H.)); on fly, Romsey, Hants., 1963 (B.M. (N.H.)).

Pselaphochernes scorpioides (Hermann). Attached to leg of *Musca domestica*, Blackheath, London, October 1957 (B.M. (N.H.)); 8 ♀ attached to *Limonia (Achyrolimonia) decemmaculata* (Loew) (Dipt.: Tipulidae), New Forest, Hants., May 1970 (A. E. Cooper).

Chernes cimicoides (F.). On leg of *Ephialtes mesocentrus* G. ♀ (Hym.: Ichneumonidae) on dead tree stump, Epping Forest, Essex, June 1953 (B.M. (N.H.)).

Dendrochernes cyrneus L. Koch. Attached to leg of *Phymatodes testaceus* (L.) (Col.: Cerambycidae), Richmond Park, Surrey, June 1914 (H. W. Kew).

The occurrence of pseudoscorpions attached to the legs of insects seems to be confined to the family Chernetidae in the British Isles. This is probably related to the fact that many insects, especially flies, occupy similar habitats to the Chernetidae and also have a similar period of greatest activity (May-September, occasionally October). Members of the Chernetidae are mostly found in grain/straw residues, vegetable detritus and compost and manure heaps (although there are occasionally records of specimens from woodland leaf litter and from under the bark of trees). *L. nodosus* is by far the commonest species of this family demonstrating phoretic behaviour. It occurs frequently in compost and manure heaps. The common house-fly, *Musca domestica*, is a regular visitor to such heaps during the summer months. The female selects decomposing organic matter as a breeding ground and thus it is possible that an adult *L. nodosus* will come into contact with a female house-fly when she settles to lay her eggs (Jones 1970). It is interesting to note that three of the specimens of *L. nodosus* recorded above are phoretic males. Although this is a very small number compared with the total number of phoretic individuals on record, it is significant in view of the fact that both Vachon (1947) and Beier (1967) assert that it is only usually gravid females which are phoretic (see Discussion below). Like *L. nodosus*, *P. scorpioides* is frequently found in heaps of vegetable refuse and could come into contact with flies in exactly the same way.

C. cimicoides and *D. cyrneus* are typically found under the bark of decaying trees. *C. cimicoides* could have attached itself to the ichneumon if the latter had alighted on the dead tree stump during its search for a suitable host to parasitize. The Cerambycidae are wood-feeding insects and therefore *D. cyrneus* might be expected to come into contact with members of this family fairly frequently.

Species found attached to the bodies of arthropods other than insects:

Lamprochernes nodosus. Attached to *Opilio parietinus* (Deg.) (Opil.: Phalangidae), Wye, Kent, 1944 (J. Sankey); attached to *Phalangium opilio*

L., Wye, Kent, 1944/45 (J. Sankey); attached to *Mitopus morio* (F.), Wye, Kent, 1946 (J. Sankey); two nymphs attached to *Nelima sylvatica* (Simon), Dale, Pems., 1948 (J. Sankey); attached to *P. opilio*, East Bergholt, Suffolk, 1948 (J. Sankey).

Allochernes dubius. One adult attached to leg of *Mitopus morio*, in leaf litter, Wytham Wood, Berks., September 1953 (Wytham Ecological Survey); 2 ♀ attached to legs of *Oligolophus meadii* Cambridge, in a garden, Esher, Surrey, September 1954 (J. Cloudsley-Thompson).

All the records in this category are of pseudoscorpions phoretic on harvestmen. This occurrence is not as common as pseudoscorpions being phoretic on flies and appears to be restricted to the Chernetidae. This is consistent with Beier's (1948) suggestion that species living in more open and drier habitats, such as members of the Chernetidae, will frequently attach themselves to more mobile creatures because of a modification of their original hunting instinct.

The instance of two nymphs being attached to *Nelima sylvatica* is of interest as it is the only record, as far as I am aware, of nymphs being phoretic. It is unlikely, because of their size, that they would be attacking the harvestman for food or even utilising it as a means of transport and so this must be regarded as an accidental occurrence of unknown significance.

Discussion—the function of phoresy

The above records show that pseudoscorpions do cling on to the bodies of larger arthropods and animals and that they may be transported as a result. Why they do this is not known with any certainty. Two main theories exist. First, phoresy is predatory in nature. The pseudoscorpions are simply attacking their host for food. Secondly, phoresy is 'the non-parasitic association of one kind of animal with another in order to obtain transportation' (Webster's Third New International Dictionary).

Most of the records of phoresy refer to females and both Vachon (1947) and Beier (1967) link phoretic behaviour with the restlessness and intense hunger particularly experienced by gravid females. From the date of capture of his phoretic specimens (end of August in the case of *Allochernes dubius*) and the presence of spermatozoa in the spermathecae, Vachon concluded that fertilisation of the females had just finished and that it was this that had released in them an intense hunger, driving them, in cases where the normal smaller prey had become scarce, to seize any larger insect/arthropod passing within reach of them. Transport could then have resulted if the insect/arthropod moved off before the pseudoscorpion had relinquished its hold. (In the case of pseudoscorpions being carried on the bodies of birds or small mammals, it is unlikely that they are trying to attack them for food and one must therefore conclude that it is movement of the animal or possibly bodily warmth which is the stimulus causing the pseudoscorpions to cling on to them.) Vachon also concludes that male pseudoscorpions probably do not exhibit phoretic behaviour because they have different behaviour patterns generally and have a much more restricted range of movement within the habitat. This is because the advantage of movement to males is different to that of females which need to cover larger areas to satisfy their intense hunger.

True phoretic behaviour has not been recorded in Britain in the Chthoniidae and Neobisiidae, but occurs frequently in the Chernetidae and Cheliferidae (Weygoldt 1969). Six of the ten British members of the Chernetidae and one of the three British members of the Cheliferidae have

so far been shown to demonstrate phoresy. Members of the Chernetidae and Cheliferidae have a fairly large body size, are relatively dark in colour and possess a somewhat heavy exoskeleton (compared with the Chthoniidae and Neobisiidae). The problem of desiccation is not so great and they are therefore found associated with relatively dry habitats, which are often temporary and less stable ones (C. Clayton Hoff 1959), such as barn refuse and animal nests (although some of them have exploited more permanent habitats, such as the bark of trees). They also possess spermathecae and are able to store sperm for prolonged periods (Legg 1975). Thus, a female with spermathecae fertilised, and stimulated by a desire for food, can reach another habitat as a result of phoresy and on reaching that habitat can find a new source of food and initiate a new population. Here, phoresy can be regarded as a mechanism which will facilitate dispersal to another habitat when the temporary habitat in which the pseudoscorpions are living is threatened.

The Chthoniidae and Neobisiidae are unable to store sperm for prolonged periods and are associated with permanent and fairly stable habitats, such as woodland leaf litter and soil. Southwood (1962) regards phoresy to be the main, if not the only, regular migratory movement in pseudoscorpions but in view of the lack of records of phoretic behaviour in these two families, it seems clear that there must be other means of dispersal for these in addition to phoresy. The subject bears further investigation.

In conclusion, it seems clear to me from the evidence given above, that phoretic behaviour in pseudoscorpions has developed as a modification of their original hunting instinct (particularly in pregnant females), which causes them to seize large arthropods/animals which go past, at the same time allowing themselves to be carried along by them. The association is only profitable to one animal—the one being transported—and is motivated by stimuli arising only within that animal. These stimuli, released by the inadequacy of the biotope, arise from hunger and the need to find a more favourable environment for the development of the young. Probably the most important outcome of phoretic behaviour is the geographical distribution of the species.

Records of commensalism

Species found in the nests of social insects:

Chthonius ischnocheles (Hermann). In nest of *Lasius fuliginosus* (Lat.) (Hym.: Formicidae), Oxshott, Surrey, about 1902 (H. St. J. K. Donisthorpe); in nest of *L. flavus* (F.), Prestatyn, Flint., 1913 (H. St. J. K. Donisthorpe); 1 ♂ in debris in *L. fuliginosus* nest, Woking, Surrey, May 1976 (P. A. Boswell).

Neobisium muscorum (Leach). In nests of *Formica rufa* L. (Hym.: Formicidae), Weybridge and Oxshott, Surrey, 1902 (H. St. J. K. Donisthorpe); one tritonymph in material from nest of *F. aquilonia* Yarrow, Aberfoyle, Perth., July 1974 (R. Paul).

Roncus lubricus L. Koch. With *L. flavus*. Dartmouth, Devon, April 1908 (H. St. J. K. Donisthorpe).

Allochernes dubius (O.P.-C.). ♂♂, ♀♀, all nymphal stages, in nest of *F. rufa*, near Blean, Kent, October 1966 (J. M. Anderson).

Chernes cimicoides. With *F. rufa*, Ashton, Devon, April 1931 (B.M. (N.H.)); many specimens from nest of *L. brunneus* (Lat.) under the bark of an oak tree, Oxford, May 1953 (J. Pontin).

Pselaphochernes scorpioides. ♂♂, ♀♀, in nest of *F. rufa*, nr. Blean, Kent, October 1966 (J. M. Anderson); 1 ♂, 1 ♀, in nest of *F. rufa*, Maulden, Beds., December 1975 (A. J. Rundle).

Toxochernes panzeri (C. L. Koch). In nest of *L. fuliginosus*, Oxshott, Surrey, about 1902 (H. St. J. K. Donisthorpe); 1 ♀ in debris of nest of *Vespa crabro* L. (Hym.: Vespidae); in tawny owl pellet, Wytham Woods, Berks., December 1950 (O. Gilbert); one tritonymph in debris in nest of *L. fuliginosus*, Woking, Surrey, May 1976 (P. A. Boswell).

None of the British genera of pseudoscorpions is restricted in habit to associations with social insects. It is probable that most individuals find their way into nests of social insects purely by chance. This is undoubtedly the case with members of the Chthoniidae and Neobisiidae, which are ground-dwellers, mainly in moss and leaf litter, and in the case, cited above, of *C. cimicoides*, which usually lives under bark. They would easily find their way into the nests of social insects in such habitats and once there would find favourable temperatures and an abundance of small arthropods on which to feed, e.g. small mites, beetle and fly larvae. As synoeketes, they seem to do no harm to their hosts and their hosts seem to treat them with indifference. Donisthorpe (1927) showed this by introducing specimens of *P. scorpioides* into observation nests of *F. rufa*: '... the ants treated them with indifference. If a *rufa* worker was forced to take hold of a chelifer (pseudoscorpion), it dropped it at once.' The distribution of pseudoscorpions from nest to nest and the founding of new colonies in other localities probably occurs phoretically.

Species found in birds' nests:

The records in this category form the basis of a paper published elsewhere (Jones 1975) and therefore only a small selection of the more interesting records appears below.

Chthonius ischnocheles. One in house-martin's nest, Churcham, Glos., September 1954 (R. S. George).

Cheiridium museorum (Leach). One in nest of house-martin at 1,500ft., near Rannoch, Perthshire, April 1964 (J. Cooper); 1 ♂ in nest of tree sparrow under bungalow floor, Woodwalton Fen N.N.R., Hunts., September 1966 (J. Crocker); nine in nest of swift in roof of house, Salisbury, Wilts., June 1967 (J. Cooper).

Pselaphochernes scorpioides. Three nymphs in jackdaw's nest at 15ft., in oak tree, Wytham Wood, Berks., July 1952 (O. Gilbert).

Toxochernes panzeri. 1 ♂ in an owl's nest, Wickham, Kent, August 1940 (O. Gilbert); five in nest of great tit, Churchdown, Glos., July 1957 (R. S. George).

Chernes cimicoides. One in nest of grey heron, High Halstow, Kent, December 1973 (R. C. Welch).

Pseudoscorpions may be brought into birds' nests on nest-building materials, such as dried grass or straw, or phoretically on parasitic or nidicolous flies, or possibly even on the bodies of the birds themselves. In the case of *C. museorum* and *C. cimicoides*, which are bark-dwelling species, they may arrive in nests during the course of their normal wanderings in search of food. *P. scorpioides* and *T. panzeri* are frequently found in hay and straw debris and therefore it is most likely they find their way into nests on the nest-building materials.

Birds' nests provide favourable conditions for pseudoscorpions to live and breed—warmth, a high humidity and a plentiful supply of food in the form of mites and the young larval stages of various insects. This habitat is only a temporary one though and pseudoscorpions may be distributed to more favourable habitats on the bodies of the birds when they leave the nest. There is, as yet, no evidence to confirm this.

Species found in the nests of small mammals:

Chthonius ischnocheles. 1 ♂ in vole nest, Wytham Wood, Berks., January 1961 (M. J. Cotton); in mole-fortress bedding, Sawbridgeworth, Herts., April 1970 (G. Legg).

Neobisium muscorum. 1 ♂ in harvest mouse nest, North Cave, E.R. Yorks., December 1974 (A. Norris).

Pselaphochernes scorpioides. In grey squirrel drey, Brookethorpe, Glos., June 1954 (R. S. George).

Toxochernes panzeri. Immature specimens in winter nests of long-tailed field mice, Altrincham, Cheshire, February 1917 (J. R. Hardy).

Chernes cimicoides. One nymph in grey squirrel nest in ash tree, Chosen Hill, Glos., May 1958 (R. S. George).

C. ischnocheles and *N. muscorum* belong to genera, whose members are more usually found in ground litter, rotting vegetation and soil. *P.*

Scorpioides, *T. panzeri* and *C. cimicoides* are frequently found under the bark of dead or rotten trees or logs. As all these species occur in similar habitats to those in which small mammals build their nests, it seems likely that the association of pseudoscorpions with small mammals has come about quite by chance. As with birds' nests, mammal nests provide a readily available source of food for pseudoscorpions in the form of mites and larvae of Coleoptera and Diptera. Pseudoscorpions are undoubtedly transported to other habitats on the bodies of the mammals, having possibly being stimulated to cling on to them by the presence of warmth generated by the mammal's body. This certainly seems to be the case in *Lasiochernes pilosus* (Ellingsen), a central European species absent from Britain, that lives in the nests of moles (Weygoldt 1969).

In conclusion, one may say that the association of pseudoscorpions with social insects, birds and small mammals is primarily one of commensalism rather than phoresy, although phoretic behaviour may be employed in the distribution of the species to new habitats. This commensal relationship comes about purely by chance, the species involved occurring in similar habitats to those in which social insects, birds and small mammals build their nests. The pseudoscorpions benefit from the relationship by finding favourable temperatures in which to live and breed and particularly by an abundance of small arthropods on which to feed.

REFERENCES

- Adams, G. 1787. Essays on the microscope. London, G. Adams.
- Beier, M. 1948. Phoresie und phagophilie bei pseudoscorpionen. *Ost. zool. Z.* 1: 441-497.
- Beier, M. 1967. Ein phoretischer *Allochernes* (Pseudoscorp.) aus Afghanistan. *Beitr. naturk. Forsch. SüdwDtl.* 26 (1): 17-18.
- Cloudsley-Thompson, J. L. 1956. Notes on Arachnida, 25—An unusual case of phoresy by false-scorpions. *Entomologist's mon. Mag.*, 92: 71.
- Donisthorpe, H. St. J. K. 1927. The guests of British ants: their habits and life histories. London, George Routledge & Sons.
- Godfrey, R. 1908. The false-scorpions of Scotland. *Ann. Scot. nat. Hist.*, 1908: 90-100.
- Graham-Smith, G. S. 1916. Observations on the habits and parasites of common flies. *Parasitology*, 8 (4): 440-544.
- Grimpe, G. 1921. Chelifer als Schmarotzer. *Naturw. Wschr.*, 20: 628-631.
- Hoff, C. Clayton and Clawson, D. L. 1952. Pseudoscorpions from rodent nests. *Am. Mus. Novit.*, 1585: 1-38.
- Hoff, C. Clayton. 1959. The ecology and distribution of the pseudoscorpions of North-Central New Mexico. *Univ. New. Mex. Publs. Biol.*, 8: 1-68.

- Jones, P. E. 1970. *Lamprochernes nodosus* (Schränk)—an example of phoresy in pseudoscorpions. *Bull. Br. arachnol. Soc.*, **1** (8):118-119.
- Jones, P. E., 1975. The occurrence of pseudoscorpions in the nests of British birds. *Proc. & Trans. Br. entomol. & natur. Hist. Soc.*, **1975**:87-89.
- Kästner, A. 1927. Pseudoscorpiones. *Biologie Tiere Dtl.*, **25** (18):1-68.
- Kew, H. W. 1901. Lincolnshire pseudoscorpions: with an account of the association of such animals with other arthropods. *Naturalist, Hull*, **1901**:193-215.
- Legg, G. 1975. The possible significance of spermathecae in pseudoscorpions (Arachnida). *Bull. Br. arachnol. Soc.*, **3** (4):91-95.
- Muchmore, W. B. 1971. Phoresy by North and Central American pseudoscorpions. *Proc. Rochester Acad. Sci.*, **12** (2):79-97.
- Muchmore, W. B. 1971. On phoresy in pseudoscorpions. *Bull. Br. arachnol. Soc.*, **2** (3):38.
- Nordberg, S. 1936. Biologisch—Ökologische Untersuchungen über die Vogelniddicolen. *Acta zool. fenn.*, **21**:1-168.
- Orösi-Pal, Z. 1938. Afterskorpione in der Wohnung der Honigbiene. *Z. angew. Ent.*, **25**:142-150.
- Poda, N. 1761. *Insecta Musei Graecensis*. Graz.
- Ressl, F. and Beier, M. 1958. Zur Ökologie, Biologie und Phänologie der heimischen pseudoskorpione. *Zool. Jb. Syst.*, **86** (1/2):1-26.
- Ressl, F. 1963. Können Vögel als passive Verbreiter von Pseudoscorpioniden betrachtet werden? *Vogelwelt*, **84**:114-119.
- Ressl, F. 1965. Über Verbreitung, Variabilität und Lebensweise einigen österreichischer Afterskorpione (Arachnida: Pseudoscorpiones). *Dt. ent. Z.*, **12** (4/5):289-295.
- Southwood, T. R. E. 1962. Migration of terrestrial arthropods in relation to habitat. *Biol. Rev.*, **37**:171-214.
- Turk, F. A. 1951. On the swarming of pseudoscorpions and their association with ants. *Entomologist's mon. Mag.*, **87**:169.
- Vachon, M. 1935. Le phénomène de phorésie chez les pseudoscorpionides. *Bull. scient. Bourgogne*, **4**:158-159.
- Vachon, M. 1940. Remarques sur la phorésie des pseudoscorpions. *Annls. Soc. tn. Fr.*, **109**:1-18.
- Vachon, M. 1947. Nouvelles remarques à propos de la phorésie des pseudoscorpions. *Bull. Mus. natn. Hist. nat., Paris*, **19**:84-87.
- Vachon, M. 1954. Nouveaux cas de phorésie chez les pseudoscorpions. *Bull. Mus. natn. Hist. nat., Paris*, **25**:572-575.
- Weygoldt, P. 1969. The biology of pseudoscorpions. Cambridge, Mass.: Harvard University Press. (*Harvard books in Biology*, No. 6) 145 pp.
- Wheeler, W. M. 1911. Pseudoscorpions in ant nests. *Psyche, Camb.*, **18**:166-168.
-
-

BUTTERFLIES IN SPAIN: SIERRA DE ALCARAZ, SIERRA DE GUDAR, SIERRA DE JAVALAMBRE

by RUSSELL F. BRETHERTON

(Folly Hill, Birtley Green, Bramley, Guildford, Surrey, England)

and OTAKAR KUDRNA

(Portsmouth Polytechnic, Department of Biological Sciences, Portsmouth, England.

Present address: Museum Alexander Koenig, Adenauerallee 160, D-5300 Bonn, W. Germany)

During an expedition to Spain in 1976, besides some well known areas. Sierra de Alcaraz in prov. Albacete was visited by both authors, and Sierra de Gudar and Sierra de Javalambre in prov. Teruel by Kudrna alone—returning there after a previous visit made in 1974 which is also reported here—after Bretherton's return to England. As we have been unable to find published accounts of the Rhopalocera and Grypocera of these Sierras, we list below the species which we recorded there, with comments, relating some of them to the distribution maps of Spanish butterflies previously given by Bustillo and Fernandez-Rubio (1974) in their admirable book on Spanish Rhopalocera.

The Sierra de Alcaraz is a considerable mountain massif in prov. Albacete, reaching 1,790m. at its highest point; it forms part of the watershed between the river systems of the Guadalquivir, flowing to the Atlantic, and the Mundo flowing to the Mediterranean. Its central valley, at about 1,100 to 1,200m., is covered with mixed deciduous and coniferous woodland and is well watered by small streams bordered by damp meadows. According to the geological map the barer summits consist of triassic limestone, the lower ground of lias. The massif is crossed by a secondary road for some 60km. from the town of Alcaraz over two passes and through the central valley to the village of Riopar below its steep southern escarpment. We collected on three days—13-16.vii.1978—mainly near this road, staying for the nights at a small quiet pension in Riopar.

Sierra de Alcaraz produced a number of surprises. Of the 63 species whose presence was verified, five are not shown on the distribution maps (Bustillo and Fernandez-Rubio 1974) to occur at all in prov. Albacete. The discovery of *Brenthis daphne* Denis & Schiffermüller, which was abundant in several places, has already been recorded (Bretherton and Kudrna, 1977). This represents an extension of its range by some 160km. southwards from Serrania de Cuenca (Amor, 1977) and even more from the other localities in east-central Spain, where the species has also been very recently recorded (Garcia and Leyva y Vega, 1977; Ortiz and Lyeva, 1978; Bustillo, 1978). Much the same is true of *Brenthis ino* Rottenburg, of which a few worn but clearly identifiable examples were taken on damp ground near a spring. The same is true of the surprising capture of a single female *Agrodiaetus*, probably referable to *fabressei* Oberthür rather than to *ripartii* Freyer, which was caught on the bare slopes above the descent to Riopar. *Limnitis reducta* Staudinger, of which examples were taken in several places in the central valley, is mapped only so far as the border of prov. Cuenca, some 80km. to the north. *Plebicula amandus* Schneider is also mapped in southern Spain only on the Sierra Nevada. Besides these additions to the list of butterflies for prov. Albacete, *Mellicta deione* Geyer, *Brenthis hecate* Denis & Schiffermüller and *Argynnis paphia* (Linnaeus), all of which we found commonly in the Sierra de Alcaraz, are shown only on distant fringers of the province. It is apparent that that Sierra, possibly because of its abundance of water and rich vegetation, both permits a considerable intrusion of northern species into southern

Spain and also fills part of the gap in distribution for some other species which were previously known only considerably north and south of it.

The Sierra de Javalambre and the Sierra de Gudar are parts of the geologically very complicated mountains of prov. Teruel and Cuenca; but they lie to the north-east of the area surrounding the well explored area—rich in Lepidoptera—of Albarracin, Bronchales and Tragacete. The Sierra de Javalambre lies to the south of the main trunk road from Teruel to Sagunto, where it joins the coastal motorway just north of Valencia. Its highest point is 2,200m., but only the lower levels of 1,200-1,500m. were investigated on 22 and 23.vii.1974 and 3 and 4.viii.1976, mainly along the small road which passes through the villages of Manzanera and Torrijas and along forest tracks leading to the higher Sierra. This area is mostly lias, with triassic limestone on the summits, with a small stream running through the main valley, bordered with cultivated agricultural land in some places and wooded (mostly pine trees) or covered with small areas of garigue shrub in others, situated mostly on drier slopes a little way from the stream itself. The Sierra de Gudar is situated north-east of the same main trunk road mentioned above; it is crossed by a secondary road which runs north from Mora de Rubielos. The highest point of the Sierra de Gudar is 1,909m. The areas collected on 20 and 21.vii.1974 and 30.vii-2.viii.1976 were along the above mentioned secondary road between the passes Puerto de Alcala and Puerto de Gudar and in the vicinity of the village Alcala de la Selva, at altitudes 1,400-1,850m. These mountains, covered by a mixture of vegetation types (woodland, meadows, pastures, etc.) are cold, much cooler than the Sierra de Javalambre, even in summer, as is especially noticeable at night and early in the morning; also the butterflies, especially at higher levels in somewhat more exposed localities, start flying much later in the morning than in other parts of central and east-central Spain at comparable altitudes. Unlike Javalambre, Sierra de Gudar is geologically eocretacian. The Hesperidae of Sierra de Javalambre and Sierra de Guda were not recorded, but those collected incidentally were given to Dr. R. de Jong (Rijksmuseum van Natuurlijke Historie, Leiden).

The following species were collected and recorded in the above described three Spanish Sierras, which are in the list of species abbreviated for convenience thus: Sierra de Alcaraz=A, Sierra de Javalambre=J, Sierra de Gudar=G. For ease of reference the order of families, genera and species and their nomenclature also follows that used by Bustillo and Fernandez-Rubio (1974).

HESPERIIDAE

Carcharodus boeticus Rambur; *C. alceae* Esper; *C. lavatherae* Esper; *Pyrgus cirsii* Rambur; *P. alveus* Hübner; *Spialia sertorius* Hoffmannsegg; *Muschampia proto* Ochsenheimer; *Thymelicus sylvestris* Poda; *T. actaeon* Rottemburg; *Ochlodes venata* Bremer & Grey: All A.

LYCAENIDAE

Laeosopis roboris Esper: A; *Strymonidia spini* Denis & Schiffermüller: G; *S. esculi* Hübner: A, J, G; *S. ilicis* Esper: A, G; *Lycaena phlaeas* Linnaeus: A, J, G; *Lampides boeticus* Linnaeus: A, J, G; *Syntarucus pirthous* Linnaeus: A, J, G; *Celastrina argiolus* Linnaeus: A; *Cupido minimus* Fuessly: G; *Plebejus argus* Linnaeus: A, G; *Lycaeides idas* Linnaeus: G; *Cyaniris semiargus* Rottemburg: G; *Plebicula thersites* Cantener: J, G; *Polyommatus icarus* Rottemburg: A, J, G; *Plebicula*

amandus Schneider: A; *P. dorylas* Denis & Schiffermüller: G; *P. nivescens* Keferstein: A; *P. escheri* Hübner: A; *Lysandra albicans* Herrich Schäffer: A, J, G; *L. bellargus* Rottemburg: A, G; *Agrodiaetus damon* Denis & Schiffermüller: G; *A. fabressei* Oberthür: A(?), G; *A. ripartii* Freyer: J, G; *Aricia cramera* Eschscholz: G; *A. montensis* Verity: A, J, G.

SATYRIDAE

Lasiommata megera Linnaeus: J, G; *L. maera* Linnaeus: A, J, G; *Coenonympha iphis* Denis & Schiffermüller: G; *C. dorus* Esper: A, J, G; *Melanargia lachesis* Hübner: A, J, G; *M. russiae* Esper: G; *Hipparchia alcyone* Denis & Schiffermüller (*): A, J, G; *H. semele* Linnaeus: A, J, G; *Arethusana arethusa* Denis & Schiffermüller: J, G; *Brintesia circe* Fabricius: A, J, G; *Satyrus actaea* Esper: J, G; *Chazara briseis* Linnaeus: A, J; *Hyponephele lycaon* Kuhn: A, J, G; *Pyronia tithonus* Linnaeus: A, J, G; *P. cecilia* Vallentin: J; *P. bathseba* Fabricius: A, J, G; *Maniola jurtina* Linnaeus: A, J, G; *Erebia meolans* Prunner.

NYMPHALIDAE

Limnitis reducta Staudinger: A, J, G; *Vanessa atalanta* Linnaeus: A, G; *Cynthia cardui* Linnaeus: A, J, G; *Aglais urticae* Linnaeus: G; *Nymphalis polychloros* Linnaeus: A; *Polygonia c-album* Linnaeus: A, G; *Euphydryas aurinia* Rottemburg: A; *Mellicta deione* Geyer: A, J, G; *M. parthenoides* Kerferstein: A, G; *Melitaea didyma* Esper: A, J; *M. phoebe* Denis & Schiffermüller: A, J, G; *Brenthis hecate* Denis & Schiffermüller: A, G; *B. daphne* Denis & Schiffermüller: A; *B. ino* Rottemburg: A, G; *Issoria lathonia* Linnaeus: A, J, G; *Fabriciana niobe* Linnaeus: A, G; *F. adippe* Denis & Schiffermüller: A, J, G; *Mesoacidalia aglaja* Linnaeus: A, J, G; *Argynnis paphia* Linnaeus: A, J, G; *Pandoriana pandora* Denis & Schiffermüller: A, J.

PIERIDAE

Leptidea sinapis Linnaeus: J; *Aporia crataegi* Linnaeus: A, J, G; *Pieris brassicae* Linnaeus: A, G; *P. rapae* Linnaeus: A, J, G; *P. napi* Linnaeus: A; *Pontia daplidice* Hübner: A, J; *Colias australis* Verity: A, J, G; *C. crocea* Geoffroy: A, J, G; *Gonepteryx rhamni* Linnaeus: A, J, G; *G. cleopatra* Linnaeus: A, J, G.

PAPILIONIDAE

Papilio machaon Linnaeus: J, G; *Iphioides podalirius* Linnaeus: A; *Parnassius apollo* Linnaeus: J.

REFERENCES

- Amor, F. P., 1977. Ropaloceros en la inmediaciones de Guenca. *Revta Lepid.*, 5: 83-86.
- Bretherton, R. F. and Kudrna, O., 1977. The discovery of *Brenthis daphne* (Denis & Schiffermüller) in south Spain. *Nota lepid.*, 1: 17-18.
- Bustillo, M. R. G., 1978. La distribución de *Brenthis daphne* (D. & Schiff., 1777) en España. *Revta Lepid.*, 5: 340-342.
- Bustillo, M. R. G. and Fernandez-Rubio, F., 1974. *Mariposas de la Península Iberica. 2. Ropaloceros*. Icona, Madrid.
- García, M. O. and Leyva y Vega, J. M. de, 1977. Nuevas citas para Guadalajara: *Cyaniris semiargus*, *Plebicula nivescens* y *Brenthis daphne*. *Revta Lepid.*, 5: 243-246.

* *Hipparchia hermione* Linnaeus according to Kudrna (1977).

- Kudrna, O., 1977. *A revision of the genus Hipparchia* Fabricius. Classey, Farringdon.
- Ortiz, M. and Leyva, J. M. de, 1978. Nota aclaratoria sobre *Brenthis daphne* D. & Schiff. *Revta Lepid.*, 5:320.

FOR SALE — HEWITSON ON BUTTERFLIES, PRICE 6d.

by B. O. C. GARDINER

(Agricultural Research Council, Unit of Invertebrate Chemistry and Physiology, Department of Zoology, Downing Street, Cambridge, England)

Between 1867 and 1877 W. C. Hewitson published a number of important pamphlets describing new species of Lepidoptera. This was apparently done in order to claim priority of nomenclature in advance of his more comprehensive and expensive illustrated descriptions which were slowly being published in parts. Taxonomically these leaflets are of great importance and they have recently been reprinted (Higgins, 1972).

It is stated that they are one of the rarest of modern entomological publications and it is not known if they were ever offered for sale. I now have definite evidence that the first one at least was offered for sale and it is also my belief the publications may be much commoner than is generally believed.

Proof of the first number to be issued having been advertised appears on the verso of the back wrapper to a part of Hewitson's Illustrations where it states below other advertisements for his more expensive works with coloured plates: —

Will be published April 15th, 1867 Price 6d.

DESCRIPTIONS OF FIFTY NEW SPECIES OF HESPERIDAE

By

W. C. HEWITSON,

JOHN VAN VOORST, 1, PATERNOSTER ROW

Above this is the statement that Part III of the Lycaenidae, with 16 coloured plates is 'just published, April 1st, 1867, price 25s.' (see fig. 1). It is therefore reasonable to assume that this part of the illustrations appeared between these two dates. It is also interesting that the advertised date of publication is five days in advance of that generally taken, April 20th, 1867. It seems probable that an examination of other similar ephemeral covers would reveal further advertisements and prices for the other parts.

Hewitson's works nowhere appear to be that common, but are present in most of the major Libraries. His publications on birds and butterflies were however lavishly illustrated with coloured plates and like so many similar works of the time, expensive to all but the leisured classes and produced in small editions. His 'Descriptions' however, octavo size, 16 to 36 pages, un-illustrated, published over a ten-year period, one of which, as now know, was priced at 6d. are likely to have been in larger editions, possibly several hundred. The Contemporary Journals such as the *Entomologist* and *Entomologist's Monthly Magazine* were also priced at 6d. per issue (1/- for double numbers) and the 'Descriptions' could therefore have been afforded by the average Entomologists. In view of the price stability of the Victoria era, I consider it probable that all the numbers were sold at the same price as the first. Even if individuals were not

Price 21s.

A CATALOGUE OF LYCÆNIDÆ

BY

W. C. HEWITSON, F.L.S.

**With Eight Coloured Plates illustrating the
Genera *Ogyris* and *Amblypodia***

PUBLISHED BY THE TRUSTEES OF THE BRITISH MUSEUM

ALSO, BY THE SAME AUTHOR,

Price 25s. each,

ILLUSTRATIONS OF DIURNAL LEPIDOPTERA

PARTS I & II. LYCÆNIDÆ

With, together, Thirty Coloured Plates

Just Published, April 1st, 1867, price 25s.

PART III. LYCÆNIDÆ

With Sixteen Coloured Plates

Will be Published April 15th, 1867, price 6d.,

DESCRIPTIONS OF FIFTY NEW SPECIES
OF HESPERIDÆ

BY

W. C. HEWITSON

JOHN VAN VOORST, 1, PATERNOSTER ROW

Fig. 1

interested, there were hundreds of small local Entomological and Natural History Societies in existence at the time and many of these possessed libraries.

I have in my possession several parts of the 'Descriptions'. They are as follows:—

The first four parts of 'Equatorial Lepidoptera collected by Mr. Buckley' bound in a Continental style with title page and index and bearing on the flyleaf 'Donatio auctoris' with on page one in the same hand, 'Hewitson'. It also bears the label of 'Ortner, Wien No. 7196 Lepidoptera'. Ortner was a well-known dealer of the Austro-Hungarian Empire.

My 'Descriptions of new species of Lycaenidae' has in its early days been bound up with other pamphlets into a book. This is a common occurrence. Small items like this either end up in a box, gather dust and get forgotten, get thrown out or get bound up with other material, the mix depending on the preference of the owner. When they pass into other hands, particularly those of dealers, they are then frequently torn apart into their original parts and re-distributed. That is what has happened here. It was obtained through an advert in the *Insektenbourse*.

My 'Bolivian Butterflies collected by Mr. Buckley' bears the stamp of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne and the shelf mark or catalogue reference EAh5. It was an uncut copy! Having also seen a copy bearing the stamp of the Norwich Natural History Society, I am therefore of the opinion that many copies may well be lying around in local libraries, if they have not already been disposed of. Very many libraries have in recent years been disposing of old, little or never used, stock, either to make room for new, or to raise funds. Many items such as these Hewitson pamphlets have been thrown onto the market and lately I have seen the parts on Lycaenidae, Equatorial Lepidoptera and Bolivian Butterflies advertised in booksellers' catalogues. They would be worth keeping an eye open for.

REFERENCE

Higgins, L. G. (1972). *Hewitson on Butterflies*. E. W. Classey Ltd., Abingdon.

HOW SWALLOWTAIL BUTTERFLIES PASS THE NIGHT

by KATE GARTON and MIRIAM ROTHSCHILD
(Ashton Wold, Peterborough)

Very few of us in the U.K. have visited the Archbold Biological Station of the American Museum of Natural History. We were two of the lucky ones. The station is located in the southern part of the Florida peninsula, mid-way between the Atlantic and the Gulf of Mexico, in slash pine/sugar sand country. All members of the museum staff can work there free. One wishes that our Natural History Museum could collaborate in such an enterprise, for we can think of no greater stimulus to systematics or taxonomy than a visit to the Archbold.

All entomologists enjoy pottering about, and the station provides an inspired synthesis of serious research and watching butterflies in the sun. Furthermore the secluded 2,000-acre estate in which it is situated is sufficiently unspoilt and undisturbed for the wild life round the central

building to have become as tame as animals on an uninhabited south sea island. You can set up a feeding tray for scrub jays in the garden of your bungalow and you won't require a hide or field glasses to see which butterflies are accepted or rejected. For a naturalist with a well planned piece of field work in mind this is paradise on earth.

On both occasions when we were at the Archbold Station three species of swallowtails were common in the garden, *Papilio cresphontes* Cramer, *Papilio palamedes* Drury, *Battus polydamas* Linnaeus. Four others were seen only as single individuals.

We have often wondered what butterflies do when they wake up and drop off to sleep. Is there a preparatory phase equivalent to reading in bed? Here was the chance to watch the giant swallowtail settling down for the night. In early March in Florida there are about 12 hours of daylight and the maximum temperature at the time was 80°-91°F. by day and 66°-68°F. by night.

Up to 4.15 p.m. the females of *P. cresphontes* were ovipositing on the young leaves of *Citrus* trees. At 4.20 p.m. all the specimens in that area were to be seen together on beds of flowering plants or bushes, where they put in 25 minutes intensive feeding.

P. cresphontes goes to bed early, about 30-40 minutes before either *P. palamedes* or *B. polydamas*, and a good hour before the skippers which are both notoriously early risers and late feeders. At about 4.40 p.m. five specimens left the flowers and began to fly about slowly between the trees just above our heads, obviously searching for a suitable roosting site. They eventually decided on a small Laurel Oak (*Quercus laurifolia*) about 20 feet in height and surrounded by towering pine, bamboo, pepper, mango and other introduced species. The branches were laden with dried pine needles which had fallen from the trees above. This Laurel Oak was the initial choice of these butterflies on three consecutive nights.

It was difficult to follow each individual in the deep shade. Moreover the black and yellow pattern tones in so well in these dappled surroundings (Fig. 1) that it is sufficient only to let one's eyes wander for a second to lose the specimens for good. One 'pair' however kept very close together, and settled within a few centimetres of each other on the slender outermost twigs and leaves, about 10 feet from the ground. They immediately spread their wings horizontally towards the setting sun. This behaviour is reminiscent of *Heliconius charitonius tuckeri* (Comstock and Brown) which we have seen assembling here in small communal roosts, except that this latter species waves its wings gently to and fro eventually closing them, whereas the swallowtails sat motionless—each forming a flat-topped perfect triangle, tilted at an angle to catch the last rays of the sun, and held them open indefinitely.

Between 5 p.m. and 6.15 p.m. these butterflies were disturbed six times, but after flying around they returned to the same tree. On four occasions the disturbances were caused by other giant swallowtails, either latecomers or roosting specimens which had been shaken out of neighbouring trees by squirrels. They attacked the sleeping butterflies mercilessly, striking at them again and again. The 'pair' in view flickered their wings rapidly in unison but the pugnacious intruders returned to the attack and soon all five would-be roosters were on the wing. Squirrels jumping into their tree was the cause of the next flurry and finally a car passed by, and all five butterflies once again rose into the air. At 6.15 p.m. the largest of the

'pair' was once more back in the outermost branches, with wings spread, rocking almost imperceptibly in the breeze. By seven o'clock it was too dark to see them without a torch but up to eleven o'clock they had not moved. Next morning about 7.20 a.m. squirrels again created a disturbance and one butterfly began to fly around in the half-light, but we kept our eyes fixed grimly on the largest of the 'pair' which did not stir. With wings spread and tails at a slight angle in classical swallowtail fashion, it slept on for a total of 14 hours 25 minutes. At 8.45 a.m. the right forewing twitched slightly and it flopped out of bed. There was no warming-up process. Observers and observed then moved away in search of breakfast, one decidedly more stiffly than the other.

Unlike *P. cresphontes*, *P. palamedes* roost alone. This is scarcely surprising since its violent and pugnacious temperament creates a barrier to companionable night life. This swallowtail attacks almost any species, including its own, which it encounters during periods on the wing, particularly on arrival at a communal nectar source, when it strikes, apparently at random or capriciously, at any other butterfly in sight. Especially as evening approaches it engages in long strenuous combats with members of the opposite sex—a pair sometimes battering each other continuously for 13-20 minutes. Whether such flights are sexual in nature, with the male trying to subdue a reluctant female by force, is not known. Suffice to say both butterflies may receive severe injuries in the process (Fig. 2), mostly to the hind wings or 'tail' area—injuries which could easily be mistaken for bird beak marks (Rothschild, 1978). As bedtime approached *P. palamedes* made sudden long circuitous flights from the feeding grounds, often returning to the flowers, but soon or later disappearing around 4-4.30 p.m. Sleep would become virtually impossible unless a discreet approach was made from the communal feeding area to the roost. During these flights they are almost impossible to track amidst the branches of the trees and the luxuriant growth of creepers and vines. By observing flight lines and organising observation posts—and only after many repeated failures—were we eventually able to observe these butterflies roosting. Occasionally they chose sites among pine needles twenty feet up, but usually the situations selected were in bushes within 5-6 feet of the ground. Unlike *P. cresphontes* which, unless disturbed by squirrels, or other untoward events, remained all night in the original site of their choice, *P. palamedes* is a tremendous fidget. For quite long periods, 20 minutes or more, it remained with its wings fully spread in the permanent roosting position characteristic of *P. cresphontes*, and then suddenly fluttered off to select another site, sometimes close at hand but at other times far distant. This performance may be repeated several times, with quite a lot of wing-fanning in between. Eventually when it does go to sleep it is with wings closed held vertically above the thorax, but any disturbance in its vicinity elicits a few rapid wing claps.

Awakening in the morning the wings were fully extended in the direction of the rising sun; occasionally the butterfly would shut them again—like a man reluctant to leave a comfortable bed who temporarily pulls the bed clothes over his head—and remained motionless for several minutes. At last it decided to take off, but resettled almost immediately on a patch of sunlit grass and stretched fully towards the rays of the sun. The warming up, like the settling down process of this species, is a protracted affair.

Battus polydamas, the commonest species at the Archbold Station in November, also roosts singly. It is the last of the swallowtails to leave the

TABLE I
BEHAVIOUR OF ROOSTING SWALLOWTAILS

	<i>P. crespontes</i>	<i>P. palamedes</i>	<i>B. polydamas</i>	<i>P. glaucus</i>
Time of year observed	February	November	November	November
Hours of daylight and temperature	14 hours 66°F., -91°F.	12 hours 53°F., -87°F.	12 hours 53°F., -87°F.	12 hours 53°F., -87°F.
Roosting site	Outer branches of trees; terminal twigs	Outer branches of trees; and trees; terminal twigs	Outer branches of trees among pine needles	Outer branches of pine trees among needles
Communal or solitary roosting	Communal	Solitary	Solitary	Solitary*
Position of wings during sleep	Fully horizontal	Vertical after preliminary horizontal period	Vertical	Vertical
Pre-roosting flights	30 mins. or more continuous flying under trees in which roost occurs	Long circuitous flights with returns to feeding ground	None	Several short flights of between 30 secs. to 2 mins. back and forth under the trees
Hours of sleep (approx.) in sunny weather	14 hours	16 hours	15 hours	15 hours

* On this occasion, but no other specimens were on the wing.

flowering spikes of the red Pagoda flower (a species of *Clerodrum* introduced from Asia) around 5 p.m. It flew directly upwards into one of the surrounding trees, preferably a pine, immediately chose the appropriate spot between a bunch of the long pine needles—some 12-15 feet off the ground—settled, snapped its wings together and never moved again for approximately 16 hours. Even when struck at by another passing individual they did not move their wings. Similarly it left the tree in the morning without any preliminary movements equivalent to 'stretching in bed'. On overcast days *B. polydamas* extended its roosting period to 19 hours, and possibly longer. On one occasion this butterfly was found asleep beside a large dragonfly.

Of the four species represented in the garden by single individuals we were able to track down *Papilio glaucus* Linnaeus one afternoon feeding at 2.55 p.m. on a patch of *Sedum* (which had just come into bloom along the main asphalt drive), in company with a single *P. cresphontes*. After two hours at this nectar site the butterfly flew around for about one minute, apparently reconnoitering the roosting possibilities, but returned to feed for a further five minutes. This manoeuvre was repeated several times. It then suddenly rose to considerable heights above the trees, gliding down to settle for the night in the outermost twigs of a pine immediately above the road. The wings were closed vertically and after a slight fanning movement the butterfly remained perfectly still for 15 hours.

Papilio troilus Linnaeus however completely defeated us. This butterfly patrolled a special area which surrounded the principal feeding site. It excited animosity even in the usually unexcitable *B. polydamas* which drove it off—sometimes several in unison—whenever it attempted to feed on the Pagoda blooms. At intervals of about 15-20 minutes during the day it passed at high speed through the glade. Again and again as dusk fell it entered the main roosting area, flying in a more leisurely fashion and vanished, as if by magic, under our very noses. Although we knew within inches where it snapped out of sight we failed completely to find its roosting site. Some other observer was evidently smarter than we, for on our last afternoon at the Archbold, waiting around 4.30 p.m. in the roosting area, we found the four bodiless wings of our *troilus* lying spread out in butterfly array on the ground. Since there were no marks at all on the wings we assumed a small rodent was the culprit. We were utterly dismayed: it was like losing an old friend.

This brief account of the sleeping habits of four species of swallowtails demonstrates that, although the group as a whole share a general pattern of behaviour (Table I) each species displays characteristic features of its own. *P. cresphontes*, for example, roosts communally with its wings spread horizontally, while the other three are lone roosters with wings closed above their backs. *B. polydamas* dispenses with any late evening flights and never moves so much as a centimetre once it has settled down, while the pugnacious *palamedes* engages in long circuitous preroosting perambulations and—like one of the most distinguished fellows of the Royal Entomological Society—demonstrated its ability to clap while sound asleep.

REFERENCES

Rothschild, M. 1978. Hell's Angels. *Antenna*, 2 (2) 38-39.

A note on the Archbold Biological Station

The station was established in 1941 by Richard Archbold and is supported by the non-profit biological research organisation which he created, and which also finances offices, collections and curatorial staff in the Department of Mammalogy at the Museum.

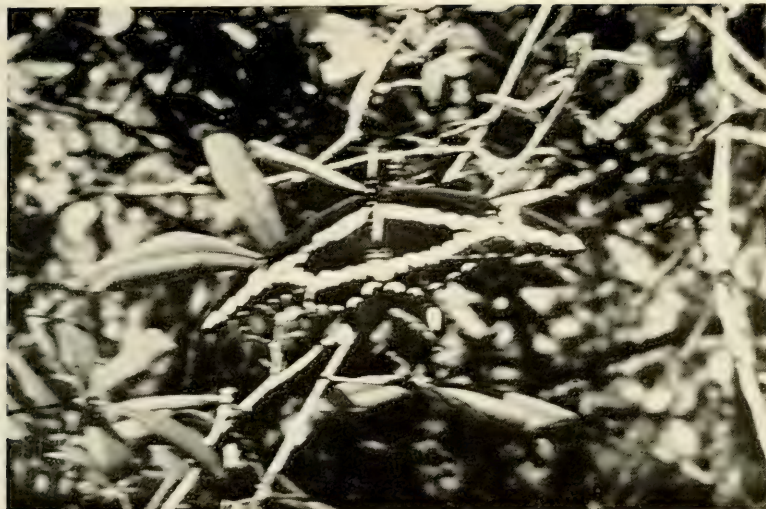


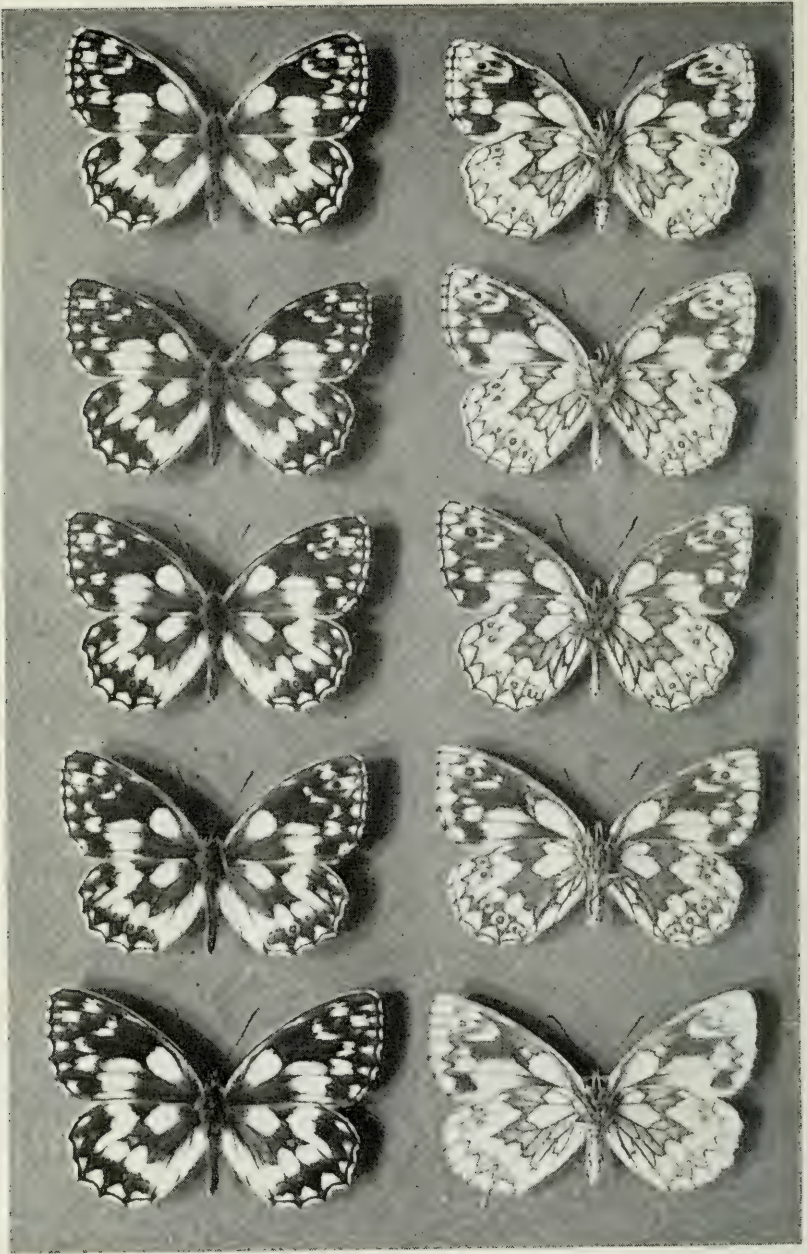
Figure 1. *P. cresphontes* roosting with wings extended during the hours of darkness. Note the cryptic effect of the wing pattern among the branches of the Laurel Oak.



Figure 2. *P. palamedes* returning at dusk to the Pagoda flowers after a 20 minute flight. It has lost a greater part of one hind wing. [Note: In the failing light it is impossible to obtain a sharp picture of a moving object with Kodacrome II.]
(Photographs by Miriam Rothschild.)



1. *Erebia aethiops* (Esper.) with enlarged eye spots. ♀ bred 17.7.63.
 2. *Melanargia galathea* (L.) ab. *craskei* Tubbs. ♀ bred 6.7.76 F.1 of ♂ ab. × ♀ ab.
 3. *Hipparchia semele* (L.) ab. *holanops* Brouwer. ♀ bred 28.8.77.
 4. *Aphantopus hyperantus* (L.) ab. *lanceolata* Shipp. ♀ bred 26.6.76.
 5. *Pieris brassicae* (L.) ♀ albino form ab. *albinensis* Gardiner + ab. *coerulea* Gardiner, bred 16.7.67.
 6. *Lysandra coridon* (Poda.) ♀ ab. *syngrapha* Kef + ab. *fowleri* South, bred 13.7.76.
 7. *L. coridon* ♀ ab. *semi-syngrapha* Tutt + ab. *fowleri*, bred 15.7.76.
- All specimens bred by R. S. Tubbs.



Melanargia galathea (L.) ab. *craskei* Tubbs ab. nov.

A series taken in 1973 in Sussex by Mr. R. M. Craske. These specimens are now in the British Museum collection. The uppersides are all males. The top three undersides are males, and the bottom two females. The bottom left-hand specimen is the *holotype*.

Five of the major terrestrial habitats of the region are found in the main property stations (2,000 acres). These include South Florida slash pine/turkey oak woodland, sand pine scrub, scrubby flatwoods, low flatwoods and bay tree forest. The station also owns a tract of about 80 acres on the north side of nearby Lake Placid. The biota of the region is unusually diversified. The dry pine-oak habitats contain a number of endemic forms of plant and animal life such as the Florida scrub jay, scrub lizard, sand skink and Florida mouse. Audubon's caracara, sandhill crane and burrowing owl are characteristic of the nearby flatland region. (A dead armadillo on the highway quickly attracts a hoard of vultures.) The number of species thus far recorded on the station property includes 15 fish, 54 amphibians and reptiles, 142 birds, 36 mammals, about 350 vascular plants, and more than 1,100 insects and other invertebrates. It is not unusual to see half a dozen species of swallowtail butterflies in the station garden.

The mean annual temperature is about 72°F. with an average annual rainfall of approximately 55 inches with over 60% falling (mainly in the form of short but heavy thunderstorms) between June and September. Maximum-minimum summer temperatures are 93°F.-69°F. and winter temperatures 76°F.-49°F.

Research centres on the ecology of the highland area of southern peninsula Florida, with special emphasis on the natural ecosystems represented on the station. The several distinctive and completely protected habitat types together with well equipped laboratories and other facilities combine to make the station an ideal site for in-depth long-term ecological investigations. In the course of their studies the laboratory staff and visiting scientists have marked and released thousands of individuals of many kinds of reptiles, birds and mammals on permanent sampling grids in each major habitat or on the whole station property.

The laboratory is supplied with most standard equipment and there are invaluable reference collections and library facilities. There are also outdoor cages for animals (two with concrete pools) and a greenhouse. My only suggestion for improvement of this fantastic set-up is that nectar sources for butterflies and insects in the immediate vicinity of the laboratory—the garden area—could be increased with advantage.

Living facilities for visiting workers include rooms in the main building or one, two or four bedroomed, air-conditioned cottages (equipped for self-catering, although visitors can have their meals in the main building). Charges for food and lodging are nominal (a current fee schedule is available).

Persons wishing to utilise the station's facilities must submit an application with a research programme. Applications are reviewed by an Advisory Board and should be received as far as possible in advance, preferably two months, of the proposed date of the visit to allow sufficient time for review by the Board. Application forms and additional information may be obtained from The Director, Archbold Biological Station, Route 2, Box 180, Lake Placid, Florida 33852.

H. C. HUGGINS, BIBLIOGRAPHY

by J. M. CHALMERS-HUNT

(St. Teresa, Hardcourts Close, West Wickham, Kent, BR4 9LG)

(A) *The Entomologist* (continued from p. 38)

- 1949 *Daphnis nerii* at Leigh-on-Sea. **82**:15.
 1949 The Yellow Female of *Colias hyale*. **82**:118-119.
 1949 Feeding Habits of *Spilosoma lutea*. **82**:119.
 1949 *Anania nubilalis* in S. Essex. **82**:119.
 1949 Two New Varieties of *Peronea cristana*. **82**:156.
 1949 Early Emergences in 1949. **82**:212-213.
 1949 *Melanargia galathea* in Essex. **82**:236.
 1950 Migrant Lepidoptera in 1949. **83**:88.
 1950 *Epirrhoe tristata* in Kerry. **83**:211-212.
 1950 *Sterrrha muricata* Hufnagel in Ireland. **83**:234-235.
 1950 Aberration of *Anaitis plagiata*. **83**:251.
 1950 *Celastrina argiolus* in South-West Ireland. **83**:265-266.
 1951 Migrants in 1950. **84**:46-47.

- 1951 *Thecla betulae* in Ireland. **84**:69.
 1951 *Crambus contaminellus* Hübner at Leigh-on-Sea. **84**:95-96.
 1951 *Tephrosia bistortata* Goeze in Ireland. **84**:119-120.
 1951 Obituary: Percival Frederick Harris. **84**:120.
 1951 *Eupithecia innotata* Hufnagel at Whitstable. **84**:142.
 1951 The Present Status of *Agrotera nemoralis* Scopoli. **84**:142-143.
 1951 *Eucnemidophorus rhododactyla* Schiff. at Leigh-on-Sea. **84**:238.
 1951 *Emus hirtus* at Southend-on-Sea. **84**:264.
 1951 *Eucnemidophorus rhododactyla* Schiff. in Essex. **84**:280.
 1951 *Phlogophora meticulosa* ab. *roseo-brunnea* Warren at Westcliffe-on-Sea. **84**:280.
 1952 Migrants in 1951. **85**:42-43.
 1952 A Late Form of *Lophopteryx capucina*. **85**:45.
 1952 *Angerona pruneria* ab. *pickettaria* Prout. **85**:168.
 1952 Two Noctuid Aberrations. **85**:185.
 1952 *Eupithecia pulchellata* ab. *hebudium* Sheldon at Glengarriff, Co. Cork. **85**:196.
 1952 *Pararge aegeria* at Chattenden. **85**:214.
 1952 *Cacoecia pronuba* Hübner in Kent. **85**:214.
 1952 Obituary: Alfred Fogo Common. **85**:216.
 1952 *Argynnis aglaja* in West Cork. **85**:220-221.
 1952 *Sterrha rusticata* Schiff. in Kent. **85**:237-238.
 1952 *Minucia lunaris* in South-East Essex. **85**:270.
 1953 The Lepidoptera of Glengarriff, Co. Cork. **86**:12-17, 242-254.
 1953 *Tabanus tropicus* (L.) in Glengarriff, Co. Cork. (Dipt. Tabanidae). **86**:33.
 1953 *Strangalia aurulenta* (F.) in West Cork (Col., Cerambycidae). **86**:40.
 1953 *Agrochola lychnidis* ab. *conjuncta* Cockayne in South-East Essex. **86**:58.
 1953 *Adoxophyes orana* (V. Roesl) (Lep., Tortricidae) in South-East Essex. **86**:189.
 1954 *Adoxophyes orana* (F. V. Roesl) in Essex. **87**:128.
 1954 Erratic Emergence of Insects, Spring 1954. **87**:132.
 1954 *Eupithecia pulchellata* Stephens in West Cork. **87**:147-148.
 1954 Late Emergence of Insects in 1954. **87**:173-174.
 1954 Migrants in South-East Essex. **87**:219.
 1955 Late Appearance of Lepidoptera in 1954. **88**:63.
 1955 Pyralidae and Politics. **88**:106.
 1955 Early Emergences in 1955. **88**:115.
 1955 Early Appearances of British *betularia*. **88**:141.
 1955 A Few Further Notes on *Margaronia unionalis* Hübner (Lep., Pyralidae). **88**:141-142.
 1955 *Hadena suasa* in May. **88**:152.
 1955 Dr. Ford and Irish Lepidoptera. **88**:193-198.
 1955 *Aegeria andrenaeformis* in North Essex. **88**:198.
 1955 *Donacaula mucronellus* Schiffermuller in South-East Essex. **88**:203.
 1955 *Dioryctria splendidella* H.-S. in South-East Essex. **88**:211.
 1955 The Emergence Date of *Euphyia luctuata*. **88**:212.
 1955 The Burren in July, 1954. **88**:212.
 1955 *Heterographis oblitella* in South Essex. **88**:263.
 1955 The Southern English Captures of *Itame fulvata* de Villiers. **88**:283-284.
 1956 New Aberrations of British Lepidoptera. **89**:1-2, Plate 1.
 1956 *Ephestia woodiella* in South-East Essex. **89**:8.
 1956 *Loxostege sticticalis* Linn. in the Breck. **89**:24.
 1956 The Irish Race of *Gonopteryx rhamni* (Lep., Pieridae). **89**:65-66.
 1956 Later Migrants in 1955. **89**:72.
 1956 A Parasite of *Nephopterix obductella* F.R. **89**:121.
 1956 The Irish Subspecies of *Gonopteryx rhamni*. **89**:130-131.
 1956 Curious Cocoons of *Ccrura furcula*. **89**:147.
 1956 *Heterographis oblitella* Zeller (Lep., Pyralidae): A Resident British Species. **89**:152-154.
 1956 An Early Larva of *Pieris brassicae*. **89**:173.
 1956 Some Aspects of Melanism. **89**:185-187.

- 1956 *Phymatodes variabilis* in the Southend area. **89**:219.
 1956 *Hadena lepida* at Westcliffe-on-Sea. **89**:231.
 1956 The Habits of *Hydraecia hucherardi* Mabille (Lep., Noctuidae). **89**:232-233.
 1956 *Volucella zonaria* at Westcliffe-on-Sea. **89**:234.
 1956 The Burren Subspecies of *Erynnis tages* Linn. **89**:241-242.
 1956 *Cucullia absinthii* in South-East Essex. **89**:252.
 1956 *Nephoterix similella* at Westcliffe-on-Sea. **89**:256.
 1956 An Early Date for *Cirrhia icteritia*, **89**:256.
 1956 Habitat of *Leptidea sinapis* L. **89**:283.
 1956 *Erannis defoliaria* in September. **89**:297.
 1956 The Origin in England of *Hydraecia hucherardi* Mabille. **89**:298-299.
 1957 Rare Pyralids in Essex in September 1956. **90**:41.
 1957 Immigrants in 1956. **90**:50-51.
 1957 Lepidoptera of the Burren in May and June 1956. **90**:139-142.
 1957 Early Emergences in 1957. **90**:61.
 1957 *Biston betularia* F. *carbonaria* in Ireland. **90**:188.
 1957 *Platytes alpinellus* Hübner and other Micro-Lepidoptera at Westcliffe-on-Sea. **90**:269-270.
 1957 Thread Spinning of the Larva of *Apatele aceris*. **90**:272.
 1957 The Swarming Habit of *Acentropus nivea* Ol. **90**:315.
 1958 A New Aberration of *Gymnancyla canella*. **91**:14.
 1958 *Crociosema plebeiana* Zeller Resident in the British Isles (with R. M. Mere). **91**:20-22.
 1958 The Larval Colour of *Nonagria typhae* Thunberg. **91**:22.
 1958 C. Granville Clutterbuck. **91**:52.
 1958 An Early *Plusia gamma*. **91**:99.
 1958 *Euchromius ocella* Haw. as a British Insect (Lep., Crambidae). **91**:123-125.
 1958 A Further Devonshire Record of *Ephestia woodiella* Richards and Thompson. **91**:155.
 1958 Migrant Arrivals in May in South-East Essex. **91**:162.
 1958 A New Aberration of *Ectropis crepuscularia* Huebner (Lep., Geometridae). **91**:208-209.
 1958 *Cuculla absinthii* L. at Westcliffe-on-Sea. **91**:232.
 1958 *Plusia ni* Huebner in Essex. **91**:250.
 1958 Immigrants (Lepidoptera) on Tresco, Isles of Scilly, 1958. **91**:251-252.
 1958 *Eupithecia millefoliata* in South-East Essex. **91**:254.
 1958 *Nephoteryx semirubella* Scopoli in Essex. **91**:254.
 1958 *Myelois ceratoniae* Zeller at Westcliffe-on-Sea. **91**:262.
 1958 *Evetria purdeyi* Durrant in South-East Essex. **91**:269.
 1958 *Eulia formosana* Huebner in Essex. **91**:269.
 1959 Lepidoptera on Tresco in June. **92**:14-17.
 1959 *Cetonia aurata* ab. *nigra* (Col., Melolonthidae) in the Isles of Scilly. **92**:26.
 1959 The Further British Records of *Euchromius ocellus*. **92**:26.
 1959 *Ectropis crepuscularia* ab. *stovinaris*. **92**:37.
 1959 *Rhodometra sacraria* in North Essex. **92**:37.
 1959 A Note on Breeding *Nycterosa obstipata*. **92**:129.
 1959 Review: An Illustrated List of the British Tortricidae Part II: Olethreutinae by J. D. Bradley. **92**:129-132.
 1959 *Plusia interrogationis* Linn. at Westcliffe-on-Sea. **92**:157.
 1959 The Food-Plant of *Celaena leucostigma* Huebner. **92**:157.
 1959 A British Capture of *Crambus leucoschalis* Hampson. **92**:176.
 1959 The Breck Race of *Crambus inquinatellus* Schiff. **92**:236.
 1959 *Heterographis oblitella* Zeller in the Southern Area. **92**:243.
 1959 Lepidoptera on Tresco in 1959. **92**:246-249.
 1960 Notes on Coleoptera at Tresco, Isles of Scilly. **93**:61.
 1960 Autumn Immigrants in 1959 in South-East Essex. **93**:74.
 1960 *Heterographis oblitella* Zeller (Lep.) A Correction. **93**:85.
 1960 A Halved Gynandromorph *Laothoe populi* L. (Lepidoptera) at Westcliffe-on-Sea. **93**:224.

- 1960 *Euzophera cinerosella* Zell. (Lep.) at Westcliffe-on-Sea. **93**:224.
 1960 A Melanic Aberration of *Endotricha flammealis* Zell. (Lep.). **93**:231.
 1960 *Lasiocampa quercus* (Linn.) Flying at Night. **93**:235.
 1961 Some Notes on *Oidaematophorus bowesi* Whalley (Lep., Pterophoridae).
94:9-10.
 1961 Lepidoptera on Tresco in 1960. **94**:26-28.
 1962 A New Subspecies of *Eupithecia vulgata* Haworth (Lep.: Hyriomenidae).
95:45-46.

(B) *Entomologist's Record and Journal of Variation*

- 1951 Notes on the Microlepidoptera. **63**:181-182.
 1951 Notes on the Microlepidoptera. **63**:221-222.
 1951 Notes on the Microlepidoptera. **63**:250-251.
 1951 Notes on the Microlepidoptera. **63**:300-301.
 1952 The Dorset Swallowtail Butterfly. **64**:23-24.
 1952 Notes on the Microlepidoptera. **64**:25-26.
 1952 Notes on the Microlepidoptera. **64**:50-51.
 1952 Notes on the Microlepidoptera. **64**:84-85.
 1952 Notes on the Microlepidoptera. **64**:120-121.
 1952 Notes on the Microlepidoptera. **64**:144-145.
 1952 Notes on the Microlepidoptera. **64**:177-178.
 1952 Notes on the Microlepidoptera. **64**:211-213.
 1952 Killing Specimens for the Cabinet. **64**:222.
 1952 *Hydrophilus piceus* L. at Light. **64**:228.
 1952 Notes on the Microlepidoptera. **64**:250-251.
 1952 Notes on the Microlepidoptera. **64**:285-286.
 1952 Notes on the Microlepidoptera. **64**:319-320.
 1952 Notes on the Microlepidoptera. **64**:345:346.
 1953 Notes on the Microlepidoptera. **65**:14-15.
 1953 Aberrations of *Arctia villica* Linn. **65**:17.
 1953 Notes on the Microlepidoptera. **65**:50-51.
 1953 Notes on the Microlepidoptera. **65**:85-86.
 1953 Notes on the Microlepidoptera. **65**:116-117.
 1953 A Note on *Spatalistis bifasciana* Hübn. **65**:132-134.
 1953 Notes on the Microlepidoptera. **65**:137-138.
 1953 Some Notes on *Strangalia aurulenta* Fab. **65**:149-150.
 1953 Notes on the Microlepidoptera. **65**:176-178.
 1953 Notes on the Microlepidoptera. **65**:213-215.
 1953 Notes on the Microlepidoptera. **65**:255-256.
 1953 Foodplants of *Polychrisia moneta* Fab. **65**:256-257.
 1953 Melanism in *Tethea ocularis* Linn. **65**:277-278.
 1953 Notes on the Microlepidoptera. **65**:287-288.
 1953 *Nola albula* Schiff. at Chattenden. **65**:308-309.
 1953 Notes on the Microlepidoptera. **65**:320-321.
 1953 *Calophasia lunula* Hufn. Larvae in Essex. **65**:322-323.
 1953 A Few Notes on *Cirrhia ocellaris* Bork. **65**:347:348.
 1953 Notes on the Microlepidoptera. **65**:360-361.
 1954 A Further British Specimen of *Heterographis oblitella* Zell. **66**:2-3.
 1954 Notes on the Microlepidoptera. **66**:18-18.
 1954 *Maniola tithonus* L. on Marshes. **66**:22.
 1954 Notes on the Microlepidoptera. **66**:54-55.
 1954 Notes on the Microlepidoptera. **66**:82-83.
 1954 Late Emergence of *Nycterosia obstipata* Fab. **66**:83.
 1954 *Heterographis oblitella* Zell.: A Further British Specimen. **66**:84.
 1954 The Burren in 1953. **66**:104-107.
 1954 Notes on the Microlepidoptera. **66**:115-117.
 1954 *Sphinx ligustri* Linn. Feeding on Holly. **66**:120-121.
 1954 Notes on the Microlepidoptera. **66**:150-152.
 1954 The Wood Leopard Moth on the Essex Coast. **66**:162-164.
 1954 Notes on the Microlepidoptera. **66**:167-168.

- 1954 Irregular Dates of Spring Insects. **66**:171-172.
 1954 Notes on the Microlepidoptera. **66**:196-197.
 1954 *Pararge aegeria* Linn. in East Essex. **66**:199.
 1954 A Staggered Emergence of *Notodonta dromedarius* Linn. **66**:199-200.
 1954 *Arctia villica* ab. *bruyanti* Defour in South-East Essex. **66**:201.
 1954 *Sterrha rusticata* Schiff. in North-West Kent. **66**:201-202.
 1954 Clearwings in Essex. **66**:210-212.
 1954 Notes on the Microlepidoptera. **66**:226-227.
 1954 Notes on the Microlepidoptera. **66**:252-253.
 1954 *Lithomoia solidaginis* Hub. in South-East Essex. **66**:255.
 1954 Notes on the Microlepidoptera. **66**:271-272.
 1954 Notes on the Microlepidoptera. **66**:293-294.
 1957 Notes on Microlepidoptera, June. **69**:130-131.
 1957 Rearing *Mamestra albicolon* Hb. and *Heliothis dipsacea* Linn. **69**:174.
 1957 Notes on Microlepidoptera. **69**:193-194.
 1957 Notes on Microlepidoptera. **69**:216-217.
 1957 Notes on Microlepidoptera. **69**:244-245.
 1957 Ireland, Then and Now. **69**:267-269.
 1957 Notes on Microlepidoptera. **69**:281-282.
 1958 Notes on Microlepidoptera. **70**:21.
 1958 *Leucania unipuncta* Haw. as a Resident Species. **70**:29.
 1958 Notes on Microlepidoptera. **70**:53-55.
 1958 A Further Record of *Laspeyresia lobarzewskii* Nowicki in Kent. **70**:71-73.
 1958 Notes on Microlepidoptera. **70**:80-81.
 1958 Notes on Microlepidoptera. **70**:107-109.
 1958 Notes on Microlepidoptera. **70**:136-137.
 1958 Notes on Microlepidoptera. **70**:162.
 1958 The Supposed Irish Record of *Lycaena dispar* Haw. **70**:182-183.
 1958 Notes on Microlepidoptera. **70**:191-192.
 1958 Notes on Microlepidoptera. **70**:218-219.
 1958 Notes on Microlepidoptera. **70**:266-267.
 1958 Notes on Microlepidoptera. **70**:299-300.
 1959 Notes on Microlepidoptera. **71**:21-22.
 1959 Notes on Microlepidoptera. **71**:51.
 1959 Notes on Microlepidoptera. **71**:75-76.
 1959 Notes on Microlepidoptera. **71**:97-99.
 1959 Notes on Microlepidoptera. **71**:121.
 1959 Notes on Microlepidoptera. **71**:153-154.
 1959 Notes on Microlepidoptera. **71**:181-182.
 1959 Notes on Microlepidoptera. **71**:228-229.
 1959 Notes on Microlepidoptera. **71**:262-263.
 1959 Notes on Microlepidoptera. **71**:284-285.
 1960 Notes on the Microlepidoptera. **72**:16-17.
 1960 British Entomologists and the British Fauna. **72**:19.
 1960 Notes on the Microlepidoptera. **72**:30-31.
 1960 Honest Doubt. **72**:31-33.
 1960 The Foodplant of *Tiliacea aurago* Schiff. **72**:72.
 1960 Notes on the Microlepidoptera. **72**:125.
 1960 British Entomologists and the British Fauna. **72**:134-135.
 1960 Notes on the Microlepidoptera. **72**:141-142.
 1960 *Gonepteryx rhamni* Linn. Migrating. **72**:168-169.
 1960 Notes on the Microlepidoptera. **72**:172-173.
 1960 Notes on the Microlepidoptera. **72**:185-186.
 1960 Notes on the Microlepidoptera. **72**:214.
 1961 Notes on the Microlepidoptera. **73**:10-11.
 1961 Notes on the Microlepidoptera. **73**:89-90.
 1961 The Emergence Date of *Eupithecia fraxinata* Crewe. **73**:95.
 1961 Notes on the Microlepidoptera. **73**:113-114.
 1961 Notes on the Microlepidoptera. **73**:149-152.
 1961 *Cosymbia puppillaria* Hübn. in South-East Essex. **73**:163.

- 1961 Notes on the Microlepidoptera. **73**:181.
- 1961 The Present Status of *Euphyia bilineata* L. ab. *isolata* Kane. **73**:203-206.
- 1961 A Dilute Aberration of *Leucania lithargyrea* Esp. **73**:221.
- 1961 Notes on the Microlepidoptera. **73**:229-230.
- 1961 An Entomological Mystery. **73**:240.
- 1961 The Dingle Peninsula in July 1961. **73**:247-249.
- 1961 Notes on the Microlepidoptera. **73**:257-258.
- 1962 Notes on the Microlepidoptera. **74**:39.
- 1962 Insect Movements in 1961. **74**:40-41.
- 1962 *Cryphia muralis* Forst. In Kerry. **74**:119-120.
- 1962 A New Subspecies of *Eupithecia venosata* Fabr. **74**:171-172.
- 1962 Notes on the Microlepidoptera. **74**:202.
- 1962 Notes on the Microlepidoptera. **74**:218-219.
- 1962 Notes on the Microlepidoptera. **74**:240-241.
- 1962 Dingle in 1962. **74**:249-252.
- 1962 The Habits of *Bomolocha fontis* Thunb. **74**:278-279.
- 1962 *Emus hirtus* L. in the Southend District. **74**:279.
- 1963 Notes on the Microlepidoptera. **75**:138-139.
- 1963 *Lampropteryx oregiata* Metcalfe. **75**:218-219.
- 1963 Notes on the Microlepidoptera. **75**:219.
- 1963 Obituary: Mrs. Ethel Ada Huggins. **75**:228.
- 1963 *Eupithecia virgaureata*. **75**:228-229.
- 1964 Notes on the Microlepidoptera. **76**:16-17.
- 1964 Dingle 1963. **76**:18-20.
- 1964 Melanism in Lepidoptera in the West of Ireland. **76**:155-158.
- 1964 Notes on the Microlepidoptera. **76**:158-159.
- 1964 Ireland 1964. **76**:223-227.
- 1964 Notes on the Microlepidoptera. **76**:230-231.
- 1964 A New Aberration of *Xylocampa areola* Esp. **76**:286, **77**:36.
- 1964 The Hibernation and Pupation of *Cossus cossus* L. **76**:294-295.
- 1965 Ireland in 1964, a Postscript. **77**:13-14.
- 1965 Notes on the Microlepidoptera. **77**:14-15.
- 1965 More About *Cossus cossus* L. (Lep., Cossidae). **77**:176.
- 1965 *Procus versicolor* Borkh. (Lep., Noctuidae) in Kent. **77**:186-187.
- 1966 Notes on the Microlepidoptera. **78**:110-111.
- 1966 Notes on the Microlepidoptera. **78**:166-167.
- 1966 The Second Broods of Irish Hadenidae. **78**:183.
- 1966 *Celastrina argiolus* L. **78**:183-184.
- 1966 *Plusia gracilis* Lempke at Wicken. **78**:255-256.
- 1966 Notes on the Microlepidoptera. **78**:256.
- 1966 Dingle 1966. **78**:294-297.
- 1967 Notes on the Microlepidoptera. **79**:14.
- 1967 A Note on the Hydraecias in the West of Ireland. **79**:99-100.
- 1967 Notes on the Microlepidoptera. **79**:100-101.
- 1967 A Curious Conduct of *Alsophila aescularia* Schiff. **79**:118.
- 1967 Notes on the Microlepidoptera. **79**:256.
- 1967 The Dingle Peninsula, 1967. **79**:280-284.
- 1968 A New Aberration of *Eupithecia venosata* Fabr. **80**:157.
- 1968 Notes on the Microlepidoptera. **80**:233-235.
- 1968 "Innisfallen" Fare Thee Well! **80**:315-318.
- 1969 Notes on the Microlepidoptera. **81**:104.
- 1969 *Hydraecia lucens* Freyer at Dingle. **81**:120.
- 1969 Ireland 1969. **81**:319-321.
- 1970 Some Notes from Essex. **82**:15-17.
- 1970 Notes on the Microlepidoptera. **82**:17-18.
- 1970 Ireland 1969, A Postscript. **82**:193-194.
- 1970 Notes on the Microlepidoptera. **82**:194.
- 1970 The Food Plant of *Celastrina argiolus* L. **82**:201.
- 1970 "Another Last Day." **82**:314-316.
- 1971 Hydraecias in the Coastal Areas of Western Ireland. **83**:37-38.

- 1971 Dingle, 1971. **83**:343-346.
 1972 Notes on the Microlepidoptera. **84**:163-164.
 1972 *Euphydryas aurinia* Rott. in the Isle of Wight. **84**:291.
 1972 Obituary: Edward Stuart Augustus Baynes, O.B.E., F.R.E.S. **84**:209-210.
 1972 Obituary: Dennis Alfred Smith, F.R.E.S. **84**:291.
 1973 Ireland, 1972. **85**:65-67.
 1973 *Nymphalis polychlorus* L. in South Essex. **85**:225.
 1973 "They Were Irish Gannets." **85**:234-237.
 1974 Notes on the Microlepidoptera. **86**:70-71.
 1975 Essex Insects in 1974. **87**:60.
 1975 The Black Larva of *Abraxas grossulariata* L. **87**:268
 1975 A Few Notes on Clearwings. **87**:275-276.
 1976 The Second Brood of *Apatele euphorbiae* s.sp. *myricae* Gn. in the West of Ireland. **88**:82.
 1976 Apropos of Dr. Young's Letter. **88**:119-120.
 1976 *Epiblema grandaevana* (L. & Z.). **88**:206-207.
 1976 *Chloroclystis chloerata* Mab. at Westcliffe-on-Sea. **88**:239.

(C) *Entomologist's Gazette*

- 1951 A Further Old Record of *Parascotia fuliginaria* Linn. (Waved Black). **2**:75.
 1952 Farniana. **3**:231-233.
 1953 The Dillon Enigma. **4**:305-307.
 1954 The Dispersal of Insects. **5**:63-64.
 1954 Burrows of Mucking. **5**:113-115.
 1954 Foodplants of *Aricia agestis* Schiff. **5**:234-235.
 1955 The Old Days at Chattenden Roughs. **6**:55-57.
 1955 The Irish Subspecies of *Alucita icterodactyla* Mann (Lep.: Pterophoridae). **6**:124-126.
 1957 A Note on *Paramesia guomana* Clerck (Lep.: Tortricidae). **8**:19.
 1958 *Papilio podalirius* L., as a Genuine Immigrant (Lep.: Papilionidae). **9**:82.
 1962 Notes on Variation in *Cryphia muralis* Forster (Lep.: Noctuidae). **13**:94-96.
 1964 *Pyrausta funebris* Strom, 1768 (Lep.: Pyralidae). **15**:95-96.
 1967 Robin Mere in the Field. **18**:110.
 1970 Review: The Butterflies and Moths of Kent, Vols. I and II, by J. M. Chalmers-Hunt. **21**:57.
 1970 *Lasiocampa quercus* (L.) subspecies *callunae* Palmer. **21**:239-240.

(D) *Various*

- 1918 The Limnaeae of the Alpine Lakes in the Glengarriff District, West Cork. *Irish Nat.*, **27**:119-128.
 1919 Occurrence of *Hartmannia septemspiralis* (Razoumovsky) and *H. patula* (Drap.) in England. *Jnl. Conch.*, **16** (2), 51:52.
 1955 A Survey of Essex Lepidoptera in the Past Fifty Years. *Essex Nat.*, **29** (5), 1-4.
 1956 Lepidoptera of the Rochford Hundred. *S. Essex Nat.*, **1955**:23-41.
 1956 A Naturalist in the Burren. *Proc. S. Lond. ent. nat. Hist. Soc.*, **1956**:176-183.
 1959 A Naturalist in the Kingdom of Kerry. *Proc. S. Lond. ent. nat. Hist. Soc.*, **1959**:176-183.
 1972 Obituary: Edward Stuart Augustus Baynes, O.B.E., F.R.E.S. *Proc. Brit. ent. nat. Hist. Soc.*, **5** (2), 80.
 1975 *A Guide to the Butterflies and Larger Moths of Essex* (with J. Firmin, F. D. Buck, A. J. Dewick, D. G. Down, G. A. Pyman, E. F. Williams). Essex Naturalist's Trust.

DATE OF THE ARRAN BROWN AND SCOTCH ARGUS (a correction)

In our last number in the current volume (1/2): 5 and 55, we gave an account of the exhibit of a ♀ *Erebia ligea* (L.) captured in the Scottish Highlands 'in July 1969' by T. J. Daley 'together with many *E. aethiops* Esp.'

Our member C. Edwards of Oban, Argyll, wrote to us to say that in his experience *E. aethiops* males start flying in late July and the first females a week or ten days later. He considered '5th July' too early a date for *aethiops* and pointed out that Higgins & Riley (Field Guide) give 'end of June to August' for the flight season of *ligea*.

While confirming the fact of the capture by T. J. Daley of *ligea* in Scotland, we must apologise for an error of date that crept in due to the circumstances of organising data of exhibits at the Annual Exhibition. On learning that the Society wished to photograph for publication his '*aethiops* form' (as he thought it), Mr. Daley was questioned about the date and replied 'late July 1969', speaking from memory. Later, after confirmation of the identity of the specimen, he changed this, both verbally and in written account, to '5th August 1969'. A confusion occurred in drawing up the account between the two versions which became combined. We have no doubt of the genuineness and circumstances of Mr. Daley's capture of *ligea*, but must request readers to correct both this mistake and one or two others which, we regret, occurred in our report and plate on the Annual Exhibition.—Editor.

ERRATA Vol. 11 (1/2)

- p. 2, line 44 and p. 8 line 6: FOR ab. *holonops* READ ab. *holanops*.
 p. 5, line 7: FOR July READ August.
 p. 7, line 34: FOR C.B. READ C.G.; line 36: BEFORE ab. *confluens*
 INSERT ab. *valezina*; line 37: FOR ab. *ater* female READ ab. *ater* male.
 p. 55, line 25: FOR July 5th READ August 5th.
 Plate 1, captions: fig. 2: FOR *lathonia* read *paphia*.

PROCEEDINGS

9th February 1978

The President, Mr. G. PRIOR, in the chair.

EXHIBITS

Dr. A. A. ALLEN — (i) A ♀ example of *Apanteles pinicola* Lyle (Hym., Braconidae) bred 25.ix.1977 from an immature larva of *Thera obeliscata* (Hübner) (Lep., Geometridae), the grey pine carpet. The young host larva was beaten, together with other larvae of the same species, from low branches of *Pinus sylvestris*, 3.ix.1977, on Brownsea Island, Dorset. The host larva was killed on 12.ix, on which date the parasite larva spun its rosy-tinted white cocoon, attaching it to the dead host skin. *A. pinicola* seems to be a regular parasite of *Thera* spp., but its distribution in Britain is uncertain. (ii) A ♀ example of *Platylabus pulchellatus* Bridgman (Hym.,

Ichneumonidae) bred 15.viii.1977 by Mr. R. Cordell, from a full-grown larva of *Eupithecia pulchellata* Stephens found at East Prawle, Devon, June 1977. In common with other members of this sub-family the Ichneumoninae, *pulchellatus* attacks the full-grown host or pre-pupa but emerges from the host's pupa. All the species are solitary parasites. Perkins (1960) writes of the species being 'infrequent' in occurrence: possibly it is limited by the distribution of *E. pulchellata*, apparently its only host. The exhibitor was grateful to Mr. Cordella for the gift of the specimen.

E. S. BRADFORD — (i) *Gelechia scotinella* H.-S., an uncommon moth found among other micros in a box and recently confirmed as this species. The larva feeds in the flowers of blackthorn in April, the adult moth appearing in June-July. (ii) *Pyralis farinalis* L. bred from original wild stock taken in Kent. There is a marked difference in the size of the two broods that occurred in 1977. The food supply was plentiful, so there must have been another cause for the smaller size of the second brood specimens. The moth is usually single brooded; at times taking two years to complete the life-cycle.

S. N. A. JACOBS — A leaf of an American poplar bearing the gall and mine of the Nepticulid moth *Ectoedemia populella* Busck, together with drawings of the mine and also of the mine and gall made by the British moth *Ectoedemia turbidella* (Z.) for comparison.

MEMBERSHIP

The obligation book was signed by Messrs. Cumming, Tranter and Smith.

COMMUNICATIONS

Mr. E. S. BRADFORD reported that in his 1976 light-trap material he had found two broods of the moth *Stenoptilia saxifragae* Fletcher (Lep., Pterophoridae), in fact 39 specimens of the first (vi-vii), and 10 specimens of the second (viii-ix) at Boreham Wood, Herts. The species was first found in Dublin nearly forty years ago.

Mr. K. G. B. SMITH then gave the Society a very comprehensive yet succinct illustrated talk on 'Changes in the British Diptera fauna'. This was followed by a keen discussion on the many interesting aspects of the subject.

OBSERVATIONS ON EXHIBITS

Some members reported having observed in the wild a second brood of *Pyralis farinalis*, while others declared they had never observed this.

23rd February 1978

The President, Mr. G. PRIOR, in the chair.

EXHIBITS

J. BROWN — Two species of Lycaenidae from an isolated mountain in northern Greece, recently discovered by the exhibitor and Mr. J. Coutsis, with transparencies illustrating the habitat. After performing chromosome counts, the exhibitor was proposing to consider them as (i) a new species near *Lysandra coridon* (Poda) and (ii) a new species of *Agrodiaetus*, subject to reserves.

M. W. F. TWEEDIE — A photograph of the Arachnid *Anelasmacephalus cambridgei* (Westwood) (Opiliones, Trogludae) from a wood near Rye, Sussex.

The President then announced that two books had been presented to the library, and exhibited them; they were *Dragonflies of Great Britain and Ireland* (Hammond and Gardner), and *Insect Photography* (P. E. Lindley).

NOMINATIONS

Having been read a second time, the following were declared elected new members: A. R. Cronin, Lt. Col. G. Eastwick-Field, C. A. Guy, D. Budworth, M.Sc., R. Allison, A.C.A., N. F. Heal and R. A. Softly.

COMMUNICATIONS

B. HARGREAVES then gave an illustrated talk on 'The versatility of entomological illustration'. In addition to revealing his own techniques and showing some examples of early artists whom he admired, the speaker showed reproductions of a mass of recent, unpublished illustrations. In the ensuing discussion members were interested to learn the artist's views on various questions, such as the capacity of a non-entomological artist to reveal diagnostic characters; the speaker said that for this purpose he had had the benefit of repeated advice from entomological experts on the groups concerned.

9th March 1978

The President, Mr. G. PRIOR, in the chair.

EXHIBITS

Dr. A. A. ALLEN — Two examples (♂, ♀) of *Dusona pulchripes* Holmgren (Hym., Ichneumonidae), bred singly from two larvae of *Thera obeliscata* (Hübner) (Lep., Geometridae). The hosts were beaten, in the company of others, from low branches of *Pinus sylvestris*, 14.viii.1977, on Haldon Moors, near Dawlish, Devon. The larvae attained full size at irregular intervals, the majority producing moths in the early autumn. The two parasitised by *pulchripes* were characteristically killed as prepupae; one in late August, from which a ♂ was bred 18.ix.77, and one on 27.ix, the ♀ being bred 28.x. Not only is *T. obeliscata* a new host for the parasite, but this record seems to represent the first incidence of *pulchripes* in Britain. The exhibitor was compelled to send the insect to an authority on *Dusona*, Dr. R. Hinz, in Germany, who kindly identified the species: it was not in the British section at the British Museum, nor listed in the (1945) Klotz & Hincks check-list. On the Continent the species is a parasite of *Thera juniperata* (L.). It is possible that the species was introduced when conifer trees were imported from Scandinavia and planted in Britain.

L. N. BAXTER — *Actias maenas* (Doubl.), an example of the adult (Lep., Saturniidae), the larva of which was reared wholly on sumach (*Rhus typhira*) after the third instar; the rearing was started on a mixture of walnut (*Juglans*) and sumach, the latter by accident; it showed a strong preference for this instead of the recommended walnut. The ova were purchased from R. N. Baxter of Wanstead, and the adult hatched on 25.i.1977.

Dr. B. J. MACNULTY — *Myrina silenus* (F.) (Lep., Lycaenidae), four examples, as an additional illustration to his talk.

MEMBERSHIP

The obligation book was signed by Mr. A. R. Barton.

COMMUNICATIONS

Dr. C. G. M. DE WORMS reported that, after the severe cold spell, fair numbers of moths had now appeared, among those reported being *Biston strataria* (Hufn.) and the common *Orthosia* spp. Dr. ALLEN stated that the first *Gonepteryx rhamni* (L.), a ♀ at Coulsdon, Surrey, was seen on 23rd February. Mr. E. WILD stated that he had so far only seen *Apocheima pilosaria* (D. & S.) and *Alsophila aescularia* (D. & S.) to his light in Surrey.

Mr. A. E. STUBBS stated that the Nature Conservancy had declared 530 acres of the Wyre Forest, in Hereford and Worcestershire, as a National Nature Reserve by agreement with the Forestry Commission. Mr. M. BROWN reported that Darenth Wood, Kent, considered by the Nature Conservancy as a site of National Importance was under threat of being quarried and subject to an enquiry in April. He had a list of old records of Lepidoptera, but would be grateful for a list of species still inhabiting it which might be endangered.

Dr. B. J. MACNULTY then gave an illustrated talk on West African Lepidoptera early stages; this one dealt particularly with Acraeidae, Lycaenidae and HesperIIDae.

30th March 1978

The President, Mr. G. PRIOR, in the chair.

NOMINATIONS

Their names having been read for the second time, the following were duly declared elected members: Messrs. G. G. Cleland, M.Sc., A. J. Halstead, M.Sc. and T. C. Rednall. The Rev. S. C. Pettis and Mr. M. Sterling signed the obligation book.

COMMUNICATIONS

Dr. C. G. M. DE WORMS reported that three examples of *Gonepteryx rhamni* (L.), the brimstone, had been seen recently near Staines. In Dorset *Orthosia munda* (D. & S.) had been noted as plentiful near Ringwood, with *Biston strataria* (Hufn.) still on the wing, but *Achlya flavicornis* (L.) was scarce; the first *Xylocampa areola* (Esp.) had been noted. Mr. R. FAIRCLOUGH reported an unusually early appearance of one *Thera variata* (D. & S.).

A discussion on 'Conservation, help or hindrance to entomologists?' then ensued, led by Mr. A. E. Stubbs, a member who is also one of the Nature Conservancy staff. He said that entomologists, if they wished their interests to be defended, should voice their concern, with details of an endangered species' place of flight, so that appropriate measures of management could be taken before it became too late. Mr. John Rudge, also of the Conservancy, spoke of the 1975 Act which at present forbade under penalty the taking of *Maculinea arion* (L.), the large blue; he asked members to state whether any of those present desired other species to be named in future legislation. Nobody present suggested any other species of Lepidoptera in need of protection in this way. However, a very animated discussion on the topic of conservation as it related to this order and other creatures, followed, and a variety of opinions, some critical of these laws, were voiced.

13th April 1978

The President, Mr. G. PRIOR, in the chair.

EXHIBITS

Dr. A. A. ALLEN — (i) A ♂ *Alexeter nebulator* Thunberg (Hym., Ichneumonidae), caught at m.v. light at Plaistow, Sussex, 17.vii.1976. The species is apparently very widely distributed but perhaps rather irregular in its appearance. Most genera of the tribe Mesolerini (of the Ctenopelmatinae) to which *Alexeter* belongs, are endoparasites of Symphyta larvae. However, no reliable host records appear to exist for *nebulator*. It shares with the following exhibit the 'Ophionoid facies', i.e. a testaceous colouring and nocturnal flight, *inter alia*. (ii) A ♀ *Ophion minutus* Kriechbaumer (Hym., Ichneumonidae), captured by Mr. P. Cordell, 20.v.1974, in a light trap at Nutfield, Surrey. *Ophion* species are solitary endoparasites of Lepidoptera and usually of large size; the present species may be recognised by its small size and wing venation. Although widely distributed through Southern England, it does not seem to be common, and is much rarer in northern counties. (iii) Two larvae of *Euplagia quadripunctaria* (Poda) (Lep., Arctiidae) (Jersey tiger) found on cliffs at Dawlish, Devon, 1 and 2.iv.1978; one larva was found at night feeding on groundsel, while the other was beaten from bramble nearby, by day. Both were about 1in. long when captured. Although the moth is abundant at Dawlish in August, these larvae were hard to find; but larvae of the scarlet tiger (*Callimorpha dominula* (L.)) were abundant on nettle on the cliffs in late March and early April 1978. (iv) A specimen of *Phlogophora meticulosa* (L.) (the angle-shades moth) captured at 18.00 hours on 13.iv.1978 at South Audley Street, London.

Mr. E. S. BRADFORD — *Eudonia angustea* (Curtis) (Lep., Pyralidae). The larvae of this species were found feeding on moss on walls in Faversham, Kent. In 1977 the larvae were numerous on these same walls, almost completely destroying the moss by their workings; however, the species reappeared this year.

Mr. and Mrs. T. G. HOWARTH exhibited three larvae, in their last instar, of *Euplagia quadripunctaria* (Poda), bred from ova laid by a female captured in Seaton, E. Devon, in August 1977, the easternmost station of the moth in Britain. These having been reared indoors, were much more advanced than those shown by Dr. Allen.

J. MUGGLETON — Morphs of the two-spotted ladybird (*Adalia bipunctata* (L.)) (Col., Coccinellidae) commonly found in Britain, together with one specimen of the form *fasciatopunctata* of this beetle; examples of the latter form have been found in 1976-77 at Staines, Datchet and Milford, though apparently previously only known from Mongolia where it makes up over 50% of the population. Breeding experiments with the Staines form indicate that *fasciatopunctata* is controlled by an allele recessive to the typical form. The reason for its sudden appearance at Staines is a mystery. It will be interesting to see whether the frequency increases in the next few years.

MATTERS ARISING FROM THE LAST MINUTES

Mr. A. E. STUBBS spoke regarding the passage of Lord Cranbrook's Bill, reported to have been recently 'noddled through' its third reading in the House of Lords. It is still not known whether the contestable portions will still be in the Bill when it reaches the House of Commons. Dr. C. G. M. DE WORMS said he understood Lord Cranbrook had agreed to drop his long list.

MEMBERSHIP

Mr. Softly signed the Obligation Book.

ANNOUNCEMENTS

Review copies, presented to the Society's library by the authors of two books, were exhibited. Peter Coates: 'The Gardens of Buckingham Palace' and Pinhey: 'The Butterflies of Central and S. Africa'.

Mr. G. ELSE announced that, Dr. J. Alison having died, it would be necessary to organise a substitute to speak at the meeting of 8th February 1979.

Mr. D. STIMPSON mentioned reports of tidying up Hampstead Heath resulting in protests. Mr. SOFTLY said he understood that the Parks Department had cleared scrub in the Old Kenwood Estate or Highgate Valley sector. It was hoped that someone knowledgeable in conservancy would be associated with these measures. The President undertook to find out if such were the case.

COMMUNICATIONS

Dr. C. G. M. DE WORMS reported that *Celastrina argiolus* (L.), the holly blue, had been reported on the wing at Brighton, and that *Lithophane semibrunnea* (Haworth) had recently visited his own light trap in Surrey. Dr. ALLEN described the comparative frequency of larvae observed feeding at night in March-April recently in Devon. Mr. R. TUBBS reported that hibernating larvae were about a fortnight late, 18 overwintering *Limenitis camilla* (L.), white admiral, larvae only beginning to leave their hibernacula on 8th April. Mr. G. ELSE reported having, with Mr. D. Appleton, dug out the rare beetle *Anostris castaneus* (L.) (Col., Elateridae) from sandy hillocks on the southern coast-line of the Isle of Wight on 8th April 1978. Mr. MEREDITH reported the flight of *Inachis io* (L.), peacock, *Aglais urticae* (L.), small tortoise-shell, and *Polygonia c-album*, comma, butterflies on 31st March in South Dorset, also the sighting of lizards and a badger.

Miss M. A. GIRLING then gave an illustrated talk entitled: 'Evidence from fossil assemblages of Coleoptera of extinctions from the British Fauna during the last 9,000 years'. Those present evinced great interest in the data and conclusions revealed in this unusual talk, and the hope was expressed that much of this might shortly be published in the Society's *Proceedings*.

27th April 1978

The President, Mr. G. PRIOR, in the chair.

EXHIBITS

Dr. A. A. ALLEN — A cocoon, alive and unhatched, of *Apanteles formosus* Wesmael (Hym., Braconidae) obtained from a larva of *Ourapteryx sambucaria* (L.) (Lep., Geometridae) beaten from privet, 24.iii.1978, in a wood at Salfords, Surrey. The host fed well on privet but did not increase appreciably in size, and on 15.iv the parasite larva appeared and spun its most characteristic cocoon near by to the dying host. The cocoon was finally a rather discoloured yellow, but the outstanding feature was the firm, thin stem which extended from the base of the cocoon to the floor of the container for a distance of about 10mm. Shortly after the parasite had appeared (from the rear half of the host), the host experienced a series of violent convulsions, after which it died; it was dead within twelve hours. This behaviour contrasted with the more usual gradual

deterioration of the host after the appearance of other solitary spp. of *Apanteles*; in the experience of the exhibitor, death usually takes 3-6 days. The host record is of interest for *A. formosus* has a known life-cycle: it is bivoltine, the usual overwintering host larva in which *A. formosus* hibernates is *Abraxas grossulariata* (L.), while the summer brood larva are parasitic on larvae of *Lycia hirtaria* Clerck. Very old records list *sambucaria* as a host, but G. T. Lyle, an experienced hymenopterist, failed to obtain this species from the many *sambucaria* which he collected in the early part of this century.

Lt. Col. A. M. EMMET — A larva of *Epinotia nanana* (Tr.) (Lep., Tortricidae) mining leaves of Norway spruce (*Picea abies*), to show the unusual method of feeding. The larva was taken in Hatfield Forest, Essex on 23rd April 1978.

G. PRIOR — (i) A 'Handylite' to which a fluorescent tube had been fitted after purchase for £4.59, which can be hung from a tree and run from a car battery to catch moths. (ii) Larvae of the slender pug (*Eupithecia tenuiata* (Hübner)) which had been beaten from the catkins of a female *Salix caprea* by a member, John Fell, at Hockwold, near Thetford.

MATTERS ARISING FROM THE PREVIOUS MINUTES

The President stated that he had made the promised enquiries about work at Hampstead Heath, but the G.L.C. was not telling the Camden Borough Council anything about it.

COMMUNICATIONS

Dr. C. G. M. DE WORMS said it had been a 'blackthorn winter' with only two nice days in the spring period. However, A. Harbottle had seen *Vanessa atalanta* (L.) on 23rd April; and another member, Mr. Messenger, had seen *Odontesia carmelita* (Esper) on a telegraph-pole. Mr. G. R. ELSE reported having seen *Pyrgus malvae* (L.) on the wing on 23rd April, on which day also *Polygonia c-album* (L.) had been seen at Wimbledon by Mr. R. TUBBS. Other sightings or captures of various lepidoptera species were also reported.

Mr. R. S. GEORGE then gave an illustrated talk entitled 'Trying to record the distribution of British fleas', full of anecdotes and salt.

11th May 1978

The President, Mr. G. PRIOR, in the chair.

EXHIBITS

Rev. D. J. L. AGASSIZ — An extreme aberration of *Nymphula nymphaeata* (L.) (Lep., Pyralidae) taken in 1971 by Mr. J. D. Bonny at Crews Hill, Enfield, Middx. The forewings were almost unicolorous ochreous brown with a darker subterminal line.

Dr. A. A. ALLEN — Examples of *Apanteles spurius* Wesmael (Hym., Braconidae) and an unidentifiable species of *Mesochorus* (Hym., Ichneumonidae) occurring together as parasite and hyperparasite, respectively, of *Biston betularia* (L.) (Lep., Geometridae). The host larva was found when about half-grown, on 4.ix.77 in a lane near Reigate, Surrey, on elm. On 10-11.ix, eight larvae of *A. spurius* appeared from the host and spun their yellowish cocoons. Normally these hatch in the spring of the following year, but on 28-30.ix four specimens of a *Mesochorus* sp. (♀ and 3 ♂) were bred, while the remaining four cocoons hatched at the expected time in late April 1978, giving rise to *A. spurius* (♀ and 3 ♂). The exhibit

was of interest because it illustrated only partial parasitism, exactly half of the gregarious parasite *A. spurius* being themselves parasitised by the *Mesochorus*. The female *Mesochorus* oviposits directly into some or all of the *Apanteles* larvae contained in the *B. betularia*. The occurrence of hyperparasites may be readily inferred from Braconid cocoons by the appearance of the hatched cocoon. The *Mesochorus* (like other Ichneumonids) chew an irregular hole in the cocoon to make their exit, while the Braconidae all make a more or less neat slice across the top of the cocoon.

E. S. BRADFORD — A larva of *Monochroa palustrella* (Douglas) (Lep., Gelechiidae), a very local species, taken from the rootstock of a plant of *Rumex crispus* from Stoke, Kent, in 1978.

B. O. C. GARDINER — Larvae of the American hawkmoth, *Manduca sexta* (Johan.), being reared on an artificial diet, the subject of his talk later in the evening; they were thriving, but of an unusual bluish hue.

Col. D. H. STERLING — Two larvae of *Lithophane léautieri* Boisd., bred from ova obtained from a female which came to light at Winchester on 22nd October 1977 and laid five ova before it died, of which only two hatched. These fed up on a species of *Cupressus*. After three months feeding they were only just 1 in. long. Also three larvae and an emerged pupal case of *Luffia ferchaultella* (Stephens) (Lep., Psychidae), from the bark of trees in the Denny Bog area of the New Forest, Hants. The exhibitor's son, M. J. Sterling, found a pupal case of this moth on 1st April from which a female emerged on 10th April. On the 14th April he and his son discovered over 50 larvae on lichens growing on pines, birches and oaks. Two more females hatched, but so far no male. He surmised that the Denny Bog population was parthenogenetic, as this phenomenon has been remarked on in some Psychids.

A. E. STUBBS — A fig which he had brought back from a holiday in Corsica, together with wingless males of a wasp said to fertilise the figs.

COMMUNICATIONS

Dr. C. G. M. DE WORMS reported that recently in Sussex both the orange tip and holly blue butterflies had been seen on the wing in numbers. Mr. CHALMERS-HUNT reported having bred an example of the grey form of *Eupithecia venosata* (Fab.) from County Clare, West Ireland. In reply to a query by G. Prior whether there was a case-bearing larva on juniper in Britain, Lt. Col. A. M. EMMET replied in the negative and it was suggested that a sloe Psychid might be the identity of the case-bearer which Mr. Prior had beaten at Wendover (?) from an isolated juniper.

B. O. C. GARDINER then gave a talk, with illustrations, on the rearing in his laboratory at Cambridge of various lepidopterous larvae on an artificial pabulum obtainable from Harris Biological Supplies, Old Nixon Estate, Weston-super-Mare, Avon. This talk evoked the liveliest interest among listeners.

25th May 1978

The President, Mr. G. PRIOR, in the chair.

EXHIBITS

Dr. A. A. ALLEN — A ♂ *Agrypon flexorium* Thunberg (Hym., Ichneumonidae) bred from *Drepana falcataria* (L.) (Lep., Drepanidae). The nearly full-grown host was beaten out of young birch, 16.x.1977, on Hackhurst Downs, Gomshall, Surrey. The host pupated at the end of the month, and the parasite emerged from the pupa of the host on 10.v.1978. The exhibitor had previously exhibited *A. flexorium*, but this is apparently the first time it has been reared in Britain from *D. falcataria*. (ii) A larva, as a pre-pupa, of *Epirrita dilutata* (D. & S.) (Lep., Geometridae) found on birch, 21.v.1978, in Reigate Priory, Surrey. The larva was of interest because of the presence of two cream ova of an ectoparasite, probably of the genus *Netelia*, lodged on its thoracic segments. The ova were expected to hatch shortly and the hymenopterous larvae would then consume the host.

Mr. G. PRIOR — Larvae of *Eupithecia inturbata* (Hübner) from *Acer campestre* at Medmenham, 22.v.1978, showing the dorsal colouring which serves to distinguish this species from the larvae of *Operophtera brumata* (L.) (winter moth) in its later stages.

COMMENTS ON PREVIOUS MEETING MINUTES

Lt. Col. A. M. EMMET stated that in England *Luffia ferchaultella* (L.) was always parthenogenetic, though ♂♂ were known from the Channel Isles.

Mr. G. PRIOR stated that the record of *Eucosma pauperana* (Dup.), from Thetford, Norfolk, on 5.v.1978, had by an oversight been omitted from the minutes; the capture had been made by Mr. J. L. Fenn in his garden light trap. From East Anglia the previous record had been that of a capture on the wing on Fleam Dyke, Cambs. Mr. BRETHERTON stated that he had searched the Surrey locality where *Rosa canina* was abundant, and from which this moth had been previously recorded, in vain. Lt. Col. A. M. EMMET also made statements regarding this moth in the later communications, reminding members that the first British record had been made at Darenth Wood, 1854. He had recently himself captured it on Fleam Dyke, between 6.00 and 6.30 p.m., and he suggested that the time of flight might be limited which would account for its elusiveness.

MEMBERSHIP

After the reading of their names for the second time, Mr. A. Valetta and Dr. J. Feltwell were declared elected members.

ANNOUNCEMENTS

The President announced that Mr. Rudge had informed him that the third reading of Lord Cranbrook's Bill was not yet assured. With reference to the letters written to Mr. Rudge in March and April by the Society on this topic, the list of prohibited species was now reduced from 129 to 16. This short list included the heath fritillary and the chequered skipper butterflies and three species of grasshopper.

COMMUNICATIONS

Dr. C. G. M. DE WORMS had visited the Wye Valley where orange tip butterflies were noted to be numerous. At light two species of moth deserved mention: the typical form of *Egira conspicularis* (L.), usually

the rarer of its two forms, and a number of *Nola confusalis* (H.-S.). He had also had reported to him the abundance of the holly blue in Sussex, whence also *H. lucina* (L.), *Boloria euphrosyne* (L.) and *Leptidea sinapis* (L.) were reported as now out.

Mr. BRETHERTON reported no more than ten moths per night on the average as coming to his moth trap in Surrey, though the variety of species was good, to which Mr. E. WILDE reported that to his trap in his part of Surrey an average of nine had been noted.

Mr. R. J. VANE-WRIGHT then gave an illustrated talk on the evolution and biology of Danaid butterflies. This evoked great interest in those present.

8th June 1978

The Vice-President, Rev. D. J. L. AGASSIZ, in the chair.

EXHIBITS

Rev. D. J. L. AGASSIZ — Larva of *Cnaemidophorus rhododactyla* (D. & S.) on a wild rose bud.

Dr. A. A. ALLEN — Two specimens of *Meteorus versicolor* Wesmael (Hym., Braconidae), both obtained from moorland near Dawlish, Devon. A female was bred 27.viii.1977 from a cocoon found on heather, 14.viii.77, and a male was bred 4.v.1978 from a larva of *Lycophotia porphyrea* (D. & S.) (Lep., Noctuidae), swept, with others, 30.iii.1978 from heather on the same stretch of moorland. When captured, the host larva was about half-grown and grew fairly slowly until the parasite larva appeared from within the host on 14.iv. For the six days immediately prior to the appearance of the parasite larva, the host did not feed, a phenomenon which the exhibitor had noticed with other larvae parasitised by *Meteorus* spp. (e.g. *M.* near *fragilis* Wesm., ex *Nola cucullatella* (L.)). The female exhibited was unremarkable, but the male was an unusually dark example, a character communicated to the exhibitor by Mr. T. Huddlestone of the British Museum (Natural History), to whom he was grateful for determining the species. A second very dark male was also bred 22.iv.1978 from another *L. porphyrea* larva found at the same time.

Lt. Col. A. M. EMMET — (i) *Eucosma pauperana* (Dup.) (Lep., Tortricidae): two specimens taken at Fleam Dyke, Cambs. on 14 and 17.v.1978. (ii) *Mompha propinquella* (Stainton) (Lep., Momphidae): pressed/willow-herb leaves (*Epilobium hirsutum*) showing the larval-mine; this is normally confined to the underside of the leaf and not visible from above. The leaves were collected at West Wickham, Cambs., 29.v.1978; also leaves containing cocoons spun in the final larval mines. The cocoon, being generally spun along the midrib, contorts the leaf conspicuously. These leaves were collected at Little Baddow, Essex, 2.vi.1978.

A. J. HALSTEAD — Examples of the black citrus aphid (*Toxoptera aurantii* (Boy.) (Hem., Aphididae): the world's only stridulating aphid. A faint, high pitched sound is made when the aphids jerk their bodies up and down in unison. They have a roughened area on the side of their abdomen which is brought into contact with hairs on the hind tibia, and this presumably produces the sound. It has been suggested that stridulating is a defence mechanism against predators and parasites. At Wisley, however, the colonies are heavily parasitised by aphid spp. by mid-summer.

The black citrus aphid is a pest of citrus, coffee, tea and cacao in tropical and subtropical regions. It was first recorded in Britain on camellias near Flint, Clwyd, in 1928. It then disappeared or was overlooked until

1968 when thriving colonies were found at the Royal Horticultural Society's garden at Wisley, Surrey. Since then it has continued to occur at Wisley, although only camellia is attacked. It can be found even in the winter in small numbers on outdoor camellias, but peak numbers occur in late May-June when the new shoots and leaves are colonised.

E. H. WILD — Cocoon of *Psychoides verhuella* Bruand (Lep., Tineaidae) from Weston-super-Mare, on heart's tongue fern.

MATTERS ARISING FROM PREVIOUS MEETING MINUTES

Dr. A. A. ALLEN stated that the *Netelia* ova deposited on the larva exhibited at the previous meeting had failed to hatch, perhaps because infertile; the host had pupated successfully.

MEMBERSHIP

The following names were read for the first time: Messrs. J. K. Packer, J. B. Jobe, I. McClenaghan and D. W. Yendall.

Dr. R. BLACKMAN then gave an illustrated talk entitled 'The puzzle of the adaptable aphid'. Aphid life-cycles are renowned for their complexity, largely because of all the terms that are used to describe the seasonal succession of different morphs. Stripped of this burdensome terminology, aphids can be seen to have evolved a variety of alternative reproductive strategies, whereby they can exploit the short-term advantages of parthenogenesis, but at the same time balance this with the long-term need to retain sexual reproduction. Some of these alternatives and other related aspects of aphid biology were explored in this talk, which provoked many questions from the audience who thus evinced how much they had been interested by it.

DISCUSSION OF EXHIBITS

In reply to a question, Lt. Col. A. M. EMMET said that the cocoon of *Mompha lacteella* (Stephens), which also fed on willow-herb, was, in contrast to that of *M. propinquella*, almost impossible to find, perhaps being formed later in the year.

22nd June 1978

The President, Mr. G. PRIOR, in the chair.

EXHIBITS

Dr. A. A. ALLEN — Four specimens of the gregarious parasite *Apanteles chares* Nixon (Hym., Braconidae), obtained with seven others from a larva of *Colotois pennaria* (L.) (Lep., Geometridae), beaten from oak, 30.v.1978, on Brownsea Island, Dorset. During the late evening of 31.v eleven parasites appeared from the nearly full-grown host, around which they spun their pale straw-coloured cocoons, mostly arranged in one group held together by a tough, woven silk. Ten adult *A. chares* emerged during the night of 5-6.vi; the remaining cocoon yielded a hyperparasite, also exhibited, of the genus *Mesochorus* (Ichneumonidae). The bred series of *chares* included one male, which is the first apparently known occurrence of this sex of *chares*. Although the host is a common species, especially as a larva, the exhibited parasite, *A. chares*, appears to be very uncommon; the first known example was caught in 1941, and the only records prior to this are 1944 and 1961; in the latter year a series was bred, also from *pennaria*. All were caught in Southern England; see G. E. J. Nixon, *Bull. ent. Res.*, 65: 722 (1976). Writing in that journal, Dr. Nixon suggests that *A. chares*

is closely related to the more commonly occurring species *Apanteles spurius* Wesmael; great care is needed to differentiate between the two. A short series of *A. spurius* (ex. *Biston betularia* (L.)) was also exhibited for superficial comparison with *chares*.

Lt. Col. A. M. EMMET — A bird's nest from a nest-box from Shadwell Wood Nature Reserve, Ashdon, Essex, from which specimens of *Tinea piercella* Benth were emerging. This moth species was added to the British list in 1943 by S. Wakely and appears to have been recorded only seldom since then. A second, very flimsy, nest from Colne Point Nature Reserve, St. Osyth, Essex, from which no fewer than 71 Tineids emerged, consisting of *Monopis rusticella* (Hübner) and *Tinea trinotella* Thunberg in about equal numbers.

P. A. SOKOLOFF — An intersex form of *Agrotis cinerea* (D. & S.) taken on a recent Society Field Meeting at Ranmore, Surrey, 27th May. The moth is predominantly male, the left forewing being streaked with female characters, and each hindwing having a wedge of black scales. Also cases of *Coleophora vibicella* (Hübner) collected by Mr. J. M. Chalmers-Hunt from Botley Wood, Hants. In the absence of the normal foodplant, Dyer's greenweed (*Genista tinctoria* L.), the exhibitor had successfully transferred the larvae to a potted ornamental species, *Genista lydia*, purchased from a garden centre.

MATTERS ARISING FROM THE PREVIOUS MEETING MINUTES

Lt. Col. A. M. EMMET referred to his previous exhibit of *Mompha propinquella* (Stainton). These on hatching had in fact proved to be a mixture of *M. propinquella* and *M. ochraceella* (Curtis) and constituted a new record of the feeding habit of the latter.

NOMINATIONS

Their names having been read for the second time, Messrs. J. K. Packer, J. B. Jobe, I. McClenaghan and D. W. Yendall were duly elected members. The obligation book was signed by Mr. I. McClenaghan and Miss Burton.

COMMUNICATIONS

Mr. G. PRIOR said that he had spent two weeks at Ambleside in the Lake District and had there noticed extensive defoliation of bushes by moth larvae, particularly of willows by *Opisthograptis luteolata* (L.), the brimstone moth. He also remarked that in the London suburb of Hampstead great numbers of the Tortricid *Cacoecimorpha pronubana* (Hübner) had been noticed flying on privet hedges. The same had been noted by Mr. S. A. KNILL-JONES in Balham, another suburb. Lt. Col. Emmet remarked that this moth's first record in the British Isles dated only from this century, since when it had been gradually spreading northwards. Other members also spoke of its occurrence and its polyphagy, Mr. E. S. BRADFORD saying it had been recorded in London on indoors aspidistra!

D. G. CHELMICK then gave an illustrated talk on our rarer British dragonflies (Odonata). Of the 44 species of dragonfly on the British list (Kloet & Hincks), 21 are common, or locally so, three are very rare vagrants, and three others probably extinct. The remaining 17 are either restricted to particular habitats or even to a handful of localities. The talk centred upon these species, considered on the basis of the habitats in which they occur and with particular emphasis on the threats to those habitats and the need for much more intensive study of the British Odonata fauna. The audience showed its appreciation at the end of this interesting talk in the usual way.

13th July 1978

The President, Mr. G. PRIOR, in the chair.

The President welcomed two visitors from overseas: Mr. S. Gupta from India and Mr. Schmidt Nielson from Denmark.

EXHIBITS

Dr. A. A. ALLEN — Four species of adult Ichneumonidae (Hym.), all of which were caught on the wing or beaten from vegetation. They were: (i) *Banchus pictus* F. (♂), 13.v.1978, scrub woodland, Arundel, Sussex; (ii) *Agrypus flaveolatus* Gravenhorst (♀), from oak, also 13.v. Arundel, Sussex; (iii) *Platylabus indipennis* Gravenhorst (♀), from *Salix caprea*, 20.vi.1977, Dawlish, Devon; and (iv) *Ichneumon xanthorius* Forster (♀), 30.v.1978, flying over heather, Brownsea Island, Dorset.

Lt. Col. A. M. EMMET — Sixteen specimens of *Ectoedemia argentipedella* (Z.) from pupae in a nest-box in Birch Wood Nature Reserve, Little Baddow, Essex, reared 14.v-2.vi.1978; also eight specimens of *Tinea piercella* Bentinck, bred from nest-boxes at Shadwell Wood Nature Reserve, Ashdon, Essex (30.v-5.vi.1978). These specimens are being given to the Society.

Mr. G. PRIOR — Larvae of five Pug species (*Eupithecia*, Lep., Geometridae): (i) *E. dodoneata* Guenée, from hawthorn (*Crataegus*), near Watlington, Oxon, 8.vii.78; (ii) *E. egenaria* H.-S., from *Tilia europaea*; (iii) *E. innotata* Hufn., F.1 generation from larvae taken on sea-buckthorn (*Hippophae*), at Rye, Sussex, in September 1977; (iv) *E. venosata* (F.), on bladder campion (*Silene inflata*) from Watlington, Oxon, 8.vii.78; and (v) *E. insigniata* (Hüb.), on hawthorn and crab apple, same date, same place.

MEMBERSHIP

Mr. Yendall signed the obligation book.

ANNOUNCEMENTS

The President reminded all members desiring to borrow slides to register with Mr. S. Knill-Jones.

COMMUNICATIONS

Mr. R. S. TUBBS who has been breeding the white admiral (*L. camilla nigrina*) (Lep., Nymphalidae) from twenty ova, reported that the larvae overwintered and F.2 imagines refused to pair, probably because of the impossibility of a nuptial flight in captivity.

Lt. Col. A. M. EMMET again spoke about *Eucosma pauperana* (Dup.) (Lep., Tortricidae), describing spinnings obtained on wild rose; it appeared that the larva fed on the pericarp rather than on the 'hip'. The Rev. D. J. L. AGASSIZ reported that he had obtained over 100 spinnings on wild rose from Royston; from some of these *Archips rosana* (L.) was obtained, but there had been among them about ten *E. pauperana*, of which he could later find little sign; it was a species that hid itself well.

Mr. E. P. WILTSHIRE mentioned that the British species of early moth (*Theria*, Lep., Geometridae) would henceforth have to be called *primaria* Haworth, the true *rupicaprarina* (D. & S.) occurring in Europe but being unknown from Britain; the latter had the forewing cross-lines more convergent at the hind-margin. This had already been known in the British Museum (Natural History) but now a Danish magazine had published the distinction between the two forms. He secondly appealed to members to follow the correct spelling of the eyeless grayling aberration

(*Hipparchia semele* ab. *holanops* Brouwer) as a persistent but erroneous school of entomologists continued to spell it *holonops*. He also mentioned the receipt in the British Museum of a dead noctuid larva from Africa for identification, said to have been found in the faeces of the mountain gorilla. He wondered if Mr. David Carter would be able to name the caterpillar which looked like an internal-feeding caterpillar.

A discussion of the pronunciation of the name Haworth then ensued, and a member reported that a relative of the entomologist Haworth stated that his family had always pronounced it 'Hayworth'.

Mr. T. G. HOWARTH reported having seen a ♀ *Polygonia c-album* (L.) (comma butterfly) ab. *hutchinsoni* on 13th July at Canons Park.

Mr. CHALMERS-HUNT reported that on 30th June at Ranmore, near Dorking, he saw some *Lysandra bellargus* (Rott.), of which one male was in mint condition.

Mr. BERNARD D'ABRERA then gave an illustrated talk on 'Photographing Birdwing Butterflies by available light'. He preferred to use Ektochrome film in the tropics; he disliked using flash on living specimens. He described the rapacious collecting and corrupt governments or wardens of some of the states where these butterflies flew; owing to these, and deforestation in some areas, he was gloomy about the future of *Ornithoptera*.

Many questions put to the lecturer by the large audience showed their appreciation of his subject.

OBSERVATIONS ON EXHIBITS

Mr. CHALMERS-HUNT said that although *Eupithecia insigniata* had been bred before from the ova, the larva had seldom been found before in the wild state, to his knowledge. Mr. PRIOR said he had found them in the Chilterns in a ride where old hawthorn and crab-apple were abundant, also maple. Dr. C. G. M. DE WORMS said that the moth had been taken in apple orchards in the south of England.

FIELD MEETINGS

WESTBERE MARSHES, KENT — 9th July 1977

CHURCH WOOD, KENT — 10th July 1977

Leader — T. W. HARMAN

Five members joined the leader and the expedition started with a general survey of the lakes and marshes. A number of interesting plants were observed, including *Conium maculatum* L. (hemlock) and *Oenanthe fistulosa* L. (tubular water dropwort). Insects were rather scarce, though some larvae were found spun in shoots of *Artemisia vulgaris* L. (mugwort).

More careful searching later in the day revealed a number of larvae of *Eupithecia valerianata* Hübn. on the flowers and seeds of *Valeriana officinalis* L. Their camouflage on the seedheads was particularly good. In the same marshy area were a number of plants of *Typha latifolia* L. (reedmace) and, as these showed signs of larval attack, they were split down to reveal their occupants. Nearly all contained larvae or pupae of *Archanara sparganii* (Esp.), with a few only of *Nonagria typhae* (Thunb.). A vain search was made for larvae of *Catocala nupta* (L.) on trunks of large willows.

After refreshments at the ancient hostelry nearby, a number of m.v. lights and Heath traps were set up in some excellent sites right in the marsh. Although the temperature was not high, the sky was overcast, but results were rather disappointing, almost certainly due to the late season. A few *Macrochilo cribrumalis* (Hüb.), *Mythimna obsoleta* (Hüb.), *M. straminea* (Tr.), and a fresh *Spilosoma urticae* (Esp.) were among the less than 40 species of macrolepidoptera seen.

One member supplied a list of Hemiptera-Heteroptera, of which *Sthenaris roseri* (H.-S.) and *Calocoris sexguttatus* (F.) were worthy of note. Our lone micro-lepidopterist observed 14 species, of which *Microthrix similella* (Zincken) was of particular interest.

The leader collected several species of Trichoptera from the various lights. Among 12 species since identified was a specimen of *Grammataulius nitidus* (Mull.), a local species only once previously observed in Kent, at Deal in 1888.

From our observations it is obvious that this area has great potential and further visits should be rewarding.

On Sunday the leader and one member visited Church Wood to ascertain the status of *Mellicta athalia athalia* (Rott.). Although the foodplant was abundant over large areas, the butterfly was in small numbers and very local, and obviously not fully out in this late year.

SWANAGE, DORSET — 16th/17th July 1977

Leader — Mr. P. J. BAKER

The second meeting of the year to the Durlston County Park was not well attended as only two members and a guest turned up.

The afternoon was pleasantly sunny but a persistent on-shore wind restricted flight activity. Nevertheless, *Maniola jurtina* (L.), *Coenonympha pamphilus* (L.) and *Polyommatus icarus* (Rott.) were flying freely and a number of *Clepsis consimilana* (Hüb.), *Eucosoma fulvana* (Steph.), *Pempelia dilutella* (Hüb.) and *Agapeta hamana* (L.) were flushed.

A feature of the area was the profusion of those flowers which are characteristic of chalk/limestone areas. Especially abundant was *Anacamptis pyramidalis*, the pyramidal orchid, with the occasional *Ophrys apifera*, the bee orchid.

Examples of both *M. jurtina* and *C. pamphilus* were found with orchid pollinia adhering to their proboscides. This must surely have been causing the affected insects some inconvenience as they were unable to completely retract these organs.

Towards dusk patches of *Ononaria* spp., the rest harrow, were found, over which the plume *Marasmarcha lunaedactyla* (Haw.) was swarming in very large numbers.

Due to the persistent breeze, which was south-westerly, lamps were sited on the footpath and cliff edge adjacent to the Castle Hotel. These gave very good results and turned up a number of interesting insects: *Ancyliis achatana* (D. & S.), *Archips podana* (Scop.), *Crambus perllellus* (Scop.), *Chrysotenchia culmella* (L.), *Ebulea crocealis* (Hüb.), *Aphomia sociella* (L.), *Diorcytria abietella* (D. & S.), *Gastropacha quercifolia* (L.), *Malacosoma neustria* (L.), *Thyatira batis* (L.), *Habrosyne pyritoides* (Hufn.), *Pseudoterpnia pruinata* (Walker), *Hemithea aestivaria* (Hüb.), *Jodis lactearia* (L.), *Scopula imitaria* (Hüb.), *S. marginepunctata* (Goeze), *Idaea aversata* (L.), *I. biselata* (Hufn.), *Xanthorhoe designata* (Hufn.), *Catarhoe rubidata* (D. & S.), *Epirrhoe galiata* (D. & S.), *Camptogramma bilineata* (L.), *Eulithis pyraliata* (D. & S.), *Cidaria fulvata* (Forster), *Colostygia*

pectinataria (Knoch), *Hydriomena furcata* (Thun.), *Thera obeliscata* (Hübner), *Horisme tersata* (D. & S.), *Eupithecia centaureata* (D. & S.), *E. subfuscata* (Haw.), *Chloroclystis rectangulata* (L.), *Gymnoscelis rufifasciata* (Haw.), *Pterapherapteryx sexalata* (Retz.), *Abraxas grossulariata* (L.), *Ligdia adustata* (D. & S.), *Lomaspilis marginata* (L.), *Semiothisa alternaria* (Hübner), *S. liturata* (Clerck), *Opisthograptis luteolata* (L.), *Ourapteryx sambucaria* (L.), *Selenia dentaria* (Fabr.), *Crocallis elinguaris* (L.), *Apeira syringaria* (L.), *Peribatodes rhomboidaria* (D. & S.), *Alcis repandata* (L.), *Biston betularia* (L.), *Ectropis bistortata* (Goeze), *Campaea margaritata* (L.), *Cabera exanthemata* (Scop.), *Lomographa temerata* (D. & S.), *Bupalus piniaria* (L.), *Hyloicus pinastri* (L.), *Sphinx ligustri* (L.), *Deilephila porcellus* (L.), *D. elpenor* (L.), *Eligmodonta ziczac* (L.), *Phalera bucephala* (L.), *Spilosoma lutea* (Hufn.), *Eilema lurideola* (Zincken), *Nudaria mundana* (L.), *Nota cucullatella* (L.), *Agrotis segetum* (D. & S.), *A. exclamationis* (L.), *A. clavis* (Hufn.), *A. trux* (Hübner), *A. ipsilon* (Hufn.), *Noctua fimbriata* (Schreb.), *N. pronuba* (L.), *N. comes* (Hübner), *Lycophotia porphyrea* (D. & E.), *Melanchra persicariae* (L.), *Discestra trifolii* (Hufn.), *Hecatera bicolorata* (Hufn.), *Hadena bicurris* (Hufn.), *Cucullia umbratica* (L.), *Mythimna pallens* (L.), *M. l-album* (L.), *Acrionicta megacephala* (D. & S.), *A. psi* (L.), *A. leporina* (L.), *A. aceris* (L.), *Phlogophora meticulosa* (L.), *Enargia ypsillon* (D. & S.), *Rusina ferruginea* (Esp.), *Apamea monoglypha* (Hufn.), *A. lithoxylea* (D. & S.), *A. sublustris* (Esp.), *A. charactera* (Hübner), *Mesapamea secalis* (L.), *Oligia fasciuncula* (Haw.), *Caradrina morpheus* (Hufn.), *Hoplodrina blanda* (D. & S.), *Lithacodia pygarga* (Hufn.), *Pyrrhia umbra* (Hufn.), *Autographa gamma* (L.), *Diachrysis chrysitis* (L.), *Polypogon tarsipennis* (Treit.).

FEATHERBED LANE, ADDINGTON, SURREY — 25th July 1977

Leader — J. M. CHALMERS-HUNT

Sixteen people attended this meeting despite a poor weather forecast. But the weather turned out not at all bad: it kept dry; for much of the meeting, the wind was light and there were sunny spells about mid-day.

Many of those in the party were microlepidopterists who had hoped to take the beautiful and very local Tortricoid *Cochylis flaviciliana* Westwood, of which this is a noted locality. However, in this exceptionally late season we were perhaps a fortnight too early as none was seen, though one was taken here about a week later.

Several interesting lepidoptera were recorded, among which may be mentioned: *Ostrinia nubilalis* (Hb.), *Homoeosoma sinuella* (F.), *Aethes hartmanniana* (Clerck) (fairly numerous), *Stenodes straminea* (Haworth), *Reuttia subocellea* (Stephens) (among *Origanum vulgare*), *Stephensia brunichella* (L.) (mined leaves of *Calamintha clinopodium*) and *Nemophora scabiosella* (Scopoli) (a number on flowers of *Knautia arvensis*).

Several species of butterfly were noted, including *Argynnis aglaia* L. (dark green fritillary), *Strymonidia w-album* Knoch (white-letter hairstreak) and *Aphantopus hyperantus* L. (ringlet).

Mr. Paul Sokoloff observed a slow worm which, according to Mr. Wild, is very seldom seen in this locality.

ELLENDEN WOOD, near WHITSTABLE, KENT — 31st July 1977

Leaders — Mr. M. J. NEWCOMBE and Mr. E. S. BRADFORD

The leaders, the last to arrive at the meeting place, were greeted by eight members who had already noted several species of lepidoptera, including: *Coleophora limosipennella* (Dup.), *Teleiodes vulgella* (Hübner), *Pyronia tithonus* (L.) and *Maniola jurtina* (L.); the last two species jostling each other at bramble flowers. Larval cases of the rather local *Coleophora limosipennella* appeared to be in some numbers on the scrubby elms bordering the wood and road verges at Denstroude.

Various areas in Ellenden Wood were visited and numbers of insects seen or taken. One small clearing produced two interesting species, viz. *Anana funebris* (Strom.) and *Capperia britanniodyctyla* (Gregs.), as well as *Paltodora cytisella* (Curt.), a number of which were taken by members. Along one ride several specimens of *Quercusia quercus* (L.) could be picked from the leaves of the trees, so lethargic they appeared.

Larval mines of *Stigmella basiguttella* (Hein.), *Stigmella malella* (Staint.), *Nepticula marginicolella* (Staint.), *Ectoedemia pulverosella* (Staint.), *Tischeria ekebladella* (Bjerk.), *Tischeria marginea* (Haw.) and *Mompha raschkiella* (Zell.) were seen, some being taken for pressing. Larval cases of *Taleporia tubulosa* (Retz.) and *Psyche casta* (Pall.) turned up occasionally on the trunks of trees and bushes. Three micros of interest taken during the day were *Recurvaria nanella* (D. & S.), *Epinotia (Evetria) demarniana* (F.-R.) and *Phalonidia curvistrigana* (Staint.), all fairly local. Other Lepidoptera either seen or taken were: *Bucculatrix ulmella* (Zell.), *Parornix betulae* (Staint.), *Callisto denticulella* (Thunb.), *Phyllonorycter corylifoliella* (Hübner), *Argyresthia brockeella* (Hübner), *A. goedartella* (L.), *A. curvella* (L.), *Ypsolopha nemorella* (L.), *Ypsolopha parenthesesella* (L.), *Plutella xylostella* (L.), *Coleophora hornigi* (Toll.) larval cases, *Batia lunaris* (Haw.), *Borkhausenia fuscescens* (Haw.), *Carcina quercana* (F.), *Byrotropha terrella* (D. & S.), *Sorhagenia janiszewskae* (Riedl.), old feeding sites in shoots of buckthorn, *Cydia fagiglandana* (Zell.), *Cydia janthinana* (Dup.), *Spilonota ocellana* (D. & S.), *Epiblema uddmanniana* (L.), *Zeiraphera isertana* (F.), *Ancylis mitterbacheriana* (D. & S.), *Olethreutes lacunana* (D. & S.), *Clepsis consimilana* (Hübner), *Cnephasia incertana* (Treits.), *Aleimma loeflingiana* (L.), *Acleris emargana* (F.), *Crambus perlellus* (Scop.), *Agriphila straminella* (D. & S.), *Agriphila tristella* (D. & S.), *Eudonia mercurella* (L.), *Endotricha flammealis* (D. & S.), *Pieris brassicae* (L.), *Idaea biselata* (Huf.), *Lomaspilis marginata* (L.) and *Scotopteryx chenopodiata* (L.). Towards the end of the meeting an interesting *Eucosma* was taken, which proved to be another local species, *Eucosma aemulana* (Schlager).

Mr. M. J. Newcombe spent a busy day and recorded the following list of Hemiptera-Heteroptera: *Anthocoris nemorum* (L.), *Calocoris norvegicus* (L.), *Dicyphus epilobii* (Reut.), *Elasmostethus interstinctus* (L.), *Halticus apterus* (L.), *Heterotoma merioptera* (Scop.), *Kleidocerys resedae* (Panz.), *Leptopterna dolabrata* (L.), *Liocoris tripustulatus* (F.), *Mecomma ambulans* (Fallen.), *Nabis rugosus* (L.), *Orthotylus virescens* (D. & S.), *Phytocoris tiliae* (F.), *Pithanus maerkeli* (H.-S.) and *Plagiognathus arbustorum* (F.). *H. apterus* (L.) and *M. ambulans* (Fallen) were two of note, the rest being common or abundant.

DUNGNESS, KENT — 10th/11th September 1977

Leader — Mr. P. J. BAKER

Four stalwart members turned up at the venue, to be greeted with gale force winds which prevented almost all flight activity both by day and night.

Large numbers of *Pieris rapae* (L.) and *P. brassicae* (L.) were seen sheltering from the wind, possibly the results of a migration or possibly locally bred as *Crambe maritima* (L.), the sea kale, was abundant everywhere.

A small bag of the flower heads of *Achillea millefolium* (L.) was collected in the hope that larvae of the pug *Eupithecia millefoliata* (Ross.) would be found. An intensive search over the whole area for *Linaria vulgaris* (Miller) produced not a single plant, which possibly bodes ill for the present status of *Calophasia lunula* (Hufn.) in the area. The only results from the search was a single larva of *Smerinthus ocellata* (L.) and a number of *Agriphila geniculea* (Haw.).

A little before dusk a pleasant few minutes were spent searching the toilets (male) in the Britannia Inn. This produced *Noctua comes* (Hübner), *C. geniculea*, *Mesapamea secalis* (L.) and *Xestia xanthographa* (D. & S.).

At dusk sheets were laid and anchored with copious gravel in the lee of some tallows. Little came to the lights, however, and an early night was enjoyed by those present. Additional species at light: *Agonopterix nervosa* (Haw.), *Agrotis ipsilon* (Hufn.), *A. puta* (Hübner) and *Phlogophora meticulosa* (L.).

DANBURY, ESSEX — 30th October 1977

Leader — A. M. EMMET

The meeting was attended by twelve members in fine, mild weather. The area worked was one of mixed woodland extending between the parishes of Little Baddow and Woodham Walter. Interest centred on spinings on Norway spruce, believed to be those of *Pulicalvaria piceaella* (Kearfott) which had been taken there as an adult earlier in the year; they were plentiful enough, but many were vacated. Leaf-mines were collected from oak, beech, birch, hawthorn, apple, species of willow, aspen and wild service-tree; those on the last foodplant were suspected to be of *Phyllonorycter mespilella* (Hübner), which is known to occur in the area. Some excitement was aroused by a *Phyllonorycter* mine on aspen, but as no other could be found it was concluded that it was an example of xenophagy and not the recently discovered *P. sagittella* (Bjerkander).

Another puzzle was an *Elachista* larva feeding in the leaves of the rare sedge *Carex laevigata* (smooth sedge); the larvae were too small to offer much prospect of successful rearing and another visit to the locality in spring will be necessary to establish their identity. One of the less common Nepticulids to be collected was *Ectoedemia intimella* (Z.) which was found mining *Salix fragilis*, as well as *C. caprea* and *S. cinerea*.

Few adults were observed, but *Diurnea phryganella* (Hübner) was not uncommon in the more open parts of the woodland. In the afternoon R. and A. J. Fairclough broke away from the main party to beat for *Acleris cristana* (D. & S.) in the neighbouring Backwarden Nature Reserve. In addition to that species, they noted *Ypsolophus notella* (Clerck), *Acleris ferrugana* (D. & S.), *Epinotia maculana* (F.), *Epirrita dilutaria* (D. & S.) and *Nyceteola revayana* (Scop.).

SANDY DOWN, BOLDRE, HAMPSHIRE — 25th, 26th March 1978

Leader — R. W. WATSON

Once again Mr. and Mrs. Watson opened their house to members and friends to view the Watson collection of British butterflies and larger moths, now part of the National Collection.

There were 26 visitors on the first day and a further 15 on Sunday, confirming the popularity of the meeting.

There were a number of new acquisitions among the butterfly varieties to interest those who had previously seen the collection, and for those for whom this was the first visit to 'Porcorum' the whole collection, especially the butterfly and Arctiidae varieties, was of great interest.

Our thanks are due for the customary warm hospitality of Mr. and Mrs. Watson and for the buffet lunch which Mrs. Watson and her helpers, Jackie Dyke and Cathy Pickles, provided.

KINGSPARK WOOD, PLAISTOW, SUSSEX — 20th May 1978

Leader — K. G. W. EVANS

This was a joint meeting with the Croydon Natural History and Scientific Society and some 26 members and friends of the two societies attended during the course of the day and night meeting at this delightful woodland locality.

A severe challenge by a senior Forester points to the increasing need for field meeting leaders to obtain the necessary permits to enter land administered by the relevant authority. Fortunately, such a permit had been obtained from the Forestry Commission, but without such it is clear that the visit would have had to be aborted.

The day was warm and sunny and those attending had an enjoyable time with most of the insects sought putting in an appearance. With the season a little later than usual, the Wood White and the Broad-bordered Bee Hawk were only just on the wing. Unfortunately, there was no sign of our other quarry, the Drab Looper (*Minoa murinata* (Scop.)) and it is probable that being a late season this little moth had not yet emerged.

In sharp contrast to a rewarding and pleasant day, the night was cold and unsatisfactory. Although approximately 14 lights were operated, the moth attendance was poor and nothing remarkable was reported.

Over the course of the meeting the following identifications were made:
LEPIDOPTERA: *Erynnis tages* (L.), *Pyrgus malvae* (L.), *Leptidea sinapis* (L.), *Gonepteryx rhamni* (L.), *Pieris brassicae* (L.), *P. rapae* (L.), *P. napi* (L.), *Anthocharis cardamines* (L.), *Callophrys rubi* (L.), *Celastrina argiolus* (L.), *Aglais urticae* (L.), *Inachis io* (L.), *Polygonia c-album* (L.), *Pararge aegeria* (L.), *Falcaria lacertinaria* (L.), *Drepana falcataria* (L.), *Polyploca ridens* (Fab.), *Cyclophora albipunctata* (Hufn.), *C. linearia* (Hübner.), *Epirrhoe alternata* (Müll.), *Thera obeliscata* (Hübner.), *Colostyia pectinataria* (Knoch), *Eupithecia abbreviata* (Steph.), *E. dodoneata* (Guenee), *E. lariciata* (Freyer), *E. tantillaria* (Boisd.), *Lobophora halterata* (Hufn.), *Petrophora chlorosata* (Scop.), *Plagodis pulveraria* (L.), *Opisthograptis luteolata* (L.), *Pseudopanthera macularia* (L.), *Lomaspilis marginata* (L.), *Thera variata britannica* (Turner), *Asthenes albulata* (Hufn.), *Lycia hirtaria* (Clerck), *Menophra abruptaria* (Thunb.), *Ectropis consonaria* (Hübner.), *E. crespuscularia* (Schiff.), *Lomographa bimaculata* (Fab.), *Cabera exanthemata* (Scop.), *Laothoe populi* (L.), *Hemaris fuciformis* (L.), *Cerura vinula* (L.), *Stauropus fagi* (L.), *Eligmodonta ziczac* (L.), *Pheosia gnoma* (Fab.), *Peridea anceps* (Goeze), *Ptilodon capucina* (L.), *Pterostoma palpina* (Clerck), *Drymonia dodonea* (Schiff.), *D. ruficornis* (Hufn.), *Clostera curtula* (L.), *Orgyia antiqua* (L.), *Dasychira pudibunda* (L.), *Diaphora mendica* (Clerck), *Orthosia gothica* (L.), *O. incerta* (Hufn.), *Autographa gamma* (L.), *Callistege mi* (Clerck), *Colocasia coryli* (L.), *Monopis rusticella* (Hübner.), *Adela reaumurilla* (L.).

Pyrausta aurata (Scop.), and larvae of the following: *Thecla betulae* (L.), *Quercusia quercus* (L.), *Ochlodes venata* (Br. & Grey), *Ladoga camilla* (L.), *Apatura iris* (L.), *Pyronia tithonus* (L.), *Maniola jurtina* (L.), *Trichiura crataegi* (L.), *Prays fraxinella* (Bjerk.), *Hydriomena furcata* (Thunb.), *Operophtera brumata* (L.), *Epirrita dilutata* (Schiff.), *Chesias legatella* (Schiff.), *Apeira syringaria* (L.), *Crocallis elinguaris* (L.), *Colotois pennaria* (L.), *Apocheima pilosaria* (Schiff.), *Agriopsis marginaria* (Fab.), *Erannis defoliaria* (Clerck), *Euproctis similis* (Fuessly), *Orthosia cruda* (Schiff.), *Cleoceris viminalis* (Fab.), *Eupsilia transversa* (Hufn.), *Xanthia aurago* (Schiff.), *X. icteritia* (Hufn.), *Ipimorpha retusa* (L.), *Cosmia trapezina* (L.), and pupae of *Lasiommata megera* (L.).

DIPTERA: *Bombylius major* (L.), *Phytomyza ilicis* Curt.

ODONATA: *Libellula depressa* (L.).

HYMENOPTERA: *Bombus lucorum* (L.), *B. pratorum* (L.), *Nomada ruficornis* (L.), *Biorhiza pallida* (Olivier), *Diplolepis rosae* (L.).

COLEOPTERA: *Coccinella 7-punctata* (L.), *Psyllobora 22-punctata* (L.), *Melolontha melolontha* (L.), *Rhinoncus pericarpus* (L.), *Endomychus coccineus* (L.), *Helophorus aquaticus* (L.), *Dorytomus dejeani* Faust.

CURRENT LITERATURE BOOK REVIEWS

Henry Doubleday, the Epping Naturalist, by Robert Mays. (Precision Press, Marlow.) 118 pp., 3 plates. £4.20.

In his time Henry Doubleday was Britain's great authority on Lepidoptera, as well as no mean taxidermist, ornithologist and horticulturalist. Even today, considering he hardly moved out of Epping all his life and was by profession a grocer, his influence is unusually enduring; his collection of Lepidoptera is housed in the British Museum, his techniques are still followed to a great extent, at least three of his scientific pug-names are still used and considered valid, and many of his more controversial opinions have been vindicated. He was an original member of the Entomological Society and was made a patron of our own Society in 1872. On his death in 1875, the Society summed up his services to entomology as 'of immense value' and added that 'his invariable kindness had endeared him to all who knew him'. Our present member, Robert Mays, in this handsome little book, has collected and summarised his life, work, and background, giving us also a fascinating picture of the naturalists and quakers in the 19th century and of a part of Essex now, alas, largely suburbanised. The main section of the book is about 90 pages long and very easy to read; it is followed by a 28-page appendix of notes and references with much further matter of interest. Its appearance is timely as 1978 is the centenary year of the Act which conserved for posterity Epping Forest, the scene of Henry Doubleday's birth in 1808, life, and death. I think none of our members will regret acquiring, and all who do get it, will reopen it frequently.

E.P.W.

Baltic Amber — a Palaeobiological Study, by S. G. Larsson. Entomograph, Vol. 1, 1978. Scandinavian Science Press Ltd., Klampenborg, Denmark.

This interesting book, written entirely in good English, begins with a section on amber itself, its stability, chemical and physical characteristics;

the next section deals with the origin of Baltic amber, and also shows the location in the rest of the world of ambers as old or older than the Baltic, and the relative position of the Continents at the end of the Cretaceous; a third section deals with the world flora of the past, the flora found in amber, the biological decline from the Eocene optimum and recent amber floras. The fourth and longest section deals with the fauna of the amber territory; it embraces virtually all orders of insects. A final section of ten pages, entitled 'Review', summarises the whole and shows how the coniferous plants, towards the end of the Palaeozoic, were the first to secrete resin in large amounts. The greater part of amber known today is young Cretaceous or early Tertiary. The formation of amber in the Baltic seems to have stopped early in the Oligocene, somewhat later in Rhineland and Roumania, but continued in Sicily into the Miocene, but the *Pinites* 'amber' forest had a much wider distribution in the world than this. Chironomid fossils are especially abundant in ambers deriving from the Scandinavian *Pinites* forest. The author endeavours to deduce ecological conditions from the fauna of this amber prior to the destruction of the fauna by the encroaching ice, as climatic belts were displaced towards the equator. The fauna which postglacially replaced the Baltic amber fauna consists mainly of purely boreal elements which during the Ice Age were preserved in an Asiatic refuge. The original Baltic amber fauna appears to be totally extinct.

All thinking entomologists interested by the palaeontology of their field of study will find much stimulating food for reflection in this masterly book, which inaugurates a new series designed to provide scope for larger papers on entomological subjects. Following volumes announced are by various English, American or Danish specialists, such as Gaden S. Robinson and E. P. Wiltshire, from whom the publishers promise monographs on their specialities.

Butterflies on my Mind, by Dulcie Gray. Foreword by Sir Peter Scott. Illustrated by Brian Hargreaves. Angus & Robertson (U.K.) Ltd., 16 Ship Street, Brighton, Sussex; 123 pp., 30 coloured plates, other black and white drawings, 10 maps. £5.75.

This book is addressed to the general British public. The authoress is a writer of crime novels, children's books and also an actress. However, she is no newcomer to the subject of Rhopalocera, having been for ten years Vice-President of the British Butterfly Conservation Society. The artist, a member of our Society, whose work on butterflies most members will know already, has been assisted by his wife in the lay-out of the many striking pictures which mostly depict, in quite a new style, butterflies, their foodplants and their habitats.

A strict biologist might protest that five scenes are unnatural, as they show the butterfly on the plant, blooming, or in fruit, at a season when the creature is not on the wing. This, however, would be rather unfair, as the purpose of the pictures is to help the uninitiated reader to identify both the butterfly and the foodplant, also in many cases to show the sort of country they are found in, and not to represent what actually happens when bug meets plant. Were the classical illustrators any more natural?

The text is a skilful tissue of the author's own views, interwoven with opinions of others; it should give pleasure and information to many.

Quotations from old writers alternate with the utterances of doctors of science or movie-stars; Miss Gray quotes not only Aristotle but has consulted those now in the forefront of British entomological activity, incidents from whose childhood are quoted with equal zest with what they have to say on problems of ecology and conservation. There is quite a lot by, or about Robert Goodden, and she assures us that his being an officer of the Butterfly Conservation Society does not mean there is any connection between it and his commercial butterfly farm, World Wide Butterflies, Over Compton. This Society is indeed the one which she puts first among five others which she recommends her readers to join (we are included!). In the chapter discussing the various enemies of butterflies, and in discussing various cases of extinction in the present century, her attitude to the collector, though not friendly, is not unreasonably hostile nor unbalanced. In one passage she describes an exhibit contrasting the ancient and the modern collector's tools, at the Chequered Skipper Inn at Ashton Wold; the modern collector is apparently well-off, for he is content with field glasses, a camera with a zoom lens, a cine-camera, and electronic flash! Her own views are summed up in the sentence: 'there are now so many excellent collections on exhibition, it seems silly to encourage people without knowledge to pillage the countryside and make our environment even bleaker . . . The fright butterflies receive on being caught must be considered pain.'

We doubt whether, as claimed on the jacket, that this book will be 'a standard reference for every butterfly lover', but even for the hardened lepidopterist it contains a few useful passages, and for those unversed in the lore of butterflies it would make a charming and informative present. Sir Peter Scott's foreword sums up in a dozen lines Dulcie Gray's achievement; we consider she has performed the task she set herself most successfully.

E.P.W.

Libro rojo de los Lepidopteros Ibericos, by Manuel G. de Viedma and R. Gomez Bustillo. (Instituto nacional para la conservacion de la Naturaleza, Madrid, 1976.) 117 pp. No price stated.

The stated object of this book is to provide a basis for an adequate policy of conservation for some of the lepidoptera of Spain and Portugal. It covers 35 species of Rhopalocera and 15 Heterocera. These are classified, with pages cornered in different colours, as 'in danger of extinction' (3), 'vulnerable' (8), 'endemic' (some of these are sub-species only) (13), 'rare' (19), 'immigrant' (5). Each species is well figured in colour photographs and has a map of its present range in Iberia and brief accounts of its life-cycle, the reasons for fears about its future, and recommendations for further study of its habits. The text is in Spanish, but there is a one-page explanatory summary in English.

The 35 Rhopalocera regarded as requiring some form of special attention are about one-sixth of the total Iberian list. This may seem rather pessimistic, in view of the fact that even the Rhopalocera of many parts of Spain and Portugal are still little known, despite the considerable growth of interest and recording, mainly by amateur collectors, in recent years. The number is, however, swollen by the inclusion of almost all the 'endemic' species as a separate category. This is rather awkward, since, as the text admits, some of these are widespread and common, while others are probably in greater danger than some of the species classed as 'vulnerable'; and, though it is certainly desirable to collect information

about the 'immigrant' species, it is not clear what conservation could do for them. The few Heterocera selected include only some diurnal *Zygaenidae*, *Graellsia isabelae* and some other Bombycoidea, with two introduced species, and two immigrant *Sphingidae*.

The recommendations for protection concentrate heavily on prohibition of capture of the rarer species, followed by statements of the need for more study of their biology and search for more localities for them to be communicated to the appropriate authorities. There is very little mention of the need for public or private action to protect their habitats from agricultural changes or from massive afforestation such as are now taking place in many known localities. While this attempt to identify and define the needs for deliberate conservation of endangered species is to be welcomed, one is bound to suspect that the recommendations for action are likely to be more discouraging than helpful.

R.F.B.

Guide des Papillons Nocturnes d'Europe et d'Afrique du Nord: Héterocères (Partim), by P. C. Rougeot and P. Viette. (Delachaux et Niestlé, Paris, 1978.) 227 pp., 40 colour plates. No price stated.

This book is presented as a successor to the French edition of the 'Field Guide to the Butterflies of Britain and Europe', by L. G. Higgins and N. D. Riley, which it follows closely in matter and textual arrangement. It covers, however, only a small part of the European Heterocera, namely 153 nominotypical species and 59 additional sub-species in the Notodontidae, Ctenuchidae, Lemoniidae, Brahmeidae, Saturniidae, Lasiocampidae and Sphingidae. Nearly all these taxa are figured, most of them in both sexes, by colour photography on an effective blue background. The texts cover with admirable conciseness the French, and often other, popular names for each species, its world range, description, season of flight, habitat and foodplants, and European and North African distribution. There is a well selected bibliography, mainly on a country and regional basis, but also listing a number of recent taxonomic works; and a good check list of the species covered, which does, however, lack synonyms.

Unfortunately, distribution maps have been omitted. The reason given, that in the present state of the authors' knowledge these would have inevitably been very incomplete, seems to show some faint-heartedness; but it is perhaps intelligible, since even for France the most recent collected account of the distribution of Heterocera is L'Homme's famous Catalogue, of which the relevant part is more than fifty years old.

This Guide should be used by every British lepidopterist who collects on the Continent, if only during his holidays; and we must all hope that the authors will produce soon other volumes of similar excellence to deal with other families of the Heterocera.

R.F.B.

OUR CONTEMPORARIES

Bericht nat.-Med. Verein, 64 (Oct. 1977). Innsbruck.

On pp. 107-132 of this German-language periodical, not often consulted by English entomologists, appears a most interesting article by Alois Trawöger, entitled "Der Alpenwollfläfer, *Eriogaster arbusculae* Frr. Ein Beitrag zur Kenntnis und Erforschung der Alpinen Schmetterlingsfauna".

This seems to have been evoked by a draft copy of part of the reviewer's article about the Swiss, French, and other European Small Eggar larvae which appeared in full in our *Proceedings*, Vol. 10 (3/4): 98-99 (Pl. XII,

fig. 1), sent to the author about a year earlier. Herr Trawöger, a resident of Innsbruck, has had a 25-year long experience of these *Eriogaster* forms in that district, and in the article now under review sums up his observations and conclusions; consequently the article constitutes an important advance in our knowledge of these moths.

The article deals with the deposition of the ova of the Alpine Small Eggar, its larval stage, its pupation, its pupal period which lasts between three and eight years (sic!), the hatching of its imagines, which takes place in 5-10 minutes during the daytime at the moment when the snow recedes from the cocoon, the short mating flight (20-30 minutes) which occurs just after sunset, and the mating (duration: 5-11 minutes). The males live 6-8 days, the females seldom longer than a single day. There is also a section on a hymenopterous parasite, and another on the variability of the imagines. In captivity the author found it easy to obtain hybrid couplings between *arbusculae* and *lanestris*, but impossible between ♂ and ♀ *lanestris*! The plates illustrate not only the life-history and the larval form of *arbusculae*, but also hybrid larval and imaginal forms between it and *lanestris*. Although the author obtained intermediates, he does not consider the two forms necessarily conspecific.

Nevertheless, in a letter to me, kindly enclosing his article, Herr Trawöger informed me that he considered the Swiss Vissoie form which I called the 'southern form' of larva and illustrated in Pl. XII, fig. 1b (1977), as '*lanestris* under the influence of *arbusculae*'.

It would still be interesting to know whether this form occurs elsewhere in Southern Europe, particularly if it occurs away from the high alps; if this should be the case, its origin must be different from the suggestion contained in Herr Trawöger's letter. The latter's article reveals him to be the greatest authority on the *E. lanestris* group of our day and the Innsbruck society have done science a service in publishing this important article.

Lepidoptera (n.s. III) (5) 1978/1. Copenhagen.

We quite recently drew attention to this excellent magazine and do so again on account of the interesting articles in the above number which will concern nearly all our readers, particularly the first article mentioned below.

Michael Fibiger: '*Theria primaria* (Haworth 1809) (*ibicaria* (H.-S.) 1852) found in Denmark' is, we believe, the first actually to publish the correct names, and give good illustrations, of the two *Theria* species inhabiting Europe, hitherto confused. British collectors must henceforth cease to call their Early Moths *T. rupicapraria* (D. & S.) as in the new edition of Kloet and Hincks. The males of the two species are easily distinguished in habitus, for in true *rupicapraria* the cross lines are more convergent towards the hind margin. I understand from D. S. Fletcher of the British Museum that despite considerable search in various collections no example of *rupicapraria* having been taken in Britain has been found, and there can therefore be little doubt that Haworth's name is the earliest for the one English species which we all know. Fibiger's article shows the habitus differences and also the differences in both sexes' genitalia.

The same number contains a further article, also well illustrated, by Henning Hansen entitled '*Aleucis distinctaria* H.-S., new Danish moth'. If new for Denmark, this moth, the Sloe Carpet, is not unknown, though rather local in Britain; it is somewhat similar in appearance and biology to *T. primaria*, and so its inclusion in the same number is very apt.

Other articles include a good one by P. L. Holst entitled 'Supplementary Notes on *Pyrausta ostrinalis* Hübn.' which presents a coloured plate of this species and also of *P. purpuralis* (L.), *P. aurata* (Scop.) and *P. porphyralis* (D. & S.). Male and female genitalia of these four species, also a good plate of their undersides, accompany the text.

A fourth article on three *Cochylidia* species of Denmark completes the number under review.

Entomops 46 : June 1978.

In this number of our well-known French contemporary, the French Noctuid Quadrifine specialist Dufay, evinces proof of wider lepidoptero-logical interests, for his first article reports the occurrence in the Greek mountains of Kaljakouda of some interesting butterflies and moths, including *Cyaniris helena* Staudinger; *Noctua haywardi* Tams, hitherto known from Cyprus, has now turned up in Macedonia and on Mt. Olympus; and the eastern subspecies of *Dendrolimus pini*, namely *cederensis* Dan., proves to be, at least in the author's material, the most widespread form of this handsome Lasiocampid in Greece. A second article by Claude Dufay deals with four *Thera* species, all of which he now shows to inhabit France; these are *T. variata* D. & S., *T. obeliscata* Hübn., *T. stragulata* Hübn., and *T. albonigrata* Gornik. The author illustrates the forms and shows the structural differences in their antenna, genitalia, etc., and also recapitulates their literary history. It constitutes a useful revision of the group, only two of which are known from the U.K. as far as we know.

Other articles in the same number are by Balletto and Toso on *Zygaena minos* D. & S. in the Ligurian Alps and G. S. Tempere and J. Giudicelli on Coleoptera.

Nota Lepidopterologica 1 (2), 1978.

SEL (Societas Europaea Lepidopterologica) has begun to take its place in the literature and other activities of British and Continental lepidopterists; last year its first publication 'Acta' (the *Hipparchia* Revision reviewed in our *Proceedings*, 10 (3/4): 122) appeared; and a Congress was held in March this year in Paris. And now a second part of its 'Nota' has reached us. This last is a plurilingual 48-page number with a scarlet cover and contains articles under headings Faunistic, Genetic, Environment, respectively by H. E. Back (Saharan Rhopalocera), E. Suomalainen (Parthenogenesis of *Nemophora*) and G. Ebert ('red lists'). There is also an 'Autobibliography with an autobiographical note' by B. C. S. Warren, the first of a planned series of similar contributions, and some intelligent unilingual reviews of contemporary publications.

The good paper and printing, and well-planned editorial policy, make this magazine, which will doubtless appear more regularly and frequently than the 'Acta', a welcome addition to Our Contemporaries, particularly as the articles, if not written in English, contain résumés in English and another European language. We recommend all British Lepidopterists, with an interest in Europe, to subscribe to the Society (annual membership fee D.M.20/-, entrance fee D.M.5/-); membership should certainly be higher than 353, the latest published figure (1st March 1978). The cost of a single number for non-members is D.M.8/-. Applications for membership should be sent to the Membership Secretary, S. Wagener, at Hemdenerweg 19, D-4290 Bockholt, West Germany.

E.P.W.

The Society's Publications

ILLUSTRATED PAPERS ON BRITISH MACROLEPIDOPTERA

The Society announces the publication shortly in one volume of twelve articles reprinted from the 'South London' Proceedings between 1944 and 1957 with the twelve original colour plates.

These papers comprise LAMPRONIIDAE and ADELIDAE, LITHO-COLLETIS and OECOPHORIDAE (three parts) and ALLIED FAMILIES by S. N. A. Jacobs, PSYCHIDAE, PLUTELLIDAE and GLYPHIPP-TERYGIDAE and ALLIED GENERA by L. T. Ford; CALOPTILIA and LYONETIIDAE by S. C. S. Brown; ERIOCRANIIDAE and MICROP-TERYGIDAE by J. Heath and MOMPHA by S. Wakely. For ease of use the pages and plates have been renumbered and are fully indexed accordingly; in addition there is a new appendix drawing attention to species belonging to these groups which have been added or sunk. There is also a list of species which relates names used in the text to up-to-date nomenclature and classification.

A *limited* edition of 500 copies is being published in the Autumn of 1978. The book will be bound in cloth. Price: £9; £6 to members of the *Society*. Postage, where applicable, 60p extra.

Cheques should be sent to the Hon. Treasurer, R. F. Bretherton Esq., C.B., Folly Hill, Birtley Green, Bramley, Surrey.

A CATALOGUE OF BOOKS IN THE LIBRARY OF THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

Compiled by T. R. EAGLES and F. T. VALLINS

£0.25

THE NATURAL HISTORY OF THE GARDEN OF BUCKINGHAM PALACE

(Proceedings and Transactions 1963, Part 2)

Compiled by a team of specialists.

£1.00

A LEPIDOPTERIST'S HANDBOOK

The Amateur Entomologist's Society is pleased to announce the publication of its latest Handbook, written by Richard Dickson. It is intended as a 'vade mecum' for both beginners and initiated lepidopterists and deals with all aspects of the subject in a series of eleven chapters and four appendices. There are 34 line illustrations and 13 photographs to augment the text and the binding has been sewn to meet constant use.

It is a practical book on the various facets of breeding, collecting, storing, conservation and photography of lepidoptera and should appeal to most lepidopterists. Although the various techniques relate to the British fauna, most are valid for lepidopterists anywhere.

The price is £3.00 plus postage and is available from A.E.S. Publication Agent, 137 Gleneldon Road, London, SW16 2BQ. (An invoice will be sent with orders, including postage.)

CONTENTS

Bretherton, R. F. and Kudrna, O. , Butterflies in Spain: Sierra de Alcaraz., Sierra de Gudar, Sierra de Javalambre	97
Chalmers-Hunt, J. M. , H. C. Huggins Bibliography (continued)	107
Corrigenda , Date of the Arran Brown and Scotch Argus	114
Current Literature	133
Field Meetings	127
Gardiner, B. O. C. , For sale, Hewitson on Butterflies, Price 6d.	100
Garton, K., and Rothschild, M.	
(i) How Swallow-tail butterflies pass the night;	102
(ii) A note on the Archbold Biological Station	106
Jones, P. E. , Phoresy and commensalism in British Pseudoscorpions	90
Phelps, H., and Wiltshire, E. P. , Notes on the Large Tortoiseshell butterfly overwintering in captivity in England	88
Proceedings	114
Tubbs, R. (Presidential address):	
(i) topical remarks	75
(ii) the breeding of butterflies, with special reference to the genetics of aberrational forms	77
(iii) Appendix: a new aberration of <i>Melanargia galathea</i> (L.) from Sussex	87

MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place 28th October, in Chelsea Old Town Hall. Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary.

852
nt,

PROCEEDINGS AND TRANSACTIONS OF THE
BRITISH ENTOMOLOGICAL AND NATURAL
HISTORY SOCIETY
INDEX VOLUME 11 (1978)

- Aphids, 123, 124
- Annual Exhibition, 122
- Archbold biological Station, 106
- Australia, an island called, 54
- Bibliography of H. C. Huggins, 37, 107
- Birdwing butterflies, photographing by available light, 127
- Breeding of butterflies, genetics of aberrational forms, 77
- Coleoptera, fossil assemblages, evidence of extinction from the British fauna, 119
- Conservation, a help or hindrance to entomologists? 117
- Council's and officers' reports, 56
- Corrigenda, 1, 114
- Current literature, 68, 133
- Danaid butterflies, evolution and biology, 123
- Diptera fauna, changes in the British, 115
- Dragon-flies, rarer British, 125
- Editorial 1,
- Entomological illustration, the versatility of, 116
- Field Meetings: Broxbourne Woods, Herts., 64; Canewdon Marsh and Hockley Wood, Essex, 65; Danbury, Essex, 131; Denny Bog New Forest, 65; Dungeness, Kent, 130; Ellenden Wood, Kent, 130; Featherbed Lane, Addington, Surrey, 129; Kingspark Wood, Sussex, 132; Northward Hill, Kent, 67; Sandy Down, Boldre, Hants., 131; Swanage, Dorset, 63 128.
- Fleas, distribution of, 120
- Hawaii, a lepidopterist in, 45
- Hering Memorial Research Fund, 62, 74
- Hewitson on Butterflies, 100
- Large tortoiseshell, overwintering in captivity, 88
- Leckford survey, 44
- Melanargia galathea*, a new aberration, 87.
- Obituaries: Ffennell, D.W.H., 34; Huggins, H. C., 36
- Oman, a naturalist in, 52, 53
- Phoresy and commensalism in British pseudoscorpions, 90
- Photography of butterflies, etc., 40, 127
- Pieris brassicae*, instar number and pupal coloration, 21
- Presidential address, 75
- Proceedings, 38, 114
- Rearing larvae on artificial pabulum, 121
- Revision of the British Asteiidae (Dipt.), 23
- Spain, butterflies in, 97
- Swallow-tail butterflies, how they pass the night, 102
- West African Lepidoptera, early stages, 117

PLATES

- I, II (facing p. 36): Annual Exhibition, 1977
- III (ditto): D. W. H. Fennell
- IV (facing p. 37): H. C. Huggins
- V (facing p. 106): How swallow-tail butterflies pass the night
- VI, VII (facing p. 107): Presidential Address: aberrational forms of butterflies



CONTRIBUTIONS

- Adams, A. E. C., 3
 Agassiz, D., 3, 11, 38, 40, 53, 64, 120, 123
 Allen, A. A., 3, 11, 18, 38, 40, 43, 44, 45, 46, 47, 48, 51, 53, 54, 55, 114, 116, 118, 119, 120, 122, 123, 124, 126
 Archer, M.L., 10
 Ashby, C. B., 10
 Baker, B. R., 3, 39
 Baker, P. J., 3, 63, 128, 130
 Banner, J. V., 3
 Baxter, L. N., 116
 Blackman, R. 124
 Bradford, E. S., 11, 42, 46, 47, 50, 115, 118, 121
 Bradley, J.D., 40
 Bretherton, R. F., 3, 11, 40, 45, 49, 56, 68, 71, 123, 136
 Bretherton, R. F., Cribb, P. W. & Dyson, R. C., 10
 Bretherton, R. F., & Kudrna, 0, 97
 British Museum, (Natural History), 4
 Britton, M. R., 4
 Brotheridge, D., 12
 Burton, G. N., 4, 10
 Chalmers-Hunt, J. M., 12, 36, 54, 107, 127
 Chandler, P. J., 15, 23
 Chelmick, D. G., 125
 Chipperfield, H. E., 4
 Collinson, W. E., 4
 Craske, R. M., 4
 Cribb, P. W., 4
 D'Abbrera, Bernard, 127
 Daley, T. J., 5, 114
 Dobson, 5
 Dyke, 40
 Edmunds, H., 5
 Else, G. R., 15, 16, 17, 42, 119
 Emmet, A. M., 12, 39, 43, 46, 48, 49, 53, 120, 122, 123, 124, 125, 126, 131
 Evans, K.G. W., 132
 Evans, L. J., 10
 Fairclough, A. J. & R., or R. alone, 5, 13, 45, 47, 51
 Farwell, I. G., 20
 Fearnough, T. D., 5
 Gardiner, B. O.C., 21, 100, 121
 Garton, K. & Rothschild, M., 102, 106
 George, R. S., 120
 Gilchrist, W., Stubbs, A. E. Williams, S., & Else, G. R., 44
 Girling, M. A., 119
 Goater, B., 34, 55
 Godfray, H. C. J., 13
 Guichard, K., 52, 53
 Hadley, M., & Parsons, M. J., 10
 Halstead, A. J., 123
 Hammond, C. O., 20, 48, 73
 Harbottle, A. H. H., 5
 Hargreaves, B., 13, 116
 Harman, T. W., 5, 127
 Harmer, A. S., 5
 Harper, M. W., 6, 13
 Hart, C., 6, 48, 55
 Heath, J. 6, 49, 50, 51, 55
 Hilliard, R. D. Y., 45
 Herton, G. A. N., 6, 14
 Howarth, T. G. 72, 118, 127
 Hyde, G. E., 6
 Imber, S. F., 6
 Jackson, B. C., 6
 Jacobs, S. N., 39, 47
 Johnson, P.J., 14
 Jones, P. E., 90
 Jones, R. A., 16, 17
 Kettlewell, H. B. D., 6
 Kirby, P., 20
 Knill-Jones, S. A., 6,14, 40
 Langmaid, J. R., 6, 13, 14
 Larsen, T., 10
 Mansell, G. H., 10
 Marcon, J. N., 7
 McFeely, J., 7
 MacNulty, B. J., 116, 117
 Messenger, J. L., 7
 Michaelis, 7 14
 Miles, S., 16, 17
 Muggleton, J., 118
 Newcombe, M. J., & Bradford, E. S., 130
 Owen, J. A., 44
 Packer, L., 17
 Parker, W., 3
 Pelham-Clinton, E. C., 7, 14
 Phelps, H. G., 10
 Phelps, H. G. & Lipscomb, C. B., 7
 Phelps, H. G. & Wiltshire, E. P., 88
 Pickering, R. R., 7
 Pickles, A. J., 7
 Prior, G., 39, 44, 51, 122, 125, 126
 Revell, R. J., 14
 Revels, R. C., 8, 20
 Richardson, N. A., 8
 Roche, C. G., 50, 54
 Roche, J., 14
 Russwurm, A. D. A., & Middleton, G. M., 8
 Rydon, A. H. B., 46
 Sattler, K., 45
 Shaw, M. R., 19
 Simson, L. D., 8
 Skinner, G., 8
 Smith, K. G. G., 115
 Sokoloff, P., 14, 16, 20, 48, 50, 125
 Sterling, D. H., 46, 53, 65
 Stubbs, A. E., 16, 50, 117
 Torstenius, S., 10

Trembath, D. M., 10
 Tremewan, W. G., 8, 10
 Tubbs, R. S., 8, 75, 77, 87, 126
 Tweedie, M. W. F., 69, 70, 115
 Utlen, R. W. J., 20, 50, 65
 Vane-Wright, R. J., 123
 Vickers, W. A., 20
 Walker, D. G., 8
 Watson, A. W. & A., 8
 Wheeler, A. S., 9
 Whitebread, S. E., 10, 14
 Wild, E. H., 9
 Williams, S. A., 43, 48
 Wilmott, K. P., 20
 Wilson, R. W., 20
 Wiltshire, E. P., 1, 9, 60, 71, 73, 126,
 133, 136
 Worms, C. G. de, 9, 43, 45, 46, 48, 51,
 54, 117, 119, 120, 122
 Young, L. D., 9

ARACHNIDAE

cambridgei, Anelasmacephalus, 115

BIRDS

bearded tit, 48
 chiff-chaff, 64
 cuckoo, 64
 great spotted woodpecker, 64
 nightingale, 64
 owl, tawny, 43
 reed bunting, 64
 willow warbler, 64

COLEOPTERA

Coleoptera collected at Kingspark
 Wood, 133
 ardesiacus, Harpalus, 63
 aurata, Cetonia, 117
 bifasciatus, Anthicus, 48
 bipunctata, Adalia, f. fasiatopunctata,
 118
 canaliculata, Drusilla, 64
 castaneus, Anostrius, 119
 clavipes, Otiorrhynchus, 64
 crepitans, Brachinus, 64
 diodemata, Phyllotreta, 64
 fuscirostre, Apion, 64
 goettingensis, Timarcha, 64
 gracilis, Astenus, 64
 distincta, Epuraea, 43
 fulva, Leptura, 43
 kraatzi, Borboropora, 43
 oblongus, Phyllobius, 64
 schmidti, Gnathoncus, 43
 smaragdinus, Harpalus, 63
 thujae, Phloeosinus, 44

truncatellus, Metabletus, 63, 64
 umbrosa, Amarochara, 43
 viridicoeruleus, Psilothrix, 64

DIPTERA

aenea, Callicera, 16
 alternata, Rhagoletis, 16
 amonena, Asteia, 27, 30
 annulipes, Megasyrphus, 15
 bicolor, Eurygnathomyia, 15
 bromius, Tabanus, 67
 canescens, Bombylius, 16
 caeruleiventris, Xylota, 17
 cognata, Euleia, 16
 distincta, Chymomyza, 15
 fatigans, Culex, 16
 fenestratus, Thyridanthrax, 16
 flava, Laphria, 15
 florum, Xylota, 17
 fulvipes, Thecophora, 16
 fuscimana, Chymomyza, 15
 gambiae, Anopheles, 16
 gibbosus, Ogcodes, 16
 globosum, Gymnosoma, 16
 globulus, Acrocera, 15
 guestfalica, Nephrotoma, 16
 histrio, Eustalomyia, 16
 ibis, Atherix, 15, 16
 ilicis, Phytomyza, 133
 interrupta, Cylindromyia, 16
 intestinalis, Gasterophilus, 16
 curvinervis, Leiomyza, 31
 dudai, Leiomyza, 31, 32, 33
 elegantula, Asteia, 29, 33
 flavipes, Leiomyza, 31
 glabricula, Leiomyza, 31...
 laevigata, Leiomyza, 31, 32, 33
 lenta, Xylotomima, 16
 lucida, Themira, 17
 luteola, Myolepta, 16
 maculata, Solva, 15, 16
 major, Bombylius, 133
 marginata, Laphria, 16
 Microsania sp., 15
 modesta, Vielda, 16
 obliterated, Hormopeza, 15, 29
 oelandica, Dioctria, 16
 pagana, Tipula, 16
 pecorum, Gasterophilus, 16
 permundus, Phagocarpus, 16
 quadrimaculata, Limonia, 15
 rotundatum, Gymnosoma, 16
 rotundiventris, Subclytia, 16
 rufifrons, Astiosoma, 15, 23, 24, 28
 rufiventris, Mintho, 16
 scaevoides, Chamaesyrrhus, 15
 scatophagina, Liomyza, 31, 32, 33
 submaculata, Dixia, 17
 tibialis, Chorisops, 15

umbrarum, Dictya, 17
 variabilis, Rhadiurgus, 15
 variegata, Amiota, 15
 variicornis, Tipula, 16
 vesicularis, Conops, 16
 vittipes, Eustalomyia, 16
 yerburyi, Tipula, 16

EPHEMEROPTERA

Baetidae, 42
 Ephemeroptera, 42

HEMIPTERA

affinis, Scolopostethus, 67, 63
 ambulans, Mecomma, 130
 ampliata, Tingis, 68
 apterus, Halticus, 130
 arbustorum, Plasiognathus, 68, 130
 ater, Capsus, 68
 aurantii, Toxoptera, 123
 cardui, Tingis, 68
 dimidiatus, Phytocoris, 68
 delobrata, Leptoterna, 68, 130
 elongata, Notostira, 67, 68
 epilobii, Dicyphus, 68, 130
 fabricii, Eysarcoris, 68
 grandis, Scolopostethus, 68
 flavoquadrimaculatus, Dryophilocoris, 68
 histrionicus, Cyllecoris, 68
 Homopteron sp., 65
 interstinctus, Elasmostethus, 130
 inuncta, Podops, 67, 68
 limbosus, Legnotus, 68
 maerkeli, Pithanus, 67, 130
 melanocephalus, Cymus, 68
 melanocephalus, Phylus, 68
 merioptera, Heterotoma, 68, 130
 mirmicoides, Himacerus, 68
 niger, Orius, 68
 norvegicus, Calocoris, 68, 130
 resedae, Kleidocerys, 67, 68, 130
 roseri, Sthenarus, 128
 rugosus, Nabis, 68, 130
 scutellaris, Deraeocoris, 68
 sexguttatus, Calocoris, 128
 sylvaticus, Drymus, 68
 tiliae, Phytocoris, 130
 tripustulatus, Liocoris, 67, 68, 130
 urticae, Heterogaster, 68
 varians, Psallus, 68
 virescens, Orthotylus, 130

annulata, Campoletis, 49
 anxium, Agrypon, 18
 armatorius, Amblyteles, 19 53
 armatus, Agriotypus, 47
 atra, Myrmosa, 17
 atratinus, Psen, 17
 bees, 51
 boops, Astata, 17
 camelus, Xyphidria, 17
 cantator, Charops, 46
 caviventris, Anoplius, 42
 chares, Apanteles, 124
 chrysophthalmus, Zemiotes, 19
 circumscriptus, Rogas, 49
 clandestinum, Agrypon, 53
 clavicornis, Sapyga, 18
 coarctatus, Eumenes, 17
 connexus, Protomicroplitis, 55
 corruscator, Craticheumon, 19
 crabro, Crabro, 66
 cunicularius, Colletes, 17
 cyanea, Ceratina, 17
 cynipid galls, 52
 deliratorius, Ichneumon, 19
 dirus, Zimmeria, 52
 dolichogaster, Sympiesis, 18, 19
 europaea, Macropis, 42
 excubitor, Cliocentrus, 18, 19
 flaveolatum, Agrypon, 19, 126
 flavus, Lasius, 67
 flexorius, Agrypon, 47, 122
 florissomne, Chelostoma, 18
 Formica, 65
 formosus, Apanteles, 119, 120
 fragilis, Meteorus, 18, 123
 fraternus, Apanteles, 18, 51
 gades, Apanteles, 18
 gracilipes, Cliocentrus, 20
 grandii, Macrocentrus, 19
 graniger, Astiphoromma, 18
 halophilus, Colletes, 18
 hattorfiana, Andrena, 18
 ichneumonoides, Methocha, 17
 inclusus, Apanteles, 54, 55
 indipennis, Platylabus, 126
 instigator, Pimpla, 55
 interruptus, Nisson, 17
 lapidator, Trogus, 20
 Lasioglossum sp., 17
 lepidus, Barichneumon, 45
 Litomastix sp., 18
 lucens, Lipara, 42
 lucorum, Bombus, 133
 marginata, Andrena, 43
 Mesochorus sp., 40, 41, 45, 120, 124
 microstictus, Coelichneumon, 19, 44
 minuta, Protomicroplites, 18
 minutus, Ophion, 118
 moesta, Casinaria, 18
 mutinensis, Symmorphus, 42

HYMENOPTERA

acasta, Apanteles, 51
 albifrons, Craticheumon, 18
 albilineatus, Barichneumon, 19

mygdonia, Apanteles, 52
 nebulator, Alexeter, 118
 niger, Sphecodes, 17
 orbitalis, Casinaria, 18
 Osmia spp., 18
 pallida, Biorhiza, 133
 panzeri, Omalus, 17
 pascuorum, Bombus, 16
 pectoralis, Hylaeus, 42
 Phobocampa sp., 40, 41
 pictus, Banchus, 126
 pinicola, Apanteles, 114
 pratorum, Bombus, 133
 pulchellatus, Platylabus, 114
 pulchripes, Dufona, 116
 Rogas sp., 49
 rosae, Diplolepis, 133
 rosae, Andrena, 43
 roseum, Hedychrydium, 17
 ruderatus, Bombus, 43
 ruficornis, Nomada,
 sarcatorius, Ichneumon, 19
 scutellaris, Meteorus, 19
 spurius, Apanteles, 120, 125
 strenuus, Microplitis, 18
 testaceator, Zele, 19
 testaceus, Rogas, 18
 tournieri, Enicospilus, 19, 45
 tricineta, Melitta, 43
 truncatellus, Litomastix sp. nr., 19
 verna, Odontites, 43
 versicolor, Meteorus, 123
 vicinator, Absyrtus, 18, 19
 violaceus, Omalus, 17
 violaceus, Trogus, 20
 vitripennis, Apanteles, 52
 volutatorius, Banchus, 19, 44
 walkeri, Crossocerus, 42
 xanthomelana, Osmia, 17
 xanthopus, Aphanistes, 18, 19 38
 xanthorius, Ichneumon, 126

LEPIDOPTERA

Lepidoptera spp. at Durlston, Swanage,
 128-9
 Lepidoptera spp. at Kingspark Wood,
 Plaistow, 132-3
 absissana, Lobesia, 64
 absinthiata, Eupithecia, 51
 aceriana, Gypsonoma, 11
 aceris, Stigmella, 11, 13, 39
 acroxantha, Paracystola, 11, 41, 42, 43
 adippe, Fabriciana, 8
 advenella, Eurhodope, 64
 aegeria, Pararge, ab. insula, 9
 aemulana, Eucosma, 130
 aeneana, Commophila, 11
 aeriferanus, Ptycholomoides, 14
 aescularia, Alsophila, 64, 117

aethiops, Erebia, 5, 6, 80, 114
 affinis, Cosmia, 6
 agathina, Xestia, 7, 8
 aglaja, (aglaja), Argynnis, Mesoacidalia,
 5
 ahenella, Hypochalcia, 14
 alacella, Acanthophila, 11, 13
 albiceps, Parachromistis, 12
 albicolon, Sideeridis, 67
 albipuncta, Mythimna, 6, 7
 albipunctata, Cyclophora, 64
 albipunctella, Nemapogon, 42
 albonigrata, Thera, 138
 albulata, Asthena, 64
 alburnella, Teleiores, 12
 alfierii, Iolana, 10
 algira, Dysgonia, 15
 alni, Acronicta, 8 66
 alpicola, Parornix, 62
 alpinella, Elachista, 12
 alstroemeriana, Agonopterix, 46
 alternana, Stenodes, 11, 66
 amandus, Plebicula, 97
 ambigua, Hoplodrina, 12
 ambigualis, Scoparia, 64, 67
 anceps, Peridea, 6
 angulipennis, Oligostigma, 11, 12, 40
 arbusculae, Eriogaster, 136, 137
 arenella, Agonopterix, 46
 argentella, Elachista, 63
 argentipedella, Ectoedemia, 126
 argiolus, Celastrina (holly blue), 119,
 121, 122; ab. lilacina-suffusa, 7
 argus, Plebejus, 5, 9; abs. albopunt-
 tata 8; basijuncta, 9, 85; caernensis,
 9; cretaceus, 9; infraobscura, 8;
 masseyi, 9; privata, 8; striata, 2
 arion, Maculinea, 117
 armigera, Helicoverpa, 7
 argentimacula, Infurcitinea, 11
 argentipedella, Ectoedemia, 65
 argyropeza, Ectoedemia, 64
 artemisicolella, Coleophora, 13
 arundinata, Scoparia, 68
 ashworthii, Xestia, 8
 atalanta, Vanessa, 46, 79, 120
 athalia, Mellicta, 83, 128; ab. eos=
 corythalia, 6
 atemaria, Ematurga, 65
 atricapitana, Cochylys, 66
 atropos, Acherontia, 7, 20
 augur, Graphiphora, 6
 aurantiana, Pammene, 14
 aurinia, Euphydryas, 6, 7; ab. mela-
 noleuca, 5
 aurata, Pyrausta, 138
 aurofasciana, Olethreutes, 11
 badiana, Ancylys, 20
 badiata, Anticlea, 64
 bankesiella, Epischnia, 53, 54

- bankiana, *Deltote*, 3
 belemia, *Euchloe*, 10
 bellargus, *Lysandra*, 5, 9, 45, 86, 127;
 abs. alba, 86; *ceronus*, 10, 86; *digita-*
 tata, 5; *obsoleta*, 86; *radiata*, 86;
 schmidtii, 86
 bergmanniana, *Croesia*, 64
 betulae, *Parornix*, 130
 betulae, *Thecla*, 7, 41
 biatomella, *Elachista*, 12
 bicostella, *Pleurota*, 66
 bicuspis, *Harpyia*, 6, 35
 bifractella, *Apodia*, 14
 bilineata, *Camptogramma*, 68
 biren, *Laconobia*, 6
 biselata, *Idaea*, 130
 bisontella, *Ochsenheimeria*, 12
 bractea, *Autographa*, 9
 brassicae, *Pieris*, 21, 22, 23, 43, 86, 87,
 88, 130, 131; ab. *albinensis*, 87;
 ab. *coerulea*, 87
 britanniodactyla, *Capperia*, 11, 130
 brockeella, *Argyresthia*, 130
 brumata, *Oporophtera*, 48, 63, 122
 brunnicella, *Stephensia*, 12, 129
 caecimaculana, *Pelochrista*, 13
 caeruleocephala, *Diloba*, 18, 51, 64
 caesia, *Hadena*, ssp. *mananii*, 3
 caja, *Arctia*, 71
 c-album, *Polygonia*, 9, 83-5, 119, 120,
 127; f. *hutchinsoni*, 84-5
 cambyses, *Zygaena*, 10
 caniola, *Eilema*, 9
 camilla, *Ladoga* (*Limenitis*), 85, 119,
 126; ab. *nigrina*, 6, 8, 43, 85; *semi-*
 nigrina, 6
 capreella, *Bucculatrix*, 62
 captiuncula, *Photedes*, ssp. *tincta*, 7
 cardamines, *Anthocharis* (*orange-tip*),
 5, 64, 121
 cardui, *Cynthia*, 45
 carmelita, *Odontotia*, 3, 120
 casta, *Psyche*, 64, 130
 castanea, *Xestia*, 2, 7, 8
 castrensis, *Malcosoma*, 65
 celerio, *Hippotion*, 35, 48
 centaureata, *Eupithecia*, 51
 chamomillae, *Cucullia*, 48
 caracterea, *Apamea*, 7
 charlotta, *Mesoacidalia*, 73
 chenopodiata, *Scotopteryx*, 130
 chlorosata, *Petrophora*, 64
 chrysonuchella, *Thisanotia*, 67
 chrysorrhoea, *Euproctis*, 44, 67
 cinerea, *Agrotis*, 125
 cinereopunctella, *Elachista*, 12
 cinxia, *Melitaea*, 8
 citrigo, *Xanthia*, 7
 clavis, *Agrotis*, 6, 9
 cleocharis, *Apaturopsis*, 10
 cleopatra, *Gonepteryx*, 10
 cloacella, *Nemapogon*, 64
 cnicella, *Agonopterix*, 66
 combinella, *Pseudosuammerdamia*, 63
 comes, *Noctua*, 131
 comma, *Hesperia*, 3
 compositella, *Cydia*, 14
 compta, *Hadena*, 8
 comptana, *Ancylis*, 63
 confusa, *Hadena*, 9
 confusalis, *Nola*, 123
 cnicolana, *Cydia*, 11, 42
 consimilana, *Clepsis*, 128, 130
 consonaria, *Ectropis*, 3, 8
 conspersana, *Cnephasia*, 13
 conspicillaris, *Egira*, 6, 122
 convolvuli, *Agrius*, 3, 7
 conwagana, *Pseudargyrotoza*, 68
 coridon, *Lysandra*, 5, 8, 9, 10, 45, 85-6,
 115; abs. alba, 6; *antidigitata*, 8;
 asturiensis, 10; *caeca*, 5; *discreta*, 5;
 marginata, 86; *punctata*, 86; *infra-*
 fowleri, 86; *semi-syngrapha*, 8; *syn-*
 grapha, 79, 85, 86; *ultra-fowleri*, 8,
 86; *ultranubile*, 8
 viridescens, 86
 corticella, *Nemaxera*, 11
 corylana, *Pandemis*, 13
 coryli, *Colocasia*, 64
 corylfoliella, *Phyllonorycter*, 130
 cossus, *Cossus*, 15, 40
 crataegi, *Aporia*, 6, 36
 crepuscularia, *Ectropis*, 8
 crepusculella, *Opostega*, 15
 cresphontes, *Papilio*, 103, 104, 105, Pl.
 V
 cribraria, *Coscinia*, f. *arenaria*, 2
 cribrumalis, *Machrochilo*, 128
 cristana, *Acleris*, 13, 51, 131
 croceus, *Colias*, 45, 79, 87; ab. *helice*,
 79, 87
 Cryptolechia sp., 40
 cucullatella, *Nola*, 18, 63, 123
 culiciformis, *Aegeria*, 9
 culmella, *Chrysoteuchia*, 68
 cupriacella, *Nematois*, 12
 curtula, *Clostera*, 2, 8, 64
 curvella, *Argyresthia*, 68, 130
 curvistrigana, *Phalonidia*, 130
 Cymothoe spp. 10
 cynosbatella, *Epiblema*, 64
 cytisella, *Paltodora*, 130
 daphne, *Brenthis*, 97, 99
 decentella, *Etainia*, 12
 decorella, *Telediodes*, 11
 degeerella, *Nemophora*, 68
 deione, *Mellicta*, 97, 99
 demarniana, *Epinotia*, 130
 denticulella, *Callisto*, 130
 deprivata, *Agrotis*, 43

- derivata, Anticlea, 64
 designata, Xanthorhoe, 6
 diana, Eutromula, 14
 didyma, Melitaea, 10
 dilutata (dilutaria), Epirrita, 122, 131
 dilutella, Pempelia, 128
 diminutalis, Parapoynx, 11, 38
 dissoluta, Nonagria, 6
 distinctaria, Aleucis, 137
 distinctella, Chionodes, 14
 dodonaea, Drymonia, 66
 dodonacata, Eupithecia, 3, 126
 dominula, Callimorpha, 9
 drurella, Cosmopterix, 12
 dubitella, Phyllonorycter, 35, 76
 egenaria, Eupithecia, 126
 egeria, Pararge, 63
 ekebladella, Tischeria, 130
 Elachista sp., 131
 elongella, Caloptilia, 53
 emargana, Acleris, 130
 emortualis, Trisateles, 60
 enixalis, Nymphula, 11, 12
 epilobiella, Mompha, 14
 Erebia spp., 10
 ericinella, Aristotelia, 12
 euphorbiae, Acronicta, ssp. myricae, 3
 euphrosyne, Clossiana, 7; ab. albinea, 5
 Eupithecia spp. 51, 53
 euphrosyne, Boloria, 7, 78, 82, 83, 123;
 ab. albinea, 83; ab. pallida, 83
 exanthemata, Cabera, 3
 exclamationis, Agrotis, ab. pallida-
 unicolor, 9
 exsiccata, Tathorhynchus, 35
 extensaria, Ectropis, 66
 extimalis, Evergestis, 13, 45
 extrema, Photedes, 3, 5
 exulans, Zygaena, ab. pallida, 5
 fabressei, Agrodiaetus, 97
 fabriciana, Anthophila, 20
 fagi, Stauropus, 3, 18
 fagiglandana, Cydia, 130
 falcataria, Drepana, 122
 falconipennella, Caloptilia, 53
 falloui, Euchloe, 10
 farinalis, Pyralis, 115
 fascelina, Dasychira, 66
 fasciaria, Hylaea, prasinaria, 8
 ferchaultella, Luffia, 121, 122
 ferrugana, Acleris, 131
 filipendulae, Zygaena, 5, 46
 flammea, Trigonophora, 2, 7, 54
 flammealis, Endotricha, 15, 130
 flaviciliana, Cochylys, 129
 flavincta, Polymixis, 5
 flavimitrella, Lampronia, 35, 76
 fletcherella, Scythris, 12
 fluctuata, Xanthorhoe, 6, 50
 formosanus, Lozotaeniodes, 13, 14
 fraternana, Epinotia, 14
 fraternela, Caryocolum, 13
 fraxini, Catocala, 35
 fribergensis, Caloptilia, 9
 fuciformis, Hemaris, 5, 7
 fulvana, Eucosma, 128
 fulvescens, Mompha, 46
 funebris, Anania, 11, 12, 130
 furuncula, Mesoligia, 6
 fuscateLLa, Lampronia, 66
 fuscescens, Borkhausenia, 130
 galathea, Melanargia, 8, 80; craskei,
 ab. nov. 80, 87, 88, Pl. VI, fig. 2,
 VII; valentini, 80
 gamma, Autographa, 6
 geniculea, Agriphila, 131
 gentianaean, Endothenia, 63
 geoffrella, Alabonia, 67
 gilvaria, Aspitates, burrenensis, 7
 glareosa, Paradiarsia, 7
 glaucus, Papilio, 105, 106
 gleichenella, Elachista, 12
 gnidiella, Crytoblabes, 14
 gnomana, Paramesia, 11, 13
 goedartella, Argyresthia, 130
 gothica, Orthosia, ab. circumsignata, 6
 gracilis, Orthosia, 7
 grandipennis, Scythris, 11, 42
 grossulariata, Abraxas, 18, 120
 Gypsonoma, sp., 67
 hamana, Agapeta, 128
 hartmanniana, Aethes, 13, 14, 129
 hastiana, Acleris, 48, 53
 haywardi, Noctua, 138
 hecate, Brenthis, 87, 89
 helle, Lycaena, 10
 hellerella, Blastodacna, 12
 hcmerebiella, Coleophora, 64
 heracliana, Agonopterix, 46
 herminata, Diplodoma, 12
 hippocastanaria, Pachycnemia, 66
 hippophaella, Gelechia, 12
 hirtaria, Lycia, 120
 hornigi, Coleophora, 130
 hospiton, Papilio, 20
 hydrolapatella, Coleophora, 11, 12
 hyperantus, Aphantopus, 79, 82, 129;
 ab. arete, 82; lanceolata, 79, 82;
 obsoleta, 82
 icarus, Polyommatus, 7, 9, 79, 85; abs.
 arcuata, 85; basijuncta, 85; caeca,
 8, 9; caerulea, 85; costijuncta, 85;
 obsoleta, 5, 7
 icteritia, Xanthia, ab. virgata, 9
 ilia, Apatura, 10, 71
 imbecilla, Eriopygodes, 2, 8, 9, 55, 73
 impura, Mythimna, 43
 ircanana, Eana, 13
 incarnatana, Epiblema, 14

- incertana, *Cnephasia*, 66, 130
 inferna, *Amauris*, 10
 inopiana, *Hysterosia*, 14
 ino, *Brenthis*, 97, 99
 inornata, *Ancylolomia*, 15
 insigniata, *Eupithecia*, 6, 126, 127
 instabilella, *Scrobipalpa*, 14
 interjectana, *Cnephasia*, 66
 internana, *Cydia*, 14
 interpunctella, *Plodia*, 52
 interrogationis, *Syngrapha*, 8
 intimella, *Ectoedemia*, 131
 intricata, *Eupithecia*, f. *arceuthata*, 11
 inturbata, *Eupithecia*, 122
 ino, *Brenthis*, 97, 99
 io, *Inachis*, 5, 6, 48, 119
 ipsilon, *Agrotis*, 131
 iris, *Apatura*, 7, 10, 71, ab. *irole*, 72
 irrorella, *Setina*, 3
 isabellae, *Graellsia*, 136
 isertana, *Zeiraphera*, 11, 130
 jacobaeae, *Tyria*, 9, 55
 janszkevskae, *Sorhagenia*, 130
 janthina, *Noctua*, 43
 janthinana, *Cydia*, 130
 jebelia, *Strymonidia*, 10
 juncicolella, *Coleophora*, 12
 jungiella, *Cydia*, 64
 juniperata, *Thera*, 116
 jurtina, *Maniola*, 8, 128; *anticrassipuncta*, 81; *cassiteridum*, 81; *iernes*, 81; *pallens*, 5; *semi-intermedia*, 5
 lacteella, *Mompha*, 11, 124
 lacticolor, *Apanteles*, 18
 lacunana, *Olethreutes*, 130
 lanestris, *Eriogaster*, 52, 136-7
 lariciata, *Eupithecia*, 39
 lathonia, *Issoria*, 6
 latreillella, *Panalia*, 12
 leautieri, *Lithophane hesperica*, 7, 9, 12, 46, 48
 leguminana, *Cydia*, 14
 leucopennella, *Caloptilia*, 19
 leucophaearia, *Agriopsis*, 6, 54
 leucostigma, *Celaena*, 6, 7
 leucostola, *Parornix*, 62
 lichenea, *Eumichtis*, 7
 ligea, *Erebia*, 2, 5, 55, 114
 limospennella, *Coleophora*, 130
 linealis, *Nymphula*, 38
 lineata, *livornica*, *Hylas*, 2, 3, 6
 linneella, *Glyphipteryx*, 11, 39
 litoralis, *Mythimna*, 8
 liturata, *Semiothisa nigrofulvata*, 6
 loefflingiana, *Aleimma*, 130
 loniceriae, *Zygaena transferens*, 8
 longana, *Cnephasia*, 66
 lucidella, *Monochroa*, 12
 lucina, *Hamearis*, 123
 luctuata, *Spargania*, 60
 luctuosa, *Tyta*, 9
 luedersiana, *Pammene*, 11, 14
 lunaedactyla, *Marasmarcha*, 66, 128
 lunalis, *Herminia*, 2, 3
 lunaris, *Batia*, 12, 130
 lunula, *Calophasia*, 131
 lunularia, *Selenia*, 64
 lupulinus, *Hepialus*, 68
 lutarea, *Paraswammerdamia*, 64
 luteolata, *Opisthograptis*, 125
 lutulenta, *Aporophyla*, 8
 machaon, *Papilio*, 20
 machimella, *Coleophora*, 50
 maculana, *Epinotia*, 131
 macularia, *Pseudopanthera*, 3, 64
 maculella, *Incurvaria*, 64
 maenas, *Aetias*, 116
 malacellus, *Angustalius*, 15
 malella, *Stigmella*, 130
 maha, *Zizeeria*, f. *argia*, 74
 malvae, *Pyrgus*, 87, 120
 malvella, *Pexicopia*, 1
 manniana, *Phalonidia*, 14
 margaritata, *Campaea*, 18
 margarotana, *Aethes*, 15
 marginata, *Lomaspilis*, 6, 130
 marginea, *Tischeria*, 130
 marginicolella, *Nepticula*, 130
 mascullella, *Incurvaria*, 63
 maura, *Mormo*, 44
 mediopectinellus, *Ochsenheimeria*, 11
 megera, *Lasiommata*, 64, 80; *anticrassipuncta*, 80
 megerlella, *Elachista*, 12
 mellonella, *Galleria*, 14
 mendica, *Diaphora*, 6
 mendica, *Diarsia*, 6; *orkneyensis*, 8
 menyanthidis, *Acronicta*, 6
 mercurella, *Eudonia*, 130
 mepilella, *Phyllonorycter*, 131
 meticulosa, *Phlogophora*, 91, 131
 metis, *Apatura*, 71
 metzneriana, *Eucosma*, 11, 14, 43
 mi, *Callistege*, 64
 microdactyla, *Adaina*, 13
Micropterix spp., 5
 millefoliata, *Eupithecia*, 131
 miniosa, *Orthosia*, 6
 ministrana, *Eulia*, 64
 minorata, *Perizoma*, 6
 minos, *Zygaena*, 138
 mitterbacheriana, *Ancylis*, 130
 molesta, *Cydia*, 11, 42
 monoglypha, *Apamea*, 19, 43
 montana, *Xanthorhoe*, 64
 monylifera, *Narycia*, 49
 morpheus, *Heteropterus*, 10
 munda, *Orthosia*, 117
 muralis, *Cryphia*, 3, 6, 43, 44
 musculana, *Syndemis*, 14, 64

- nana, *Cochylis*, 66
 nanana, *Epinotia*, 120
 nanella, *Incurvaria*, 130
 nebulella, *Homoeosoma*, 14
 nemorella, *Ypsolopha*, 130
 nervosa, *Agonopteryx*, 46, 131
 ni, *Trichoplusia*, 35
 nickerlii, *Luperina*, 2, 60; *gueneei*, 5,
 7; *knilli*, 6; *leechi*, 9
 nisella, *Epinotia*, 12
 notella, *Ypsolophus*, 131
 nubilalis, *Ostrinia*, 45, 47, 129
 nupta, *Catocala*, 35
 nymphaeata, *Nymphula*, 120
Nymphula sp., 38
 obelisca, *Euxoa*, 9
 obeliscata, *Thera*, 3, 114, 116, 138
 oblitella, *Heterographis*, 40
 oblonga, *Apamea*, 7
 obsoleta, *Mythimna*, 6, 128
 occulta, *Eurois*, 35, 2, 7
 ocellana, *Spilota*, 66, 130
 ocellata, *Smerinthus*, 131; *hybridus*, 9
 ocellatella, *Scrobipalpa*, 14
 ochraceella, *Mompha*, 125
 ochroleuca, *Eremobia*, 6, 8
 ochsenheimeriana, *Pammene*, 14
 ocula, *Amphipoea*, 9
 oditis, *Leucoclaena*, 3, 7
 olivalis, *Udea*, 68
 oliviella, *Dasycera*, 11
 ophiogramma, *Apamea*, 6, 7
 opima, *Orthosia*, 6
 oppressana, *Gypsonoma*, 13
 orion, *Scolitantides*, 10
 ostrina, *Eublemma*, 35
 ostrinalis, *Pyrausta*, 138
 otis, *Zizina*, 74
 oxyacanthae, *Allophyes*, 51, 52
 palaemon, *Carterocephalus*, 50
 palamedes, *Papilio*, 103, 104, 106, Pl. V
 pallens, *Mythimna*, 43
 pallescentella, *Tinea*, 48
 palustrella, *Monochroa*, 12, 121
 pamphilus, *Coenonympha*, 128; *abs.*
anti-excessa, 6; *transformis*, 8
 paphia, *Argynnis*, 51, 79, 97, 99; *abs.*
ater, 7; *confluens*, 7; *nigricans*, 7;
valesina, 7, 79, 83, 84
 parenthesesella, *Ypsolopha*, 130
 paripunctella, *Teleiodes*, 13
 parva, *Eublemma*, 35
 pauperana, *Eucsoma*, 122, 123, 126
 pavonia, *Saturnia*, 66
 pedella, *Stathmopoda*, 11, 13, 39
 pennaria, *Colotois*, 124
 penziana, *Eana*, *colqhounana*, 14
 perlellus, *Crambus*, 130
 perlucidalis, *Eurrhyncha*, 11
 perplexa, *Hadena*, 3
 phoeniceata, *Eupithecia*, 6, 43, 60
 phloea, *Lycaena*, 64; *abs. cyprinus*,
 5; *latomarginata*, 5
 phryganella, *Diurina*, 131
 Phyllonorycter spp., 13, 20, 49
 piceaella, *Pulicalvaria*, 12, 46, 47, 131
 piercella, *Tinea*, 125, 126
 pilosaria, *Apocheima*, 3, 54, 64, 117
 pinastri, *Hyloicus*, 3
 pini, *Dendrolimus*, *ssp. cederensis*, 138
 piniaria, *Bupalus*, 64
 plantaginis, *Parasemia*, 6
 plebejana, *Crociosema*, 14
 polychloros, *Nymphalis*, 83, 88, 89
 polydamus, *Battus*, 103, 104, 105
 polyodon, *Actinotia*, 71
 populella, *Anacamptis*, 67
 populella, *Ectoedemia*, 115
 populi, *Laothoe*, *hybridus*, 9
 porcellus, *Deilephila*, 67
 porphyralis, *Pyrausta*, 138
 porphyrea, *Lycophotia*, 123
 postvittana, *Epiphyas*, 14, 54
 potentillae, *Scythris*, 11, 14
 pratella, *Crambus*, 64
 primaria, *Thera*, 126, 137
 proboscidalis, *Hypena*, 68
 procellata, *Melanthia*, 6
 promissa, *Catocala*, 5
 pronuba, *Noctua*, 53
 pronubana, *Cacoecimorpha*, 125
 propinquella, *Mompha*, 123, 124, 125
 pruniana, *Hedya*, 68
 pseudobombycella, *Taleporia*, 65
 pseudospretella, *Hofmannophila*, 46
 pterodactyla, *Stenoptilia*, 64
 pulchellata, *Eupithecia*, 115; *ssp. hebu-*
dium, 39
 pulverosella, *Ectoedemia*, 130
 pupillaria, *Cyclophora*, 5, 7, 12, 35
 purpuralis, *Pyrausta*, 138
 purpuralis, *Zygaena*, *hibernica*, 3
 puta, *Agrotis*, 43, 131; *abs. insula*, 8;
nigra, 6
 putris, *Axyliia*, 71
 pyrina, *Zeuzera*, 8
 quadrimaculella, *Bohemannia*, 12
 quadricolor, *Bematistes*, 10
 quadripunctaria, *Euplagia*, 43, 118
 quercana, *Carcina*, 130
 quercifolia, *Ectoedemia*, 49, 52
 quercus, *Lasiocampa*, *f. callunae*, 9
 quercus, *Quercusia*, 40, 41, 68, 130;
ab. depuncta, 5
 quinquella, *Ectoedemia*, 49
 quinnata, *Phyllonorycter*, 14
 ramburialis, *Diasemiopsis*, 35
 rapae, *Pieris*, 22, 63, 64, 131
 raschkiella, *Mompha*, 130
 reaumurella, *Adela*, 64

- reducta, *Limenitis*, 97, 99
 repandata, *Alcis*, 18, 52
 repentiella, *Stigmella*, 13
 revayana, *Nycteola*, 131
 ripae, *Agrotis*, 7
 rhamnii, *Gonepteryx*, 117; f. *gravesi*, 36
 rhododactyla, *Cnemidophorus*, 64, 123
 Rhopalocera, list of spp., three Spanish Sierras, 98-99
 roborana, *Epiblema*, 64
 roborella, *Phycita*, 47
 rosana, *Archips*, 126
 rubi, *Callophrys*, 64
 rubi, *Macrothylacia*, 66
 rubiginata, *Plemyria*, 6
 rubiginata, *Scopula*, 5
 rubricollis, *Atolmis*, 3
 ruficornis, *Drymonia*, 66
 rufocinerea, *Elachista*, 63
 rupicaprarria, *Theria*, 126, 137
 ruralis, *Pleuroptya*, 15, 19
 russiae, *Melanargia*, 10
 rusticella, *Monopis*, 125
 sabinella, *Gelechia*, 11
 sagittella, *Phyllonorycter*, 131
 sambucaria, *Ourapteryx*, 119
 sanguinalis, *Pyrausta*, 12, 14, 15
 sarcitrella, *Endrosis*, 46
 saturatella, *Coleophora*, 12, 13
 saxifraga, *Stenoptilia*, 115
 scabiosella, 14, 129
 scabriuscula, *Dypterygia*, 6, 66
 scalella, *Pseudotelphusa*, 11, 13, 64
 schmidtiiellus, *Telephila*, 13
 scirpi, *Elachista*, 12
 scoliaeformis, *Conopia*, 3
 scopariella, *Phyllonorycter*, 12
 scopigera, *Bembecia*, 39
 scotinella, *Gelechia*, 115
 scutulana, *Epiblema*, 64
 secalis, *Mesapamea*, 131
 segetum, *Agrotis*, f. *pallida*, 9
 selene, *Clossiana*, 5; abs. *medionigrans*, 5; *transversa*, 5
 semele, *Hipparchia*, 5' 8, 78; abs. *caeca*, 6; *holanops*, 3, 8, 80, 81, 127, Pl.V, f. 3
 semifulvella, *Tinea*, 68
 sepium, *Bacotia*, 12
 seriata, *Idaea*, 54...
 sericeella, *Heliozela*, 49
 sexta, *Manduca*, 121
 sheperdana, *Acleris*, 67
 silenus, *Myrina*, 116
 similella, *Microthrix*, 128
 similis, *Euproctis*, 55
 simplicella, *Dioryctria*, 11
 simpliciatia, *Eupithecia*, 44
 simulans, *Rhyacia*, 3
 sinaicus, *Pseudophilotes*, 10
 sinapis, *Leptidea*, 123; ab. *erysimi*, 5; ssp. *juvernica*, 3
 singula, *Neofriseria*, 13
 sinuella, *Homoeosoma*, 129
 smeathmanniana, *Aethes*, 66
 solieri, *Blepharita*, 2, 7
 sparganii, *Archanara*, 127
 speciosa, *Stigmella*, 13
 spectrana, *Clepsis*, 13, 14
 statices, *Adscita*, 3
 stephensi, *Dystebenna*, 13
 stragulata, *Thera*, 138
 strataria, *Biston*, 117
 straminea, *Mythimna*, 128
 straminea, *Stenodes*, 129
 straminella, *Agriphila*, 130
 strigillaria, *Perconia*, 3, 65
 subbimaculella, *Ectoedemia*, 49, 52, 67
 subcinerea, *Platyedra*, 14
 sublustris, *Apamea*, 7
 subocellea, *Reuthia*, 14, 129
 subsequana, *Epinotia*, 14
 substrigella, *Mompha*, 46
 succedana, *Cydia*, 63
 sulphurella, *Esperia*, 64
 swammerdamella, *Nematopogon*, 64
 sylvestris, *Thymelicus*, ab. *intermedia*, 5
 sylvicolana, *Dichrorhampha*, 13
 tages, *Erynnis*, 64; *baynesi*, 36; *hugginsi*, 3
 tamara, *Zygaena*, 10
 telmessia, *Maniola*, 10
 tentaculella, *Ancylolomia*, 15
 tenuiata, *Eupithecia*, 120
 terrella, *Bryotropha*, 130
 testacea, *Luperina*, 6, 7
 tiliae, *Mimas*, 9
 tiliae, *Stigmella*, 12
 titania, *Clossiana*, 10
 tithonus, *Pyronia*, 8, 81, 130; abs. *albidus*, 5; *excessa*, 7, 81; *pallidus*, 3
 trabeatella, *Agriphila*, 15
 trapezina, *Cosmia*, 64
 tridens, *Calamia*, *occidentalis*, 7
 trifolii, *Discestra*, 8
 trifolii, *Zygaena*, 18; subsp. *decreta*, 8, 9; *palustrella*, 8
 trigemina, *Abrostola*, 3
 trigeminella, *Coleophora*, 12
 trimaculana, *Epinotia*, 68
 trinotella, *Tinea*, 64, 125
 tristella, *Agriphila*, 130
 troilus, *Papilio*, 106
 trux, *Agrotis*, 7
 tubulosa, *Taleporia*, 66, 130
 tullia, *Coenonympha*, 81, 82; ab. *lanceolata*, 8, 82

turbidella, Ectoedemia, 12, 115
 typhae, Nonagria, 127
 uddmanniana, Epiblema, 130
 ulicolella, Phyllonorycter, 12
 ulmella, Bucculatrix, 130
 umbra, Pyrrhia, 67
 umbratica, Cucullia, 67
 undulana, Orthotaenia, 68
 undulata, Rheumaptera, 7
 unionalis, Palpita, 14, 47
 unipuncta, Mythimna, 7, 35
 urticae, Aglais, 6, 8, 9, 48, 119
 urticae, Spilosoma, 128
 utonella, Elachista, 12
 vapourer moth, 1
 variata, Thera, 3, 138; f. britannica, 3
 velocella, Aroga, 13
 venosata, Eupithecia, 121, 126; subsp.
 orcadensis, 9; plumbea, 36
 verbasci, Cucullia, 49
 verhuella, Psychoidea, 124
 versicolor, Oligia, 9
 vibicella, Coleophora, 125
 villica, Arctia, 67
 villosella, Pachythelia, 66
 vinella, Syncopacna, 14
 vinula, Cerura, 64
 vigata, Mesotype, 66
 viridaria, Phytometra, 65
 viridata, Chlorissa, 66
 vitellina, Mythimna, 3, 7, 40, 46
 vulgana, Capua, 64
 vulgata, Eupithecia, 64; clarensis, 36
 vulgella, Teleiodes, 130
 w-album, Strymonidia, 129
 wockeella, Coleophora, 13
 xylostella, Plutella, 66, 130

MAMMALS

hare (leveret), 67

MISCELLANEOUS ARTHROPODS

hoffmannseggi, Platyarthus, 67
 Pseudoscorpions, genera & spp., 90-96
 woodlouse, 67

MOLLUSCA

involuta, Limnaea, 36
 praetenuis, Limnaea, 36

ORTHOPTERA

discolor, Conocephalus, 67
 panzeri, Ectobius, 67
 parallelus, Chorthippus, 67
 splendens, Qaboosia, 52
 viridissima, Tettigonia, 67

PLANTS

Abies, 14, 120
 Acer, 19, 39, 122
 Achillea, 50, 131
 Agrostis, 50, 131
 Agrostis, 78
 Alnus (alder), 11, 15, 39, 53
 Anacamptis, 128
 Armillaria, 33
 Artemisia, 13, 43, 47, 65, 127
 Atriplex, 44
 bamboo, 103
 Bartsia, red, 43
 bedstraw, 66
 beech, 16
 Beta, 14
 Betula (birch), 18, 122
 broom (Sarthamnus), 12, 65
 buckthorn, 130
 cacao, 123
 Calamintha, 129
 camellia, 123
 Carex, 131
 Centaurea, 11
 Chamaenerion, 65
 Chenopodium, 41
 Cirsium, 15, 68
 Citrus, 103, 123
 Clerodendrum (Pagoda flower), 106 &
 Pl. V. fig. 2
 coffee, 123
 Conium, 127
 Coprinus, 33
 Corylus (hazel), 13, 51
 crab apple, 126
 Crambe, 131
 Crataegus (hawthorn), 16, 51, 63, 126
 Cupressus, 44, 46, 121
 Dipsacus, 63
 Echium, 16
 elm, 130
 Endymion, 65
 Epilobium (willow-herb), 48, 68, 123
 frankincense, 53
 Ficus (fig), 121
 Fuchsia, 48
 Genista, 14, 125
 heather, 19, 123, 126
 Heracleum, 16
 Hippocrepis, 78
 Hippophae (sea buckthorn), 12, 66, 67,
 126
 holly, 65
 honeysuckle, 65
 hornbeam, 14
 Hypholoma, 33
 Juglans, 116
 Knautia, 18, 129
 Lavatera, 14

- Linaria, 131
 Lotus, 39
 Luzula, 65
 Lysimachia, 42
 Malva, 14
 mango, 103
 Melampyrum, 65
 Melica, 65
 Mentha, 14, 15
 Molinia, 8
 Oenanthe, 127
 Ononaria, 128
 Ophrys, 128
 Orchys, 64
 Origanum, 129
 Oudemansiella, 33
 peach, 42
 pepper, 103
 Picea (spruce), 46, 120
 pine (Pinus), 11, 42, 103, 107, 114, 116
 Pinites, 134
 Plantago, 83
 Pleurotus, 33
 Poa, 65, 78, 80
 Polygala, 39
 pomegranate, 14
 Populus (poplar), 11, 42; alba, 67;
 (aspen) tremula, 65, 131
 Poterium, 39
 privet, 52
 Prunus, 18
 Quercus ilex (holm oak), 19, 63
 Quercus (oak), 11, 13, 15, 65, 124,
 126; turkey oak, 103, 107
 ragwort, 51
 rest-harrow, 66
 Rosa (rose), 16, 122, 123, 126
 Rubus (bramble), 17, 65, 130
 Rumex sp., 65, 121; R. hydrolapa-
 thum, 12
 Salix (sallow), 16, 45, 120, 126, 131;
 (willow), 65, 131
 scabious, 43
 Sedum, 106
 Senecio, 66
 Silene, 126
 Sorbus, 65
 Spiraea, 67
 Stachys, 13
 sumach, 116
 Tanacetum, 14
 Taraxacum, 123
 tea, 123
 Tilia, 39, 126
 Tricholoma, 33
 Tripleurospermam (chamomile), 48
 Tussilago, 16
 Typha, 127
 Ulex, 11, 42
 Urtica, 65
 Valeriana, 127
 Viola (violet), 55, 82
 Volvariella, 33
 wild service tree, 131

REPTILES

slow worm, 129

TRICHOPTERA

Goera spp., 47
 nitidus, Grammataulius, 128
 Silo spp., 47

ERRATA

Vol. 11(1/2): p.73, 1.35:
 for *discalis* (F.) read *imbecilla* (F.)
 (3/4) cover, p.2. for 1977 G. Prior,
 etc., read:
 1977, read R. Tubbs, O.B.E., F.R.E.S.
 1978 G. Prior, F.L.S., F.R.E.S.

8521

MARCH 1979

Vol. 12, Parts 1/2

Proceedings and Transactions of
The British Entomological and
Natural History Society



Price: £3.50

Officers and Council for 1979

President:

Rev. D. J. L. Agassiz

Vice-Presidents:

G. Prior, F.L.S., F.R.E.S.
R. Fairclough, F.R.E.S., F.R.H.S.

Treasurer:

Col. D. H. Sterling, F.B.C.S.

Secretary:

E. H. Wild, M.I.BIOL.

Curator:

E. S. Bradford

Librarian:

G. Prior, F.L.S., F.R.E.S.

Lanternist:

S. A. Knill-Jones, A.R.C.M.

Ordinary Members of Council:

Mrs. F. M. Murphy, B.SC.	J. Muggleton
B. J. Jackson	W. G. Tremewan, M.I.BIOL.
T. J. Daley	C. G. Roche, F.C.A.
W. Parker	A. A. Allen, PH.D., B.SC.
R. S. Tubbs, O.B.E., F.R.I.B.A., F.R.E.S.	A. E. Stubbs, B.SC., F.R.E.S.

Editorial

Editor: E. P. Wiltshire, C.B.E., F.R.E.S.

Address: Wychwood, High Road, Cookham, SL6 9JS, Berks.

with the assistance of:

T. R. E. Southwood, B.SC., PH.D., A.R.C.S., M.I.BIOL., F.R.E.S.
T. G. Howarth, B.E.M., F.R.E.S., F.Z.S.
M. W. F. Tweedie, M.A., F.Z.S.
R. W. J. Uffen, F.R.E.S.
E. S. Bradford

Proceedings and Transactions of
The British Entomological and
Natural History Society

The correct abbreviation of THIS Volume is:
'Proc. Trans. Br. ent. nat. Hist. Soc.'

Vol. 12
1979

Published at the Society's Rooms, The Alpine Club, 74 South
Audley Street, London, W.1, and printed by Charles Phipps
Ltd., 225 Philip Lane, Tottenham, LONDON, N.15

EDITORIAL

In recent years, the first double-part of these Proceedings has included reports on both the Annual Exhibition of the preceding autumn and the Annual General Meeting of January of the current year.

This year the Annual General Meeting on January 25th was adjourned to a later date due to a combination of bad weather and transport strikes affecting the attendance. We are, however, able to hold over the meeting report (usually running to some eight pages) without reducing size, thanks to one or two weighty contributions in hand. An early appearance is very desirable for various reasons, mainly financial, and it is still our aim, but a further snag may frustrate the hope: — our printers are trying to catch up the time lost last autumn when a break-down set them back six weeks in printing a monthly contemporary and our own Proceedings; may they succeed!

These explanations will enlighten members who may not have received the index to Vol. 11 or the reprints of their own contributions as promptly as desired, or who may miss certain customary features in the present double-part. As for our hope to appear as early as late March, more or less emerging in step with the Brindled Beauty (*Lycia hirtaria* (Clerk)), our readers, who are mostly lepidopterists and used to making allowances for the vagaries of the weather or other *forces majeures*, will, we trust, pardon us if, after all, we should not hatch before April.

THE 1978 ANNUAL EXHIBITION

(see Plates I, II)

The Society's Annual Exhibition was again held at Chelsea Old Town Hall on the day immediately following the Annual Dinner, Saturday, October 28th. The attendance was good, and considering that the season had been as unfavourable for insects as any could remember the total of over 100 exhibitors was creditable, even if there was a slight falling-off compared with last year. Of these over seventy were of Lepidoptera.

The Editor is indebted to Messrs. B. Skinner, R. Bretherton, J. Chalmers-Hunt, D. Stimpson, G. Else and Dr. A. A. Allen for their reports on the various classes of exhibits, and to Mr. D. Wilson for the photographs in the Plates. Wholehearted thanks are also due to Mrs. Murphy for organising the refreshments and to members of certain members' families for assisting her in serving them.

BRITISH MACRO-LEPIDOPTERA

AGASSIZ, Rev. D. J. L. — A short series of *Alcis jubata* (Thunb.) from South Wiltshire. An aberrant specimen of *Boloria selene* (D. & S.) from Argyllshire.

ALLEN, A. A. — *Bembecia scopigera* (Scop.) captured on a grassy cliff face at Shaldon, S. Devon on 7.viii.78.

BAKER, B. R. — A small brood of *Diaphora mendica* (Clerck), *f. rustica* Hubn. bred from a female, taken near Killmallock, Co. Limerick on 13.iv.77. A selection from a garden m.v.l. trap at Caversham, Berks including *Orthonama obstipata* (F.), *Hadena compta* (D. & S.) and *Xestia agathina* (Dup.).

BLAND, K. P. — *Apamea exulis assimilis* (Dbl.) taken at m.v.l. at Blackford, Edinburgh on 19/20.viii.78.

BRETHERTON, R. F. — *Hepialus fusconebulosa* (de Geer), a new record to the Bramley garden light trap. A distribution map relating to the October migration together with daily weather charts from the Times.

BRITISH MUSEUM (NATURAL HISTORY). — Four drawers of *Eilema* spp. from the newly curated collection of British Lithosiinae. Single drawers of both *Biston strataria* (Hufn.) and *Noctua pronuba* L. including a number of recent acquisitions.

CHALMERS-HUNT, J. M. — A pair of *Arctornis l-nigrum* (Müller), O.F. bred from a female taken at Bradwell-on-Sea, Essex by A. J. Dewick.

CHAMBERS, D. A. — A specimen of *Cosmorhoe ocellata* (L.) from East Malling with the central band of the left forewing broken.

CLASSEY, E. W. and DEMUTH, R. — Immigrant moths from Central Gloucestershire: *Helicoverpa armigera* (Hüb.), Oakridge on 12/14.x.78., *Mythimna vitellina* (Hüb.), Southrop, 13/14.x.78., *Peridroma saucia* (Hüb.), *Mythimna unipuncta* (Haw.), both from Oakridge 13/14.x.78 and *Diachrysia orichalcea* (F.), Southrop, 14/15.x.78. The last two are both new county records.

CRASKE, R.M. — Aberrant examples of *Boloria selene* (D. & S.), *Pyronia tithonus* (L.) and *Melanargia galathea* (L.) including an extreme specimen of the latter species.

CROW, P. N. — A melanic form of *Acronicta alni* (L.) and a specimen of *Hemaris tityus* (L.), both uncommon in North Wales.

FAIRCLOUGH, R. and A. J. — Bred series of *Euphyia biangulata* (Haw.) from the Forest of Dean and bred examples of *Noctua orbona* (Hufn.) from larvae collected in the Suffolk Breckland in early spring.

GREENWOOD, J. A. C. — A detailed record of the rearing of *Euphyia biangulata* (Haw.) from females collected in an area on the West Sussex/Hants. border where some 40 specimens were noted during 1978.

GOATER, B. — The first bred specimens of *Eriopygodes imbecilla* (F.) from South Wales. A female is depicted on Plate I fig. 4.

HARMER, A. S. — Aberrant lepidoptera taken or bred during 1978 including an extreme form of *Oporinia dilutata* (D. & S.) from Lymington, Hants. (Plate II, fig. 15). Also a selection of original specimens figured in the recent publication "Aberrations of British Butterflies" by A. D. D. Russwurm which included a male *Euphydryas aurinia aurinia* (Rott.) ab. *melanoleuca* Cabeau (Plate II, fig 23).

HIGGS, G. E. — An extreme pale example of *Arctia caja* (L.) found at rest on a Blackthorn bush at Doolin, Co. Clare (see Plate I, fig. 2).

HORTON, Dr. G. A. NEILL. — A case of Lepidoptera collected mainly in Monmouthshire during 1978. Of particular interest was a short series of *Mythimna pudorina* (D. & S.) not having been previously recorded from the county.

HOWARD, Dr. GUY. — A small selection of moths taken in Glengarry, West Inverness-shire, including a *Palpita unionalis* (Hüb.) in October 1977 and a streaked example of *Spilosoma lubricipeda* (L.) (see Plate II, fig. 18).

HYDE, G. — A "freak" *Zygaena filipendulae* (L.) bred by the late H. Spencer. See Pro. S.L.E. & N.H.S. 1949-50 (see Plate III, fig. 7).

IMBER, S. F. — On behalf of B. Jewson: an *Aglaia urticae* (L.) ab. *lutea* Raynor (see Plate II, fig. 12).

JAMES, R. — Two aberrations of *Agrotis exclamationis* (L.) taken during 1978.

LEECH, M. J. — A series of *Luperina nickerlii gueneei* Doubl. from North Wales. A series of *Egira conspicillaris* (L.) and single specimens of *Rhyacia simulans* (Hufn.) and *Rhodometra sacraria* (L.), all from Herefordshire. A series of *Ptilophora plumigera* (D. & S.) from the Cotwolds.

LORIMER, R. I. — An unusual aberration of *Opisthograptis luteolata* (L.) with the costa of the forewings broadly red-brown, a large median subcostal blotch and having the other markings greatly reduced. A strongly grey-tinted *Agrochola litura* (L.) resembling the typical form which is said not to occur in Britain.

MACNULTY, Dr. B. J. — A short bred series of *Xylena exsoleta* (L.) from a female taken at Rannoch, Perthshire on 23rd April 1978.

MARCON, Rev. J. N. — Paintings of 112 varieties of British Butterflies, many of great historic interest, and now mainly housed in the British Museum (Nat. Hist.) and the Saruman Museum.

MARTIN, P. A. — A small but select collection of Lepidoptera including an unusually marked *Comibaena pustulata* (Hufn.) (see Plate I, fig. 8).

PEARCE, C. E. — A dark aberration of *Deilephila elpenor* (L.) (see Plate I, fig. 3).

PELHAM-CLINTON, E. C. — From Winchburgh, West Lothian: *Rhodometra sacraria* (L.) 11.x.78; *Mythimna unipuncta* (Haw.) 20.ix.78.

PHELPS, H. G. — Butterfly aberrations bred during 1978, including two *Lysandra coridon* Poda ab. *syngrapha-inframarginata* B. & L., bred in the F2 from a female of the same variety taken in Wiltshire during 1976.

PICKLES, A. J. and C. T. — A case of local and migrant Heterocera. From the 2d June Field Meeting to Hayling Island were examples of *Agrotis ripae* (L.), *Sideridis albicoron* (Hüb.), and *Lasiocampa trifolii trifolii* (D. & S.). From Lymington Hants. were single examples of *Rhodometra sacraria* (L.), *Cyclophora pupillaria* (Hüb.) and *Spodoptera littoralis* (Bois.).

PLATTS, J. — A drawer of Lepidoptera from widely separated areas of the British Isles illustrating many local forms. The gem of this exhibit was a striking aberration of *Cymatophorima diluta* (D. & S.).

PRATT, C. — A case of migrant and aberrant lepidoptera taken in Sussex during the past years. This included an example of *Lithacodia deceptor* (Scop.) from Peace haven, 7.vi.76.

REVELL, R. J. — Lepidoptera from South Cambridgeshire during 1975-78: *Eupithecia millefoliata* Röss, first county record, *Xestia rhomboidea* (Esq.), *Orthosia opima* (Hüb.), *Cucullia absinthii* (L.), and *Lithophane ornitopus* (Hüb.) all of rare occurrence in the county.

REVELS, R. — Six cabinet drawers of Butterfly aberrations: One of varieties caught during which include *Ladoga camilla* (L.) ab. *nigrina* Weymer and ab. *obliterae* Robson and Gardener from Hants. One drawer each of *Aphantopus hyperanthus* (L.) ab. *pallens* Schultz and ab. *lanceolata* Shipp and *Melanargia galathea* (L.) ab. *craskei* Tubbs. Three drawers of *Lysandra coridon* (Poda) abs. *semi-syngrapha* Tutt, *fowleri* South, *tithonus* (*syngrapha* Kef), and *antidigitata* B. & L., bred over the past nine years.

RICHARDSON, Austin. — Eight *Luperina nickerlii gueneei* Doubl. from North Wales including an ab. *fusca* Turner. *Hadena caesia mananii* Greg., bred from Islay, and *Uresiphita limbalis* (D. & S.) from the Isles of Scilly. All taken or bred during 1976.

RUSSWURM, A. D. A. and MIDDLETON, H. G. M. — A selection of varieties taken or bred during 1978. These include a series of *Aglais urticae* (L.) subjected to low temperatures, an example of which is depicted on Plate II, fig. 11, and a teratological male *Maniola jurtina* (L.) ab. *atrescens* Leeds. Also exhibited was a heavily marked specimen of *Itame wauaria* (L.) and a melanic male *Hyloicus pinastri* (L.) both taken M.V.L. at Brockenhurst, Hants.

SAUNDERS, D. A. — A dark female and an intersexed example of *Lasiocampa quercus* (L.) together with a pair of typical specimens.

SIMS, I. R. — A female *Agrotis deprivata* Walker, Fam. Noctuidae, bred from a larva found at the Spitalfields Fruit Market in June 1977. Evidence seems to support its arrival in a consignment of onions from Chile. A female aberration of *Acasis viretata* (Hübner) taken at a Rothamsted light trap at Chigwell Row, Essex, on 8th August 1978 (see Plate II, fig. 22). SIMSON, Brig. E. C. L. — Examples of *Paradiarsia glareosa* (Esp.), *Xestia agathina* (Dup.), *Amphipoea oculatea* (L.) and *Dichonia aprilina* (L.) from Hampshire showing normal variation.

SKINNER, B. — A bred series of *Cabera pusaria* (L.) from Abinger, Surrey, including pink forms. A short bred series of *Ectropis consonaria* (Hübner) ab. *waiensis* Richardson from Monmouthshire. A male aberrant *Xanthorrhoe fluctuata* (L.) from Addington, Surrey, depicted on Plate II, fig. 14. A female *Trigonophora flammea* (Esp.) taken at Swanage, Dorset, on 14/15.x.78.

SOKOLOFF, P. A. — Lepidoptera bred or collected during 1978 including a male intersex *Agrotis cinerea* (D. & S.) (see Plate I, fig. 5).

STERLING, Col. D. H. — A specimen of *Heterogenea asella* (D. & S.) taken by P. H. Sterling at the Society's New Forest Field Meeting on 29th July 1978. A small selection of moth aberrations mainly from Winchester district including several unusual forms of *Xanthia aurago* (D. & S.).

TUBBS, R. S. — The results of breeding *Melanargia galathea* (L.) ab. *craskei* Tubbs since 1974 from wild caught specimens received from R. M. Craske.

TUCK, K. and ROBINSON, G. S. — A specimen of *Cosmia trapezina* (L.) ab. *nigra* Tutt. (see Plate I, fig. 6).

WALKER, D. H. — A series of *Hipparchia semele* (L.) from an isolated locality in Westmorland which resembled the drawf form *thyone* Thompson. Examples of this race from the Great Orme, North Wales were also exhibited.

WATKINSON, Dr. I. A. — Migrants taken in mid October at Boughton, Kent were two *Helicoverpa armigera* (Hübner), one *Mythimna unipuncta* (Haw.), one *Rhodometra sacraria* (L.) and two *Mythimna albipuncta* (D. & S.). The first authenticated record of *Rhyacia simulans* (Hufner) from Kent, taken at Boughton on 8.ix.78.

WATSON, R. W. and A. — A variable series of *Erebia aethiops* (Esp.) from Dalmally, Argyllshire. Two drawers of *Argynnis paphia* (L.) showing genetic variation and the results of subjecting the pupae to low temperatures, an extreme example of this experiment is shown on Plate I, fig. 1. Four drawers of aberrant *Lasiommata megera* (L.), many of which have been previously illustrated in past proceedings and South's Butterflies.

WILD, E. H. — A male *Diloba caeruleocephala* (L.) having the '80' marks absent (see Plate II, fig. 17). One *Mythimna unipuncta* (Haw.) from Selsdon, Surrey, 14th October, 1978 and a male *Clostera anachoreta* (D. & S.) from Dungeness, Kent, 18th August 1978.

WINTER, P. Q. — The first recorded *Mythimna vitellina* (Hubn.) from Yorkshire, taken at Filey on 11th October 1978. Three specimens of *Eurois occulta* (L.), bred from a pairing between a virgin female taken at sugar near Malton on 8th July 1977 and a male assembled to it near Filey on the 14th July.

WITHERS, B. G. — The first recorded British specimen of *Lomographa trimaculata* (Vill.), taken at m.v.l. on 13/14th June and a specimen of *Spodoptera littoralis* (Bois.) on 13/14th October, both taken during 1978 at Stowborough, Dorset (see Plate I, fig. 7).

WORMS, DR. C. G. M. de. — Aberrant and local Lepidoptera taken during 1978, including examples of *Cryphia muralis* (Forst.) and *Scotopteryx peribolata* (Hübner) from Guernsey in September. A male *Cossus cossus* (L.) from Horsell, Surrey, 7th July. The uncommon type form of *Xyloges conspilaris* (L.) from the Severn Valley, and a small male *Xanthorhoe designata* (Hübner) having a very narrow central band, taken at Horsell on September 7th.

YOUNG, L. D. — A selection of outstanding Lycaenid varieties taken or bred during the past 40 years. One extreme example of *Polyommatus icarus* (Rott.) is illustrated on Plate I, fig. 9.

YOUNG, M. R. — A series of *Diarsia mendica* (F.) from Hoy and a halved gynandromorph of the same species from Inverpolly, Wester Ross. Specimens of *Eupithecia pygmaeata* (Hübner) from the Kincardine Coast.

FOREIGN LEPIDOPTERA

Some twenty members showed foreign lepidoptera, covering a wide range of origins and interest. For Scandinavia there was a large display by SING TORSTENIUS and C. B. ASHBY of the collection of Geometridae and other species which the former has generously given to the Society. This is now being arranged and incorporated in our cabinets. It is of great interest as a basis for comparison of the forms of species which are found in Scandinavia and in Britain, and also as a guide to many species (47 among the 248 Geometridae alone) which we are not known to have, and which members may be tempted to seek in Scandinavia and possibly as new discoveries in the British Isles.

From France, P. W. CRIBB and R. W. DYSON showed selections from 130 species of Rhopalocera seen during a two weeks expedition from Calais to the Parc National des Ecrins and the Montagne de Lure, and R. F. BRETHERTON a case of eleven species of *Erebia* and some of the Zygaenidae and nocturnal Heterocera from the same expedition; but the late season inhibited study of high level species. Dr. C. LUCKENS showed butterflies collected in the Var department in April and in Andorra July, and G. N. BURTON lepidoptera taken in the Cevennes from 13th to 16th August, including *Chazara briseis* (L.), f. *pirata* Esp. and *Lysandra coridon* (Poda), f. *syngrapha* Kef., and *Amphipyra livida* (D. & S.), a species allied to our *A. pyramidea* (L.). He also showed lepidoptera from Sierra de Guadarrama, Picos de Europa, and Jaca, in Spain; and T. G. HOMER comparative selections of Spanish species taken in the spring of 1978 and the early summer of 1974. Dr. C. G. M. DE WORMS exhibited *Melanargia* (eight species) and *Plebicula* (six species) from Europe and North Africa, and also Rhopalocera caught in High Atlas of Morocco, 19th to 29th July 1978. G. PRIOR displayed coloured illustrations of *Eupithecia* larvae from "Biologie der Eupitheciën" by Karl Dietze.

From the Middle East GUY BROOME had 57 Rhopalocera species from Turkey and Cyprus; and T. B. LARSEN showed examples, caught by the British Ambassador in the Yemen in 1974, of *Papilio machaon rathjensi* Warnecke, *Pararge felix* Warnecke, *Lycaena phlaeas shima* Gabriel, and *Carcharodus alceae wissmanni* Warnecke, with a map showing the wide separation of these species and sub-species from their nearest relatives.

From West Africa H. C. J. GODFRAY had various *Syntomidae* collected on the Oxford expedition to Mount Numba, Liberia in July to September 1978; and from the Western Pacific G. S. and H. S. ROBINSON illustrated the spread and displacement in the Solomon Islands of species and forms of Arctiid genus *Utetheisa*, familiar to us as the rare immigrant *U. pulchella*.

SIR CYRIL CLARKE and the Hon. MIRIAM ROTHSCHILD jointly exhibited typical and mutant specimens of *Danaus plexippus erippus* Cr. reared from Argentine stock, and a photograph of that species attracted to flowers of the Orchid *Epidendrum paniculatum* by their scent: this mimics pyrrolizidine alkaloids which are sequestered by the butterflies. SIR CYRIL CLARKE also showed specimens of the Japanese Vapourer moth (*Orgyia thyellina* Butl.): it is closely related to *O. antiqua* (L.), to which its females will readily assemble. Finally, P. J. CROFT illustrated apparent Batesian mimicry between species in unrelated families in Venezuela, Trinidad, Canada, Borneo, and Taiwan.

BRITISH MICROLEPIDOPTERA

AGASSIZ, Rev. D. J. L. — (1) From Argyll: *Clepsis rurinana* (L.), one; *Pammene populana* (F.); *Epinotia mercuriana* (Fröl.); *E. crenana* (Hbn.); *Kessleria saxifragae* (Stt.) and *Adela croesella* (Scop.). (2) From Enfield *Eucosma pupillana* (Clerck) and an exotic Nymphuline species probably belonging to the genus *Oligostigma* Guenée taken October 1978.

ALLEN, Dr. A. A. — (1) *Parocystola acroxantha* Meyrick, five (all ♀♀), taken at actinic light on the roof of a guest house, in a residential part of Dawlish, Devon, on 30.vii, 3, 5, 7, and 11.viii.1978. One was also captured there in the same manner on 8.viii, but unfortunately escaped. The ♀ caught on 30.vii, laid 66 eggs from which the larvae hatched on 10.viii.78, and fed well on *Eucalyptus* sp. Ova were also laid by another moth but in lesser quantity. A live pupa was exhibited, as well as a photograph of the young larvae (seven days old) feeding on *Eucalyptus*. A more detailed note will appear later. (2) Other micros taken in 1978: *Lampronia luzella*, Hbn., Shaldon, Devon, 7.viii; *Zelleria hepariella* Stt., Salfords, Surrey, 5.iii; *Recurvaria leucatella* Clerck, Dawlish, Devon, 31.vii; *Teleoides alburnella* Z., Reigate, Surrey, 28.vii; *Bryotropha domestica* Haw., Dawlish, 5.viii; *Oegoconia quadripuncta* Haw., Dawlish, 5.viii; *Eucosma aspidiscana* Hbn., Folkestone, Warren, Kent, 27.v; *Aethes francillana* F., Holcombe, Devon, 11.viii.

BLAND, Dr. K. P. — Species from Scotland: *Scoparia ulmella* (Knaggs.), Craigroyston, Loch Lomond, Stirlingshire, in m.v. tray, 11.vii.78; *Schiffermuelleria similella* (Hbn.), reared from bracket-fungi, i.e. ex *Piptoporus betulinus* Fries on birch collected 27.x.76 at Crichton Glen, Midlothian bred 1.v.77; ex *Daedalea quercina* Pers. on oak collected 13.v.78 at Craigroyston, Stirlingshire, bred 4.vi.78; *Blastobasis decolorella* (Woll.), at m.v.l., Blackford, Edinburgh, 31/1.vi.78 and Musselburgh, Midlothian, 9/10.vii.78; only once previously recorded from Scotland. *Acleris abietana* (Hbn.), Craigroyston, Loch Lomond, Stirlingshire, in m.v. trap, 16/17.iv.78; new to Stirlingshire. *Eana incanana* (Steph.). Craigroyston, Loch Lomond Stirlingshire, several, 1978; *Nemophora minimella* (D. & S.), Gordon Moss

Nat. Res., Berwick, larva found under *Scabious*, 15.iv.78, stopped feeding 30.v, moth bred 21.vi.78; *Adela cuprella* (D. & S.), Gartocharn, Dumbartonshire, a young larva taken from leaf-litter under *Salix aurita* L., 1.v.78 at a time when many imagines were flying around the tree; the case had not been enlarged since 1.vi.78 although larva is still alive inside, thus indicating the species has a two-year larval life. *Stigmella basiguttella* (Hein.), Devil's Beef Tub, Moffat, Dumfriesshire, vacated mine in oak, 2.ix.77; new to Scotland.

BRETHERTON, R. F. — (1) From Inverness-shire, 1.v.78: *Amblyptilia acanthodactyla* Hbn.; *Rhyacia logaea* Durrant; *Cydia cosmophorana* Tr. (emerged from a nodule of *Petrova resinella* L.); *Olethreutes metallicana* Hbn. and *O. lacunana* D. & S., both bred from spun shoots of *Vaccinium vitis-idaea*. (2) From West Surrey: *Asara terebrella* Zinck.; *Amblyptilia punctidactyla* Haw.; *Acleris cristana* D. & S., various forms; *Neophaloptera nubilana* Hbn.; *Ancyliis unculana* Haw.

CHALMERS-HUNT, J. M. — *Eutromula diana* (Hbn.), a male bred 11.vii.78, from a cocoon found by the exhibitor on the underside of birch leaf in Inverness-shire on 29.vii.78; the first time any of the early stages of this beautiful and local insect had been found in Britain.

EMMET Col. A. M. — (1) Specimens taken in Scotland 19th July-9th August 1978, or bred subsequently from larvae taken between these dates.

Stigmella drydella (Hofmann): Erribol, Sutherland, bred 5.ix.78. *Stigmella tengstroemi* (Nolcken): Cairngorm, Inverness-shire, bred 21/26.viii.78. *Leucoptera orobi* (Stainton): Tulloch Moor, Inverness-shire, 23.vii.78. *Bucculatrix capreella* Krogerus: Kincaig, Inverness-shire, seven bred 1/12.viii.78. *Caloptilia populetorum* (Zeller): Ullapool, West Ross, bred 16.viii.78; Glen Affric, Inverness-shire, bred 19.viii.78. *Caloptilia rufipennella* (Hubner): Yair Hill Forest, Selkirkshire, five bred 16/19.viii.78. New to Scotland. *Eutromula diana* (Hubner): Glen Affric, Inverness-shire, bred from pupa, 4.viii.78; believed to be the first bred British specimen. *Elachista kilmunella* Stainton: Glen Affric, Inverness-shire, two 29.vii.78. *Bisela-chista serricornis* (Stainton): Alvie, Inverness-shire, four 26.vii.78. *Bisela-chista eleochariella* (Stainton): Loch Thom, Renfrewshire, two 20.vii.78. *Schiffermuelleria similella* (Hubner): Glen More, Inverness-shire, 24.vii.78. *Depressaria olerella* Zeller: Kincaig, Inverness-shire, bred 21.viii.78. *Depressaria silesiaca* Heinemann: Kingcaig, Inverness-shire, three bred 16/20.viii.78. *Acleris logiana* (Clerck): Glen Affric, Inverness-shire, bred 28.viii.78. *Acleris hyemana* (Haworth): Invernaver, Sutherland, bred 7.ix.78 from *Dryas octopetala*, a hitherto unrecorded foodplant. *Olethreutes arbutella* (Linnaeus): Tulloch Moor, Inverness-shire, 23.vii.78. *Olethreutes palustrana* (Lienig & Zeller): Tulloch Moor, Inverness-shire, three 23.vii.78.

(2). Essex — species new to or rare in the county.

Ectoedemia argentipedella (Zeller): Little Baddow, some of 16 specimens bred from pupae in a single nest-box in Birch Wood Nature Reserve. *Stigmella tiliae* (Frey): Woodham Walter, seven bred 26.iii/23.v.78; new to VC18. *Stigmella glutinosae* (Stainton): Brook Street, Navestock (VC18); Audley End (VC19); new to VC18. *Stigmella alnetella* (Stainton): Little Baddow, Navestock (VC18); Audley End, Berechurch (VC19); new to VC19. *Lampronia morosa* Zeller: Little Hales Wood, Ashdon, 6.vi.78; new to VC19. *Niditinea piercella* (Bentinck): Little Baddow, Harlow and Shadwell Wood Nature Reserve, Ashdon, specimens bred from nest-boxes; new to Essex. *Leucoptera lotella* (Stainton): Hainault Forest, bred 10.iv.78; new to Essex. *Bucculatrix thoracella* (Thunberg): Chalkney Wood, Earls

Colne, bred 2.v.78; new to Essex. *Elachista gleichenella* (Fabricius): Little Baddow, six bred 14/24.v.78 from *Carex laevigata*, a new foodplant; also new to VC18. *Elachista apicipunctella* Stainton: Foxearth, two 22.v.78; new to Essex. *Biselachista serricornis* (Stainton): Hatfield Forest Marsh Nature Reserve, three 25.viii.78; new to Essex. *Cosmiotes consortella* (Stainton): Great Sampford, 19.v.78; Hadstock, 29.v.78; new to VC19. *Cosmiotes stabilella* (Frey): Finchingfield, 27.v.78; first Essex record since 1916 and new to VC19. *Eulamprotes unicolorella* (Duponchel): Pods Wood, Messing, two 29.vi.78; new to Essex. *Cosmopterix zieglerella* (Hubner): Fingringhoe Wick Nature Reserve, three bred 12/25.v.78. *Cosmopterix lienigiella* Lienig & Zeller: Mucking, bred 22.ii.78; new to Essex. *Phalonidia manniana* (Fischer von Roslerstamm): Hatfield Forest Marsh Nature Reserve, two 9.vi.78. *Aethes hartmanniana* (Clerck): Great Stamford, seven, 19 and 27.v.78. *Aethes williana* (Brahm): Foxearth, four 3.vi.78; first record for VC19 since 1887. *Commophila aeneana* (Hubner): Hatfield Forest Marsh Nature Reserve, 9. vi.78; new to VC19. *Cochylidia rupicola* (Curtis): Hatfield Forest Marsh Nature Reserve, two 9.vi.78; *Cochylis atricapitana* (Stephens): Foxearth, two 3.vi.78; new to VC19. *Endothenia oblongana* (Haworth): Foxearth, three 3.vi.78; new to VC19. *Epinotia nanana* (Treitsche): Little Baddow, bred from *Abies*, 30.v/3.vi.78. *Pammene trauniana* ([Denis & Schiffermuller]): Wimbish, 2.vi.78; new to Essex.

(3) — Cambridgeshire.

Eucosma pauperana (Duponchel): Fleam Dyke, two 14 and 17.v.78: a species not recorded in Britain since 1931, but not the earliest record for 1978. *Elachista pomerana* Frey: Wicken Fen, five taken at light on 30.vii.67. Shown to draw attention to this species which is little known in Britain.

FAIRCLOUGH, R. & A. J. — The following bred or caught in 1978: *Coleophora glitzella* Hofmann and *C. idaeella* Hofmann, Aviemore, bred vi; *Bucculatrix thoracella* (Thunb.), Argyresthia sorbiella (Treits.) and *Oecophora bractella* (L.), Gwent, caught vi; *Elachista poae* Stt., Essex, bred v; *Epinotia cinerana* (Haw.), Kent, caught 28.vii; *Leioptilus lienigianus* (Z.), Essex and Suffolk, bred vi-vii.

HECKFORD, R. J. — The exhibit consists entirely of microlepidoptera taken in Cornwall and Devon. (1) Species apparently new to Cornwall. *Myelois cribella* (Hbn.), Near Millbrook three bred 29.vi.77, from larvae found in thistle stems in winter. *Aethes williana* (Brahm), Whitsand Bay, two bred 10/11.v.77, from larvae found in wild carrot (*Daucus carota*) stems in winter. *Eriopsela quadrana* (Hbn.), Lucket, one, 30.iv.76. *Eriopsela quadrana* (Hüb.), St. Blazey one, 14.v.77, St. Ives, one, 30.iv.76 and *Ancylis geminana* (Don.), Predannack Downs, near the Lizard, two, 15.vi.77. *Apotomis sauciana sauciana* (Fröl.), Callington, bred 12/13.vi.77 from larvae on bilberry (*Vaccinium myrtillus*). *Metzneria carlinella* (Stt.), Whitsand Bay, 29.vi/2.vii.78, four bred from larvae in seedheads of Carline thistle (*Carlina vulgaris*). *Caloptilia robustella* Jäckh, near St. Blazey, 14.v.77, one taken. *Bucculatrix cristatella* Z., Whitsand Bay, 27.v./3.vi.78, six bred from larvae on *Achillea millefolium*. *Agonopterix bipunctosa* (Curtis) (gen. det. J. R. Longmaid), Mullion Cove, 15/16.vii.77, two bred from larvae on Saw-wort (*Serratula tinctoria*). (2) Species apparently not recorded from Cornwall since the *Victoria County History* (1906). *Scrobipalpa ocellatella* (Boyd), Whitsand Bay, 29.ii/8.iv.77, two bred from larvae

feeding on *Beta maritima*. *Caryocolum vicinella* (Dougl.), Tregardoc, 12/15.vii.78, two bred from larvae feeding in stems of *Silene maritima*. (3) — Species new to Devon, and possibly recorded from one or two other localities in Britain. *Elachista collitella* (Dup.), South Devon (locality not disclosed), three specimens taken 6.vi.76, and three taken 30.v.78, exhibited with specimens of *E. subocellea* Stephens and *E. dispunctella* (Dup.) for comparison. Dr. J. D. Bradley, who determined these specimens, informed the exhibitor that at present the only other confirmed record is of specimens taken at Tenby, Pembrokeshire in 1875, but there are specimens in Bankes coll. in BMNH, taken at Sandwich, Kent prior to 1898 which may also be this species but have not been dissected for identification. Also in Bankes coll. are three specimens without data other than a label on one marked "Machin": these may also be *collitella* but no dissection of genitalia has been made. (4) — Species taken in Devon and Cornwall of local distribution. *Gypsonoma aceriana* (Dup.), Plympton, Devon, one 21.vii.78. *Nothris congressariella* (Bruand), Tresco, Isles of Scilly, one bred 14.v.77 from larva on *Scrophularia scorodonia*. *Aristotelia brizella* (Treits.), Near Noss Mayo, Deven, three 27/30.v.78. *Syncopaema cinetella* (Clerck), Plympton, Devon, three 21/22.vii.78. *Caryocolum viscariella* (Stt.), bred from larvae in stems of *Silene dioica*, 3/8.vii.78, Tregardock, Cornwall and 25.vi.78, Lutton, Devon. *Phyllonorycter ulicicolella* (Stt.), Noss Mayo, Devon, 6.vi.78. *Adela cuprella* (D. & S.), Callington, Cornwall, 15.vi.78; St. Blazey, Cornwall, 28.iv.78; Goss Moor, Cornwall, 28.iv.78.

HORTON, Dr. G. A. N. — Species new to Monmouthshire: *Euchromius ocella* (Haw.), Usk, 14.x.78. *Dioryctria abietella* (D. & S.), Usk, 4.viii.78. *Nemophora scabiosella* Scop., S. Monmouthshire, 25.vii.78. *Cydia jungiella* Clerck, S. Monmouthshire, 27.v.78. *Epinotia ramella* L., Wye Valley, 14.viii.78. *E. subsequana* Haw., 30.v.78. *Cydia compositella* F., Usk, 25.vi.77.

HOWARD, Dr. Guy. — *Palpita unionalis* (Hbn.), Glengarry, West Inverness-shire, taken at night, October 1977.

LANGMAID, Dr. John. — *Coleophora machinella* Bradley, Wickham, Hants., series bred from *Achillaea ptarmica*, 1978. *Teleiodes wague* Nowicki, Botley Wood, Hants., 30.v.76, the first record from England. *Gypsonoma minutana* Hbn., Portsmouth, Hants., 1978, series bred from *Populus alba*. *Pammene populana* F., Colonsay, 1978, series bred from *Salix aurita*. *Agonopterix subpropinquella* Stt., Colonsay, series bred from *Cirsium arvense*, 1978. *A. scopariella* Heinemann, Argyll 1978, series bred from *Sarothamnus scoparius*. *A. carduella* Hbn., Argyll, 1978, series bred from *Cirsium vulgare*.

LEECH, M. J. — *Pyralis farinalis* (L.), Herefordshire, a series.

MARTIN, PETER A. — *Aphomia sociella* (L.) (The Bee Moth), mounted display showing set specimens and cut sections of the pupal nest.

MICHAELIS, H. N. — *Dichrorampha simpliciana* Haw., Llandudo Junction, Caerns., ex *Artemisia vulgaris*. *Cochylidia rupicola* Curt., Newborough, Anglesey, ex *Eupatorium*, probably new to North Wales. *Apodia bifractella* Dup., Caerns. and Denbs., ex *Pulicaria*, new to Denbs. *Scrobipala instabilella* Doug., Caerns. and Denbs., ex mined leaves of *Halimione*, new to Denbs. *Phyllonorycter sagitella* (Bjerk.) (*tremulae* Z.), Mochdre, Denbs., ex. mined leaves of aspen, possibly the first Welsh record of this recently discovered species new to Britain. *Argyresthia* sp. possibly *laevigatella* H.-S., Aber, Caerns.

PELHAM-CLINTON, E. C. — Species collected during 1978: *Ectoedemia intimella* (Z.), Danbury, Essex, from larvae mining *Salix fragilis*. *Nemophora cupriacella* (Hbn.), Great Samford, Essex, from case under radical leaves of *Knautia arvensis*. *Adela cuprella* (D. & S.), Gartocharn, Dumbartonshire. *Solenobia lichenella* (L.), Longniddry, East Lothian, from cases on stone wall. *Elachista kilmunella* Stainton, Glen Affric, Inverness-shire, ab. with white costal bar, a recurring form in this locality. *Batrachedra pinicolella* (Z.), Danbury, Essex, from larva on *Picea abies*. *Celypha woodiana* (Barrett), North Currey, Somerset, from larva mining *Viscum*. *Acleris abietana* (Hbn), Winchburgh, West Lothian, 27.v, in light trap; the most southerly British record.

RICHARDSON, A. — *Uresiphita limbalis* D. & S., Scilly, taken ix.1976.

SIMPSON, Dr. A. N. B. — (1) From Worcestershire: *Aethes beatricella* (Wals.); *Epinotia fraternana* (Haw.); *Gelechia scottinella* (Z.); *G. sabinella* (Z.); *Lampronia fuscata* (Teng.); *Chrysoesthia hermannella* (F.); *Phyllonorycter sagitella* (Bjeck.); *P. muelleriella* (Z.). (2) From Warwickshire: *Elachista poae* (Stt.); *Monochroa lucidella* (Steph.). (3) From Cornwall: *Batia lambdella* (Don.). (4) From Glamorgan: *Apomylois neophanes* (Durr.). (5) From Cardigan. *Epinotia pygmaeana* (Hbn).

SOKOLOFF, P. A. — 40 species of microlepidoptera bred or captured during 1978 including: *Catoptria falsella* D. & S., *Eudonia truncicolella* Stt. and *E. crateagella* Hbn., all bred from moss on dry stone wall, Priddy, Somerset, 8/11.viii. *Orthopygia glaucinalis* L., bred from blackbird's nest, Orpington, Kent, 25.viii. *Neofriseria singula* Staud. ex *Rumex acetosae*, Dungeness, 14.vii. *Oncocera genistella* Dup. and *Brachmia gerronella* Z. ex *Ulex*, Dungeness, vii. *Pterophorus spilodactyla* Curt. ex *Marubium vulgare*, Gt. Orme, Wales, 16.vii. *Capperia britannodactyla* Greg., ex *Teucrium*, Dungeness, 29.vi. *Colephora vibicella* Hbn., Botley Wood, Hants, on *Genista tinctoria*, fed up on *G.lydia*. *C.otitae* Z., ex *Silene nutans*, Dungeness, 29.vii. *Apomylois bistriatella neophanes* Durr., third record for Kent, Orpington, 29.vii. *Plodia interpunctella* Hbn. and *Ephestia parasitella* Staud., both found indoors, Orpington, Kent, vii.

STERLING, Col. D. H. — *Ypsolopha ustella* (Clerck), Ampfield, Hants. 21.vii.78, pale form taken by P. H. Sterling. *Agonopterix bipunctosa* (Curtis), Winchester, female taken on the night of 19/20.vii.76 in the exhibitor's garden see Plate II, fig. I) the specimen was dissected by the late Denzil Ffennell and was the first *bipunctosa* he could confirm. *Epiphyas postvittana* (Walker), Winchester, one taken in an m.v. trap on the night of 27/28.x.77 is the second recorded Hampshire specimen. *Acleris literana* (L.), some Hampshire forms of this variable species taken by the exhibitor, M. J. Sterling and P. H. Sterling. *Hypsopygia costalis* (F.), Leckford, Hants. an unusual form, having the usual two yellow costal spots merged to form a single costal patch; the lines on the underwings are faint, close together and meet at three points to give the overall appearance of three circles; taken at light, Leckford, Hants., on the night of 2/3.vii.78. *Epischmia banksiella* (Rich.), Swanage, 18.vii.76, taken by M. J. Sterling.

WALTERS, JOHN. — A selection of Nepticulid leaf-mines collected autumn together with a series of drawings. Paintings of *Ectoedemia erythrogenerella* (de Joannis), Hayling Island, Hants.

WATKINSON, Dr. I. A. — Series of some *Rosaceae*-feeding species of the genus *Phyllonorycter* chosen to illustrate the similarity in appearance of the different species. The specimens exhibited: *P. oxyacanthae* (Frey); *P. sorbi* (Frey); *P. blancardella* (F.); *P. cydoniella* (D. & S.) and *P.*

mespilella (Hbn.) had all been checked by genitalia. Particular note was made of the last two, which are rare and local respectively and frequently misidentified in collections. The feeding preferences of the species were discussed, particularly in respect of *cydoniella* whose preferred foodplant is *Cydonia* (quince) and whose distribution in UK is apparently very limited. Among those exhibited were two *P. cydoniella* (det. I.A.W.), taken by S. E. Whitebread at the Danbury, Essex 1977 field meeting ex crab apple. The exhibitor requested supposed specimens of *cydoniella* and *mespilella* for confirmation by genitalia preparation.

WILD, E. H. — *Eurrhyncha terrialis* (Treit), series bred from larvae on golden rod (*Solidago virgaurea*). N. Pembrokeshire, vii.1977.

YOUNG, Dr. M. R. — *Metzneria lapella* (L.) and *Cochylidia rupicola* (Curtis), St. Cyrus N.N.R., Kincardine (both species new to Scotland. *Acleris abietana* (Hbn.) and *Epinotia pygmaeana* (Hbn.), both from Aberdeenshire. *Myrmecozela ochraceella* (Tengstrom), upper Deeside. *Catoptria permutatella* (H.-S.), Aberdeenshire.

COLEOPTERA

APPLETON, D. — Coleoptera from Hampshire and Isle of Wight taken during 1978. *Prionocyphon serricorne* (Muller), 6.vi.1978, Apes Down, I.O.W., swept below an ancient ash tree. Probably new to I.O.W. *Eubria palustris* Germar, 8.vi.1978, Totland Bay, I.O.W., swept from *Equisetum*. Probably new to both I.O.W. and Hampshire. *Gracilia minuta* (Fabr.), 9.vii.1978, Titchfield Haven, Hampshire, on dead bramble stem. The species was found breeding there in great numbers in dead bramble stems.

DARBY, M. — A display of books on the British Coleoptera published between the late 18th to early 20th century, all from his personal library. This was a rare opportunity to see such a range of rare classic works together, the illustrations being of timeless value. The 18 works ranged from Martyn, 1792 to Fowler, 1887-1913.

HODGE, P. J. — A selection of interesting Coleoptera taken during 1977-1978, including: *Trechus rivularis* Gyll., *Dromius longiceps* Dej. and *D. sigma* Rossi from Yorkshire; *Haliphus mucronatus* Steph., *Graptodytes flapipes* Ol., *Anthicus bimaculatus* Ill., *Anthonomus brunnipennis* Lat., and *Apion cerdo* Gerst. from Sussex. The last named species is northern in its British distribution, but is in fact quite a common and widespread species in Kent and East Sussex, and has perhaps been confused with the closely related species *A. subulatum* Kirby and *A. cracce* (L.). Also from Sussex was *Magdalis barbicornis* (Latr.) a species rediscovered in Sussex. *Leptura rubra* (L.) from the "Breckland" of Norfolk (see Plate II, fig. 20): the exhibitor has been unable to ascertain whether or not this species is of regular occurrence now-a-days; there are no records that he can find since the 1940s. *Agabus striolatus* Gyll., *Hydroporus scalesianus* Steph. and *Ceuthorrhynchus querceti* Gyll. from the Norfolk Broads.

PAARY, J.A. — A selection beetles including: *Emus hirtus* (L) taken at Canterbury in 1949, *Dyschirius angustatus* (Aherns) from sandhills at Rye, Sussex 1974, and *Thalassophilus longicornis* (Sturm) from Betws y Coed in July 1978.

YOUNG, M. R. — The distribution of three northern water beetles, *Potamonectes griseostriatus* (Degeer), *Dytiscus lapponicus* Gyllenhal and *Gyrinus opacus* Sahlberg was illustrated, accompanied by specimens of each. Although thought of as strictly northern, only *G. opacus* is exclusively Scottish. All show the common pattern of lower altitudinal preferences at higher latitude.

DIPTERA

MILES, S. R. — A selection of local and rare species taken in 1978, *Xylomyia marginata* (Mg.) (Xylomyiidae), Burnt Common, Hants., 29.vii.1978; *Brachypalpus bimaculatus* (Mcq.) (Syrphidae), 1 ♂ Mark Ash Wood, New Forest, Hants., 27.v.1978; 1 ♂ *Didea fasciata* Mcq. (Syrphidae), Odiham Common, Hants., 11.vi.1978; *Myolepta luteola* (Gmelin) (Syrphidae), Savernake Forest, Wilts., 1 ♂ 26.viii.1978; *Leopoldius signatus* (Wied.) (Conopidae), Alton, Hants., ♂ and ♀ 7.x.1978.

PACKER, L. — Flies caught in Kent in 1978, including: *Volucella inflata* (Fabr.) (Syrphidae) Kingston; *V. zonaria* (Poda), Faversham and *Vanoyia tenuicoris* (Mcq.) (Stratiomyidae), Westbere Marshes.

STUBBS, A. E. — Diptera Recording Schemes; maps and specimens illustrating purpose and scope of the scheme.

HEMIPTERA (HETEROPTERA)

KIRKY, P. — Polymorphism in British Heteroptera, illustrating sexual dimorphism: *Psallus ambiguus* (Fallén), *Orthonotus rufifrons* (Fallén), *Notostira elongata* (Geof.), *Leptopterna dolabrata* (L.); alary polymorphism: *Ischnodemus sabuleti* (Fallén), *Myrmus myriformis* (Fallén), *Dicyphus epilobii* Reuter, *Gerris lacustris* (L.); and dichroism (colour forms): *Myrmus myriformis* (Fallén), *Dicyphus pallidicornis* (Fieber), *Capsus ater* (L.), *Stenodema calcaratum* (Fallén).

HYMENOPTERA

ELSE, G. R. — Aculeate Hymenoptera collected in Dorset and Devon, May-June 1978, in conjunction with an inaugural field meeting of the recently launched 'Bees, Wasps and Ants Recording Scheme'. The twenty species exhibited included two national rarities (both from Devon) — the wasp *Euodynerus quadrifasciatus* (F.) (Eumenidae), ♂, and the bee *Nomada sexfasciata* Panzer (Anthophoridae), 2 ♀ ♀ (known today from only one site in Britain, but formerly widely distributed over southern England; it is the inquiline of the bee *Eucera longicornis* (L.)). Other Devon specimens included: *Vespa austriaca* (Panzer) (Vespidae), ♀, Stover Park, Near Bovey Tracy, 28.v. (inquiline of *V. rufa* (L.)); *Andrena cineraria* (L.) (Andrenidae), ♀, Rushlade Common, Dartmoor, 29.v. and ♀ Man Sands, Near Brixham, 31.v.; *A. bucephala* (Stevens), 2 ♀ ♀, and its scarce inquiline *Nomada hirtipes* Pérez, 3 ♀ ♀, both species from New Bridge, Near Holne, 29.v.; *A. labiata* F., ♂, Man Sands, 31.v.; *Lasioglossum cupromicans* Pérez (Halictidae), ♀, Corndon Down, Near Widecombe, 29.v. Dorset specimens included: *Andrena labiata*, ♂ ♀, and *Osmia bicolor* (Schrank) (Megachilidae), ♀, both species from Chideock (Undercliff) 27.v. A second exhibit was mainly devoted to aculeates collected in Hampshire and the Isle of Wight during May-June 1978. These included: *Andrena labiata*, 2 ♀ ♀, Warsash, Hants., 20.v. and, from the Isle of Wight, *Argogorytes fargei* (Shuckard) (Sphecidae), ♂, Red Cliff, Near Sandown, 11.vi.; *Andrena proxima* (Kirby), ♂ ♀, Stephill Cove area, Near Ventor, 13.v.; *A. cineraria*, ♀, Apes Down, west of Newport, 6.vi.; *Osmia xanthomelana* (Kirby), 2 ♀ ♀, coastal site, 11.vi. (formerly widespread as far north as North Wales and Lancashire, but today the most recent records are from two sites on the Isle of Wight). Another Hampshire specimen exhibited was *Xylocopa violacea* (L.) (Xylocopidae), ♀, Cove, Near Farnborough, on the floor of a greengrocer's and florist's, 16.i., H. Schonhut (the shop assistant). This large and striking bee with an almost hairless black head and body and violet wings is a rare vagrant to Britain, almost certainly arriving in imported timber and produce from the Continent. It is a 'Carpenter bee', the female excavating nesting galleries in timber.

KENNER-BOOKER, W. — *Psen bruxellensis* Bondroit (Sphecidae), ♀, Ainsdale N.N.R., Near Southport, Lancashire, 11.viii.78. Until this wasp was recorded from Ainsdale in 1977 the most northerly site for this very local species in Britain was in Middlesex.

MILES, S. R. — A small selection of wasps and a bee from Hampshire and Middlesex. Hampshire specimens included the Sphecid wasps *Ectemnius ruficornis* (Zetterstedt), ♂, Odiham Common, 16.vii.77; *E. lituratus* Panzer, ♂ ♀, Odiham Common, 13.viii.78; and the Megachilid bee *Heriades truncorum* (L.), ♂, Burnt Common, Near Silchester, 29.vii.78 — new to Hants. Also, *Ectemnius dives* (Lepelletier & Brullé), ♂, Crane Park, Near Feltham, Middlesex, 28.vii.78.

PACKER, L. D. M. — Eleven wasps collected in Kent during 1978. The most interesting were the Pompilids *Evageles pectinipes* (L.), ♀, Sandwich Bay (the only known British locality), 13.viii.; *Episyron rufipes* (L.), ♀, Sandwich Bay, 9.vi. (the presumed host of *pectinipes* in Britain), and the Sphecids *Passaloecus insignis* (Vander Linden), ♂, Near Canterbury, swept from hawthorn, vi. (apparently only the fourth Kent record); *Crossocerus distinguendus* (Morawitz), ♂, Sturry, Near Canterbury, 18.vi. and a ♂, 27.vii. (new to Britain); *Ectemnius sexcinctus* (F.), ♂, Faversham, 6.viii. (provisionally the fourth Kent record); *E. rubicola* (Dufour & Perris), ♂, Westbere, 15.vii., ♀, Sturry, 28.vii. The exhibit also included an example of the sawfly *Macrophya blanda* (F.), ♂, Ham Street Wood N.N.R., 27.v.

PARASITIC HYMENOPTERA

Species of note included: *Dusona pulchripes* Holmgren, new to Britain; bred ex *Thera obeliscata* (Hübner); *Charops cantator* de Geer (although exhibited on a previous occasion, a new locality was described for this rare species); *Apanteles chares* Nixon; *Rogas pulchripes* (Wesmael) (the second and third recorded British species) and a species of *Holocremnus* (Ichneumonidae) of intriguing interst (see below under SHAW, M. R.).

Once again the co-operation of Lepidopterists and other specialists, in saving reared parasites and the host-remains, is gratefully acknowledged by the two main exhibitors and is hoped that other entomologists will be encouraged to follow their example.

ALLEN, A. A. — Firstly, an exhibit illustrating nocturnal species of parasitic hymenoptera — nearly all these species possess constant, superficial, features, viz. — testaceous colouring, large ocelli and elongate antennae (Gauld, *Ent. Gaz.*, 27, 35 (1976)). Species previously not shown, or of especial interest were: *Macroncentrus thoracicus* (Nees), caught 11.viii.1978, Holcombe, Devon, at m.v.l.; *Charmon extensor* L., — 9.ix.1978, Plaistow, Sussex, at m.v.l. This species is atypical of this group, since the colouring is blackish — it seems fairly common, yet the host is unknown; *Zemiotus chlorophthalmus* Nees (erroneously published earlier as *Chrysophthalmus*) — two species: (♀ ♀) from Reigate, Surrey, 28.vii. and Dawlish, Devon, 12.viii. both 1978, at actinic light; *Netelia cristatus* Thomson, ♀, taken at m.v.l., 9.ix.1978, Plaistow, Sussex (this genus — with that of *Ophion* — is one of the commonest Ichneumonoidea at light) and *Ichneumon deliratorius* L. — an anomalous species, for although quite common, it is very different in appearance from the other nocturnal parasitica. The present specimen came from Plaistow, Sussex — taken at m.v.l., 9.ix.1978.

A second exhibit illustrated some bred British *Apanteles* species, their host preferences, their various — sometimes characteristic — cocoon formation. The examples included: *Apanteles inclusus* Ratzeburg, from two sources — a series bred from *Euproctis similis* Fuessly, at Lichfield, Staffs..

while the other arose from cocoons found by the exhibitor, 12.i.1974, on an oak branch, Earlswood Common, Surrey. Although mostly empty, the cocoons yielded a few intact species of *inclusus*, which seems to be difficult to come across. The cocoon mass is formed in that of the host. *A. limbatus* Marshall, bred from, and seemingly exclusively parasitic on, *Abraxas grossulariata* (L). The series exhibited were from Camber, (host on *Salix alba* 20.v.) and Littlehampton (host on *Prunus spinosa*, 19.v.) both in Sussex, 1978. In each case several larvae from each locality were affected — the size of the brood varied from three to fourteen.

LAWTON, F. D. — An exhibit consisting of an unidentified species of *Mesochorus* (Ichneumonidae) and the cocoon from which it had emerged, namely the characteristic cocoon of *Apanteles gonepterygis* Marshall. The genus *Mesochorus* are hyperparasites — the oviposits directly into a parasite larva already contained in its own host. In this instance, the primary host was *Gonepteryx rhamni* (L.) (LEP, Pieridae), three larvae of which were collected in Ferndown Forest, Near Wimborne, Dorset, in June 1978. All three were parasitized by the host-specific *gonepterygis*; a solitary endoparasite. The host is destroyed before the full growth is attained and the larva of *gonepterygis* then spins its curious, bright orange, cocoon on the centre of which is a large, filamented, tuft of silk in a fan-like arrangement.

A *Mesochorus* sp. emerged from one cocoon in early August; the other two cocoons remained intact — probably the primary (*Apanteles*) parasite would hatch in the Spring. (See Nixon, G. E. J. in *Bull. ent. Res.*, **64**, 465 et seq. and Wilkinson, D. S., *Trans. Roy. Ent. Soc.*, **95**, 95-98 (1945).

The exhibitor expressed his grateful thanks to Miss M. Brooks for providing the material and to Dr. G. Nixon and Dr. I. D. Gauld (both of the B.M. (N.H.)) for assistance in determining the identity of the insects.

MARTIN, P. — An example of *Mesostenidea obnoxius* Gravenhorst, bred as a secondary parasite — from the cocoon — of a species of *Zygaena*. *Apanteles plutellae*, Kurdjumov — exhibited earlier in the year from *Noctua orbona*, the exhibitor now showed individuals bred singly from a more familiar host — *Aglais urticae*, L. The exhibitor had found many of these larvae on *Urtica* in Dawlish Warren, Devon, 3.viii.1978 in various stages of development, but of the many larvae taken, only the smallest (least developed) larvae harboured the parasite — perhaps yet another example of parasites slowing down the rate of growth of their host. Some of the adult *plutellae* from *urticae* were bred in late August, and presumably seek another host in which to overwinter as larvae (? e.g., *Noctua* sp.) but some cocoons had not hatched by mid-December. *A. immunis* Haliday — a single example bred in September, 1978, from an unidentifiable geometrid larva swept from heater, 30.viii.1978 on Hankley Common, Elstead, Surrey.

Another exhibit consisted of a few adult Ichneumonidae taken in 1978. Amongst the species were: *Charops cantator*, de Geer (♀), taken 10.viii. at Bugle, Cornwall; *Heteropelma amictum* Fab. (♀), caught on the wing-low down — at Tywardreath, Cornwall, 10.viii; *Rhexidermus thoracicus* Gravenhorst (♂), swept from laneside herbage, Shaldon, Devon, 7.viii; *Ichneumon validicornis* Holmgren, ♀, swept from very damp vegetation along a stream at Tywardreath, Cornwall, 8.viii; *Hepiopelmus leucostigmus* Grav. ♀, swept by the sea at Littlehampton, Sussex, 27.viii; *Barichneumon ridibundus* Grav. ♂, often taken in 1978 — the example shown was from Plaistow, Sussex, 9.ix; *B. monostagon* Grav., a ♂ from Shaldon, Devon, 7.viii; *Amblyteles elongatus* Brischke, ♀, captured when flying low over

rough ground in fine rain at Bugle, Cornwall, 10.viii; and *A. palliatorius* Grav., which although common, gave rise to a ♂ exhibit unusually heavily marked with reddish-orange. It was captured flying around young pines on Hankley Common, Surrey, 30.viii.

CROW, P. — A few representatives of a brood of an *Apanteles* sp. (later det. as *bignellii* (Marshall; det. A. A. Allen) bred from *Euphydryas aurinia* Rott. from a locality in Wales. The species is a notorious parasite of *aurinia*.

SHAW, M. R. — Examples of reared Ichneumonoidea of particular significance, all bred in 1978. They included a part of an all-male brood of an unidentifiable species of *Holocremnus* obtained as an endoparasite of *Cimbex femoratus* (L.) (HYM. Cimbicidae) from Chat Moss, Manchester. This was the only incidence known to the exhibitor of gregarious endoparasitism in the Ichneumonidae. Also with this exhibit were an adult of the host sp. and an example of each sex of the common gregarious ectoparasite of Cimbicid cocoons, *Agrothreutes mandator* (L.) (Ichneumonidae, Hemitelinae). Next, some rare British species of *Rogas* (Braconidae, Rogadinae) were shown, amongst which were two specimens of *R. pulchripes* (Wesmael) bred from 'mummified' larvae of *Acronicta psi* (L.) and *Acronicta tridens* (D. & S.) (Noctuidae), both taken on Chat Moss, Manchester. Previously, the species *pulchripes* was only known in the British Isles from a single female taken in Ireland, 193. Another species of *Rogas* was *R. rugulosus* (Nees), two examples of which were displayed; they were bred from *Acronicta rumicis* (L.) and *A. menyanthidis* Esper, both as a result of induced parasitism in captivity. The parents were from Meathop Moss, Cumbria; the species is also known in Wickham Fen and in an Irish locality.

A third species of *Rogas* shown was *R. praetor* Reinhard, the single example was reared from the larva of *Mimas tiliae* (L.) (Sphingidae) found on Hampstead Heath, London as a 'mummy' by R. A. Softly. The species is widely distributed in Southern England, but infrequently collected. Notes on the species described above accompanied the exhibit; the exhibitor appealed for reared parasites to be sent to him.

The exhibitor also showed the parasite complexes (primary and secondary-hyper-parasites) of the host species *Zygaena filipendulae* (L.) and *Leucoma salicis* (L.). The notes with the exhibit explained that the composition of each complex was similar — a small number of more or less host-specific primary parasites (e.g. *Apanteles zyganarum* Marshall on *Zygaena* sp. and a larger number of secondary parasites, whose occurrence was opportunistic rather than obligatory, by virtue of their far lesser host specificity. Many of these latter are parasites of cocoons and are not encountered if the host larva is collected. These hyperparasites play a large part in stabilizing the host-primary parasite interactions, helping to prevent large fluctuations in the populations of both, which could otherwise lead to local extinction of one or more of the species.

The exhibitor was of the opinion that at times of high population density of the hosts, large, overwintered larvae left almost no food for younger, pre-hibernating larvae of the following generation (since the foodplant is used by successive generations in the same summer) and it is this factor which cause often spectacular falls in the abundance of these colonial species, rather than parasitism.

PHOTOGRAPHS

Photographs each year are more in evidence and this year is no exception.

Photography particularly lends itself to illustrating life histories and insects in their habitats.

Mr. R. C. REVELS' exhibit showed the life history of the white admiral, *Ladoga camilla* (L.), an unusual picture of 70 silver studded blues, *Plebejus argus* (L.) s. sp. *caernensis* Thompson on one bush in Great Ormes Head, N. Wales; and the Ringlet *Aphantopus hyperanthus* (L.) with the aberrations *lanceolata*, *arete* and *pallens*.

Mr. M. TWEEDIE — photographs of various Australasian lepidoptera; and Mr. P. CROW, on behalf of Mr. F. C. BEST — a photograph of pale specimen of *Boloria selene* (D. & S.).

Mrs. F. MURPHY — photographs of spiders from Kenya, Yugoslavia and Malaya and *Diaea dorsata* (F.) (female) in Surrey.

Mr. DE SOUZA — interesting series of the Broad Bordered Bee Hawk *Hemaris fuciformis* (L.) including larvae, pupae and imago in Chiddingfold Woods, the larva and imago of the Purple Emperor (*Apatura iris* (L.) — a male which landed on a hand to suck perspiration and the Dark Green Fritillary *Argynnis aglaja* (L.) with white spots towards the margins.

Dr. MIRIAM ROTHSCHILD — *Danaus plexippus* (L.) *erippus* (G.) searching for nectar on the orchid *Epidendrum paniculatum* having been attracted by the odour.

THE MYSTERIOUS SWARMS OF SEPSID FLIES AND THEIR UNPALATABILITY TO SPIDERS

W. S. BRISTOWE

(We have recently received the sad news of Dr. Bristowe's death at his home in Sussex on 11th January, 1979. He was an eminent arachnologist and the author of two of the most widely read books about spiders in the English language: *The Comity of Spiders* (1939-41) and *The World of Spiders* (1958). In 1922 his first scientific paper appeared in the *Proceedings of this Society* (Spiders Found in the Neighbourhood of Oxshott) and so we have the distinction of having published the first and last of his numerous contributions to arachnology. — Editor).

Introduction

The unusual occurrence of vast but strictly localised swarms of small ant-like flies (Dipt. Sepsidae) is a mystery without satisfactory explanation. One such swarm persisted for more than a month in my garden on one Box (*Buxus*) clump and adjoining herbs. Their purpose did not seem to be mating, egg-laying or feeding. Perhaps it is a chemical attraction. The flies have a faint aromatic odour themselves; perhaps their congregation magnifies its intensity for protection (or other) purposes.

Their odour encouraged experiments as to their palatability to spiders. In nature they were not seen in the webs of spiders and as they spend most of their time walking with wings waving up and down they might be more vulnerable to attack from hunting spiders. Was their wing-waving a 'Warning Movement'? Or did their odour serve as a deterrent?

Notes on the Flies

Sepsid flies are known to be breeders in animal dung but there were neither dung nor drains nearby. Hundreds of thousands of small ant-like male and female *Sepsis fulgens* Wied. were noticed walking actively over the leaves of one Box (*Buxus*) clump on 25th August 1978. They were not

visible anywhere else, nor even on ten similar Box clumps nearby, except feeding on the heads of umbelliferous flowers. At night they remained quiescent under the leaves or within the clump. They did not seem to be congregated for mating, feeding on the Box or laying eggs. A month later they were congregated chiefly amongst low herbs besides this Box clump — grass, nettles, convolvulus, ground elder and a small azalea. Their number had been gradually diminishing and by 26th September they had vanished following one day of rain and a ground frost.

I could only conclude that the odour of this Box clump had attracted them. Mr. A. C. Pont (British Museum, N.H.) kindly indentified the flies and confirmed the occasional swarming habit of this species though he has no other explanation to offer. He records that printing presses sometimes attract swarms due apparently to their use of ammonia in the process.

The flies have a keen sight for movement and rapidly take to flight when a person approaches. They fly delicately and seldom get entangled in spiders' webs. If they do get entangled, they rapidly escape.

Their odour has been variously described. I would simply describe it as faint, aromatic and not unpleasant.

Tests on Palatability to Spiders

I must explain that in many cases they escaped from Argioid webs and especially from Linyphiid webs before the spiders could catch them. When web-builders did catch them my early tests confused me considerably. Some spiders accepted them with or without hesitation; others rejected them after a touch, after wrapping them in silk, after biting them, or after hesitation. Several times I was to see spiders retire to a neighbouring leaf to wipe away a drop which had developed from their mouths which provided complete proof of the flies' unacceptability to them. Why the variation in behaviour?

In the field I could not be certain of the flies' sex or whether the one was more unpalatable than the other. After taking away some of the flies which had been readily accepted by spiders and finding these were of both sexes, I came to a fresh conclusion after watching the differing reactions of

Meta segmentata.

When *Meta* was sitting in the centre of its web, it usually pounced and bit the fly instantly without wrapping it up. Then it usually (though not always) went on eating it as though the body fluid was not distasteful. When *Meta* took some time to emerge from a retreat and got involved in a struggle before it could wrap it up the *Meta* often abandoned the fly after (or before) a bite. Sometimes it paused after wrapping for two or three minutes in order to go through chewing motions with its chelicerae and to pass the tips of its palps and legs through its chelicerae. Sometimes it would retire to a leaf bordering the web and dab away a drop of fluid which had appeared from its mouth. The inference drawn was that the fly which was not killed or paralyzed instantly had time to exude or squirt some substance which the spider found objectionable.

Experience with seven other small or immature species of web-builder did nothing to upset this conclusion. Brief notes will show what I mean, but it must be mentioned that the apparent deterrent seemed to be more effective against small than against large spiders like adult *Araneus diadematus* which sometimes wrapped four or more flies in one bundle and then ate them without hesitation.

Results with Web-building Spiders

1. *Meta segmentata* (Clerck)
 - (a) 13 females and 1 male bit immediately and ate.
 - (b) 4 females wrapped, bit, drew back for two to three minutes. Chewing movements and tips of palps and legs chewed before returning to eat the fly.
 - (c) 8 females and 1 male wrapped the fly and rejected it.
 - (d) 5 females withdrew after touching the fly.
 - (e) 10 females and 1 male ran to a leaf to wipe away a drop of fluid from mouth after biting.
2. *Zygiella x-notata* (Clerck)
 - (a) 10 accepted.
 - (b) 2 paused after wrapping. Chewing motions with chelicerae then returned to eat.
 - (c) 9 wrapped and withdrew without eating.
 - (d) 7 rejected after touching.
3. *Araneus diadematus* Clerck
 - (a) 1 immature accepted.
 - (b) 7 immature wrapped and withdrew without eating.
 - (c) 3 immature rejected after touching.
 - (d) 4 large adults wrapped and ate without hesitation.
4. *Araneus umbraticus* Clerck
 - (a) 1 immature accepted.
 - (b) 5 immature wrapped and withdrew.
 - (c) 1 immature touched and withdrew.
5. *Linyphia triangularis* (Clerck)

These spiders sometimes seemed to chase the flies out of the web after half-hearted attempts to catch them.

 - (a) 4 accepted.
 - (b) 4 accepted after killing and then pausing for two minutes during which cheliceral chewing movements and palp and leg tips chewed.
 - (c) 4 killed flies and withdrew.
 - (d) 3 ran to leaves to wipe away a drop from their mouths.
6. *Linyphia montana* (Clerck)
 - (a) 2 accepted.
 - (b) 2 accepted after three minute pause for cheliceral chewing motions and chewing tips of palps and legs.
 - (c) 6 withdrew after killing.
 - (d) 4 ran to leaf and wiped away drop from their mouths.
7. *Tegenaria gigantea* Cham. and Ivie
 - (a) 1 immature accepted after biting followed by five-minute withdrawal for cheliceral chewing.
 - (b) 5 immature killed and withdrew. One of these had killed eight flies because it could not resist response to web vibrations. Chewing motions ensued. Then it returned to spin web over the dead flies to avoid contact with them.
 - (c) 2 withdrew after touch and allowed the flies to escape.

Results with Hunting Spiders

Here I was particularly anxious to see if Salticids were deterred by the flies' wing waving as they walked. Could this be classed a Warning Movement (see W. S.fl Bristowe *The Comity of Spiders*, Vol. 2, p.279, 1941)? The only ones easily available to me in September were *Salticus scenicus*.

8. *Salticus scenicus* (Clerck)
4 enclosed in glass-bottomed boxes watched the flies and avoided them. Though significant this provided no reliable proof.
9. *Pardosa amentata* (Clerck)
Similarly enclosed in boxes with flies, 2 made no attempt to catch the flies and 2 others pounced, held, and then released them.
10. *Xysticus acerbus* Thor. (from Corfu)
In the course of weeks, this spider had eaten several small *Halictus* bees. It made no attempt to hold or bite the flies.
11. *Clubiona reclusa* O.P.-Camb.
I opened chelicerae but made no attempt to capture the flies.

Conclusions

1. That the sepsid flies probably congregate in huge numbers in response to some odoriferous attraction in their vicinity not in itself connected with their mating, egg-laying or feeding.

2. That in nature these flies do not often fall victim to spiders for what may be a variety of reasons. The most obvious is an odour which the chemo-tactic senses of a spider can detect by touch. This odour seems to be reinforced in the course of struggle after which a spider's taste senses are often affected by the emission of the odoriferous substance. These conclusions are based on repeated observation only.

3. Ants are not favoured as a diet by many spiders. *Sepsis is* ant-like in appearance and spends much of its time walking actively. In the course of this it waves its wings and this may represent a Warning Movement which may deter long-sighted Hunting Spiders from leaping on them. This would not apply when entrapped in an orb-weaver's web where the odour deterrent comes into play but the flies fly delicately and seem, in nature, seldom to become so entrapped; and when they do they are able to release themselves quite quickly.

4. The body fluid of the sepsid fly does not in itself seem to be unpalatable to spiders and the emitted deterrent substance is not so distasteful to spiders as the flavour of Mycetophilid flies of the genus *Sciara*. (*The Comity of Spiders* vol. 2. p.230). In the course of a month's close observation I never saw the swarm attacked by insectivorous birds or other predators. The close congregation of the flies may well have the effect of enhancing the deterrent powers of the odour.

THE NATIONAL COLLECTION OF BRITISH LEPIDOPTERA (R.C.K.)

by DAVID J. CARTER

(Entomological Department, British Museum (Natural History), Cromwell Road, London, S.W.7)

Since its formation in 1947, the Rothschild-Cockayne-Kettlewell Collection, usually referred to as the R.C.K. collection, has represented a Mecca for students of British Lepidoptera and Lepidoptera genetics. Following the transfer of the collection from Tring, Hertfordshire, to London in 1969 it was decided to amalgamate with it all British Lepidoptera in the British Museum (Natural History) to form a unified National Collection. This was in fact an extension of the original agreement relating to the formation of the R.C.K. collection (Cockayne and Kettlewell, 1953) which permitted selected specimens from the B.M. collections to be incorporated in the

R.C.K. The National Collection, which includes Microlepidoptera and Pyralidae, is now considerably larger than the original R.C.K. collection (at present some 5,000 drawers compared to 2,000 drawers in the R.C.K. in 1969) and provides an even more comprehensive source of reference for further study.

The R.C.K. collection was formed by the amalgamation of the Rothschild British collection at Tring with the combined collection of Drs. E. A. Cockayne and H. B. D. Kettlewell. A great deal of the amalgamation work was carried out by Cockayne but, due to failing health, he was unable to finish this mammoth task and it was left to Mr. A. L. Goodson to complete the curation. After the formation of the R.C.K., Cockayne continued to support the collection by the purchase of specimens, including the famous Castle Russell collection of Rhopalocera (Williams, 1953) and endowed the R.C.K. with a fund to further enrich the collection after his death. Dr. Kettlewell has continued to support the collection by donations and has shown a lively interest in the R.C.K. over the years, culminating in the presentation of his extensive research collection in 1978.

Before their amalgamation with the R.C.K., the collections of British Lepidoptera in the B.M. were many and varied, including such historically important collections as those of H. Doubleday, H. T. Stainton, J. F. Stephens and J. H. Wood together with much material from the A. H. Haworth collection. The Rhopalocera included the W. Rait-Smith collection of Lycaenidae and among the Macrolepidoptera were the collections of R. Adkin, C. N. Hawkins, A. V. Hedges and F. G. Whittle. The Microlepidoptera and Pyralidae, which were not included in the R.C.K., were richly represented by such collections as those of R. Adkin, E. R. Bankes, L. T. Ford, T. Bainbrigge Fletcher, W. Purdey, W. Rait-Smith, W. G. Sheldon, W. Tyerman and F. G. Whittle.

The National Collection is in the process of re-curation to bring all material together in a coherent form. Each species will be dealt with under three main categories. The first will be that of geographic variation and this will be shown by series of specimens arranged on a county basis to cover the whole of the British Isles. This category was inadequately covered in the R.C.K. collection and the new arrangement is based on series originally arranged at the B.M. by the late Mr. H. M. Edelsten. The second category is that of named aberrational and varietal material which comprised the main body of the R.C.K. This section is being greatly expanded but, wherever practical, Cockayne's original handwritten labels are being retained. Within this category is included the results of breeding experiments to establish the genetic foundations of variation, melanism, temperature effects and similar phenomena. The final category is that of historical material and constitutes series of specimens from such famous collections as those of Doubleday and Haworth.

Detailed accounts of accessions to the R.C.K. collection were published by Riley (1948 and 1950), Cockayne (1953 and 1954) and Goodson (1960 and 1968) but no recent list has been produced. It is not practical to give a detailed account of the extensive accessions since 1968 but the following is a résumé of the more important acquisitions.

1968

The Bessemer collection of British Macrolepidoptera was purchased by the Cockayne Trust. This large and valuable acquisition of some 17,000 specimens, including many rarities and figured specimens, is the most important purchase to have been made by the Trust.

1969

A bred series of *Eugraphe subrosea* Stephens from Wales was presented by Mr. J. M. Chalmers-Hunt, the first representatives of this Welsh population for the collection.

1970

The R. M. Craske collection of British Rhopalocera was purchased by the Cockayne Trust. This fine collection of some 5,600 specimens contained many rare aberrations and forms and has been subsequently augmented by annual donations of new material from Mr. Craske.

The late Mr. A. J. Wightman bequeathed 1,348 specimens of Noctuidae. These had previously been selected by Mr. Goodson from Wightman's extensive collection which is now in the care of Mr. G. Haggett.

1971

Mr. W. G. Tremewan presented about 2,800 Macroheterocera from Cornwall to the National Collection. This area of the British Isles was previously very poorly represented.

The late Sir Robert Saundby bequeathed his comprehensive collection of some 15,000 specimens of Macrolepidoptera including many from areas previously unrepresented and a number of rare aberrations.

The L. T. Ford collection of varieties of *Acleris cristana* Denis & Schiff. and *Acleris literana* L. was purchased by the Cockayne Trust. This important collection, containing many types, was one of the finest in private hands.

1972

The late Col. A. E. Collier bequeathed his fine collection of British Rhopalocera containing approximately 3,000 specimens with many rare forms and bred series with notes on genetics.

1973

The late Mr. G. A. Cole bequeathed 1,042 specimens of Macroheterocera selected from his extensive collection with many specimens from Northern Ireland and a number of rarities including one specimen of *Luperina zollikoferi* Freyer.

Dr. C. G. M. deWorms presented the first specimens of *Chloroclystis chloerata* Mabille to have been taken in the British Isles.

Mrs. L. A. Durden presented the second specimen of *Ochropleura fennica* Tauscher to have been collected in the British Isles.

1974

The N. A. Watkins collection of British Rhopalocera was presented to the National Collection. This collection of some 10,000 specimens was one of the finest in private hands and contained many rarities and fine bred series.

The collection of the late Mr. D. A. Ashwell was presented by Mrs. P. H. Ashwell. It consisted of about 3,000 British Macrolepidoptera and included series of forms of *Abraxas grossulariata* (L.), which were the results of extensive breeding experiments.

The first British specimen of *Semiothisa signaria* Hübner was presented by Mr. R. Tomlinson.

1975

The R. W. Watson collection was presented to the National Collection. This magnificent collection of some 50,000 specimens immaculately curated in 52 ten drawer Hill units comprises the largest and most valuable donation since the formation of the R.C.K. collection. It is particularly rich in Rhopalocera and contains many figured specimens and types of aberrations. Among the Macroheterocera are remarkable bred series of *Tyria*

jacobaeae f. *coneyi* Watson and related forms. The collection bears a Museum registration but remains in the hands of Mr. Watson until such time that he sees fit to relinquish its care.

Mr. B. Goater presented the type series of *Luperina nickerlii* ssp. *leechi* Goater.

1976

The J. M. K. Saunders collection of Macrolepidoptera was presented by Pinner Junior College. This contained some 5,000 specimens with many rare aberrations and material from areas otherwise poorly represented in the National Collection.

1977

The late Mr. H. C. Huggins bequeathed his collection of British Lepidoptera to the Museum. This contained about 19,000 specimens and included Rhopalocera, Macroheterocera, Pyralidae and Tortricidae. Many rare species and forms were represented including fine series from Southern Ireland. His collections of Pyralidae and Tortricidae were among the finest in private hands.

Mr. S. N. A. Jacobs presented his large collection of British Microlepidoptera. This important collection of approximately 14,000 specimens contained many of historic importance, including the Microlepidoptera collected by W. Fassnidge.

Mr. A. T. Hedger presented the first specimen of *Arethusana arethusana* Denis and Schiff. to be taken in Britain.

Mr. J. B. Fisher presented a series of *Gortyna borelii*, previously unrepresented in the National Collection.

Dr. G. A. N. Horton presented the first specimen of *Eriopygodes imbecilla* F. to be taken in the British Isles.

1978

Dr. H. B. D. Kettlewell presented his important research collection of British Macroheterocera formed during his investigations of Lepidoptera genetics and melanism. This collection of some 3,000 specimens contained bred series of many species.

The W. Reid collection of British Macroheterocera was purchased by the Cockayne Trust. This contained about 10,000 specimens, mainly from the Sheffield area, and was very rich in melanic examples.

Many other donations have been received during the last ten years but it is not possible to list them all. Among those who have regularly presented specimens are Messrs. L. Christie, R. Ford, B. Goater, R. I. Lorimer and A. S. Wheeler. Mr. Lorimer has presented a fine collection of Orkney Lepidoptera over this period, a most important acquisition from an area otherwise poorly represented.

In parallel with the development of the British Lepidoptera collection of imagines, the collections of immature stages have also been expanded in recent years. These collections were founded on 30 drawers of blown larvae in the R.C.K. collection and a small spirit collection made by the late Mr. H. M. Edelsten. The present collection, consisting of 60 drawers of blown larvae and about 700 jars of spirit collection, is supplemented by a collection of about 3,000 colour transparencies of immature stages to show their natural coloration. A great deal of this progress has been made possible by the efforts of a number of field entomologists, particularly Messrs. G. Haggitt and R. I. Lorimer, who have provided a steady stream of live material during the last few years.

It is apparent from this account that support for the National Collection has not diminished since its inception but indeed the flow of material over the last few years has considerably increased. Unfortunately it is not possible to accept all collections indiscriminately as storage space is limited, even though individual collections are not retained intact but are incorporated into the existing system. Many generous benefactors have donated rare or interesting specimens from their collections whilst others have made provisions enabling a Museum representative to select interesting specimens from their collections after their death. An area in which the collection is still in particular need of support is that of immature stages. Whilst this part of the collection is being actively expanded, there are still many species, particularly of Microlepidoptera and Pyralidae, which remain unrepresented.

The National Collection is housed in the Entomology Department of the British Museum (Natural History) and access to specialists and serious students is by appointment only during working hours from Monday to Friday. The Watson Collection is the venue of an annual Spring field meeting of this Society and is also open to study at other times by personal appointment with Mr. R. W. Watson, "Porcorum", Sandy Down, Boldre, Lymington, Hampshire.

REFERENCES

- Cockayne, E. A., 1950. The Rothschild-Cockayne-Kettlewell Collection. *Bull. amat. Ent. Soc.* 9 (110): 12-13.
- Cockayne, E. A., 1953. The Rothschild-Cockayne-Kettlewell Collection. *Entomologist's Rec. J. Var.*, 65: 97-99.
- Cockayne, E. A., 1954. Additions to the Rothschild-Cockayne-Kettlewell Collection. *Entomologist's Rec. J. Var.*, 66: 185-186.
- Cockayne, E. A. and Kettlewell, H.B.D., 1953. The Rothschild-Cockayne-Kettlewell Collection of British Lepidoptera. *Entomologist's Rec. J. Var.*, 65: 303-304.
- Goodson, A. L., 1960. Additions to the Rothschild-Cockayne-Kettlewell Collection of British Lepidoptera in the British Museum (Natural History) at Tring. *Entomologist*, 93: 126-127, 146-149, 173-175.
- Goodson, A. L., 1968. Additions to the Rothschild-Cockayne-Kettlewell Collection of British Lepidoptera in the British Museum (Natural History) at Tring. *Entomologist's Gaz.*, 19: 241-249.
- Hall, W. J., 1957. Edward Alfred Cockayne. *Proc. R. ent. Soc. Lond. (C)*, 21: 65.
- J[acobs], S. N. A., 1957. Obituary: Dr. E. A. Cockayne. *Entomologist's Rec. J. Var.*, 69: 120-122.
- Kettlewell, H. B. D., 1973. *The evolution of melanism*. Oxford. 447pp.
- R[iley], N. D., 1947. The Cockayne-Kettlewell Collection of British Lepidoptera. *Entomologist* 80: 147.
- Riley, N. D., 1948. The Rothschild-Cockayne-Kettlewell Collection of British Lepidoptera. *Entomologist* 81: 145-146.
- Riley, N. D., 1950. The Rothschild-Cockayne-Kettlewell Collection of British Lepidoptera. *Entomologist* 83: 19-20.
- R[iley], N. D. and W[illiams], H. B., 1957. Obituary: Dr. E. A. Cockayne. *Entomologist* 90: 78-80.
- Williams, H. B., 1953. The Castle Russell Collection. *Entomologist's Rec. J. Var.*, 65: 97.
- W[illiams], H. B., 1957. In Memoriam: E. A. C. *Proc. Trans. S. Lond. ent. nat. Hist. Soc.*, 1956: xlv-xlvii, pl. 1.

A REVIEW OF VARIATION IN *PIERIS BRASSICAE* (L.) (LEP., PIERIDAE)

(with Plates III-VI and text figs. 1, 2)

by BRIAN O. C. GARDINER

(Unit of Invertebrate Chemistry and Physiology, Department of Zoology, University of Cambridge, Downing Street, Cambridge)

Introduction

Altogether some seventy races, forms, varieties or aberrations of *Pieris brassicae* L. have been described, of which fifty are said to have been found in the British Isles. Some races are distinctive and geographically isolated; e.g. race *cheiranthi* Hüb. in the Canary Islands. Some forms have been shown to be due to simple recessive alleles; e.g. *albinensis* Gardiner (Gardiner, 1962) or to environmental factors; e.g. *minor* Ksienschopolsky (Gardiner 1963). The first generation or spring form throughout its range is of a lighter colour than the summer or later generation broods and is generally considered so by being designated *chariclea* Stephens. Apart from a few forms which in my opinion are certainly due to a recessive allele, such as *flava* Kane and two or three which may well prove to be environmental (for example *vasquezi* Oberthur), the majority of the various forms which have been named vary solely in the size and positioning of the black markings on the wings, or, in a few cases, the degree of darkening of the underside of the hindwing. The last general description of these varieties is that of Graham-Smith and Graham-Smith (1929-30) who dealt with the subject as a whole, and of Lempke (1953) who reviewed those found in the Netherlands. What little is known about the genetics of *brassicae* variation is briefly summarised by Robinson (1971). The present paper is the result of breeding some 200 generations of *brassicae* over a period of 25 years, during which time both a number of varieties have been observed and most of the named transitional and local seasonal forms have appeared. It has also been possible to do a number of breeding and hybridization experiments. These show that the factors governing the underside colour of the hindwing and the factors governing the extent of the black markings are controlled by multiple alleles. They also show that there is a graded series and that many of the named varieties gradually merge into each other which makes it difficult, indeed at times impossible, to say specifically that a particular specimen should be referred to var. "A" or to var. "B". In a sense many of the varieties named on account of the variation in the black markings should be considered transitional forms towards race *cheiranthi*. The various combinations possible between the named varietal forms are seemingly endless, as also is the degree of any particular variation. For instance, the variety *biligata* Cabeau, as described, consists of a few black scales joining the apical blotch to the upper discal spot under nervures 2 and 4. In fact it is found that all stages exist from the few scales along the nervures to the complete fusion and enlargement of the apical blotch and the upper discal spot into one continuous and inseparable whole—which may then go on to fuse with the lower discal spot and the submedian streak.

The schematic representation of some of the varieties and combinations that are possible in the extent of the black markings are shown for the female uperside in Fig. 1.

I also feel that the validity of some of the varietal names is untenable. For instance different names have been put forward for what is in fact the same variety, but in separate sexes. For example, the name *infrafasciata* Graham-Smith and Graham-Smith was introduced specifically for the

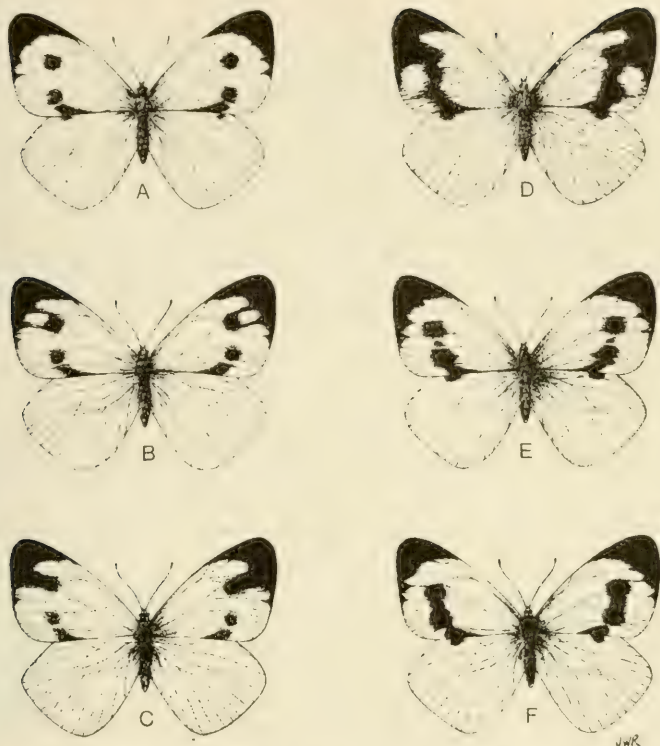


Fig. 1. Some of the possibilities in variations of black markings on the female *P. brassicae* upperside. A. Typical *brassicae*; B. *ab. striata* Rocci, as described; C. *ab. striata* extreme form; D. *ab. fasciata* Kieffer (= *cheiranthi* Hubner - *striata* plus *maria*); E. *ab. maria* Mellaerts; F. *ab. maria* extreme form.

joining of the discal spots on the underside of the wings. Lempke (1953) states that he has never seen a case of (in the female) the variety *fasciata* occurring on one surface only, as stated by the Graham-Smiths' and neither have I in the tens of thousands of examples I have seen, including original Graham-Smith material. Since therefore *fasciata* covers all cases the names *suprafasciata* and *infraciata* must be considered superfluous. In my opinion the type of *infraciata* can in any case be referred to as true *fasciata*. The original type is shown in Figs. 10 (upperside) and 13 (underside).

Many of the varieties have been found randomly over the years in the continuously brooded stock of *brassicae* designated the "Cambridge" stock. This stock is still being maintained, is now over 25 years in culture, is used by many laboratories and the culture methods as described by David and Gardiner 1952, 1966 are still in use. The other stocks examined were the "virus free" which originated in Oxford; the *cheiranthi*, and the Hereford, which have been described in previous papers by David and Gardiner 1965, 1966 and Gardiner 1973.

Additionally the original material on which Graham-Smith and Graham-Smith based their 1929-30 paper has been re-examined together with the

series of *Pieris* species in Cambridge University, Department of Zoology, various private collections, and much European material supplied to me by various colleagues and the collection in the British Museum (Natural History). All rearing was done under non-diapause conditions so all varieties bred are of course of the summer form.

In the continuously brooded Cambridge stock of *brassicae* approximately eight generations a year are obtained, and have been, for the past twenty-six years. The stock is normally reared on such varieties of *brassica* Cabbage species as may be available and sometimes several generations are run through on an artificial diet. The fact that a number of varieties occasionally turn up in this stock has already been noted (Gardiner 1973). From time to time over the years unusual looking specimens have been noted in the culture, killed and retained. It is considered almost certain that others have been overlooked.

Apart from the distinctive recessive alleles, and the gynandromorphs, most such varieties have shown a reduction in the extent of their black markings, or have had unusual wing shapes. The culture has been maintained under a variety of conditions of temperature and humidity from time to time and it has been noticed that the general appearance and size of the adults tends to fluctuate. This is certainly due to the differing environmental conditions under which they have been reared and has had the interesting result that many of the named races generations, forms and sub-species of *brassicae* have been bred from the one culture with the exception of those isolated populations such as *nepalensis* which show a consistent major variation in the extent of black markings.

Actual experiments with breeding where multifactorial effects have been involved have basically been confined to the cross of Cambridge *brassicae* with Canary Islands *cheiranthi*. These crosses and the evidence from the Hereford stock show that the amount of black markings is controlled by multiple alleles and so also is the colouration of the underside of the hind-wing. (Gardiner in preparation).

In a number of publications the wingspan of insects is often quoted. The two extremes of size in *brassicae*, *minor* and *major* are so quoted and named on account of their small and large size respectively.

The wingspan of Lepidoptera (and other insects) can be measured and expressed in at least two ways. Unfortunately most of the authors who quote

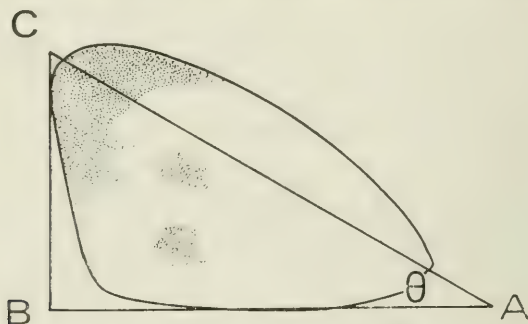


Fig. 2. Parameters that should be used for wingspan measurements. For explanation see text.

wingspan do not quote the parameters of which method they used. This is unfortunate as it leads to ambiguity and consequent misinterpretation by subsequent authors, even when at times the parameters of measurements may be clear (although not quoted) from an illustration.

The usual method apparently quoted is that shown in Fig. 2 when the specimen is set with the hind margin at right angles to the line of the body. However this can be variable on two accounts, firstly if the specimen is poorly set and secondly if the outer wingmargin be convex which permits the measurement to be taken either at the apex or at the widest part. It can be seen from Fig. 2 that the only constant method is to measure the distance from the centre of the thorax to the wing apex, call this distance H and multiply by 2. This method is independent of the angle of set of the wings and also can be carried out much more easily on live specimens, although perhaps requiring more care on dead ones.

From Fig. 2 it can be seen that H is the hypotenuse of a right-angled triangle and is also the radius of a circle at a centre A . In set specimens the angle θ of this triangle can be measured. Since H is a radius, it is independent of the angle—that is to say the 'set' of the wings—but the distance AB , so often used in wingspan measurements, is not. For specimens which have been measured wing-tip to wing-tip, distance Y , then $H = .5Y/\text{Cos } \theta$ or, conversely, as it may sometimes be easier for comparative purposes to convert the other way, $Y = 2 \text{ Cos } \theta H$. When a published figure is given by an author it is usually possible to measure it and this may tell which parameter of measurement has been used. When there is no published figure, or other evidence, the usual (but unfortunately not invariable) method of quotation has been to use Y , the wing-tip to wing-tip measurement of a set specimen but not necessarily with the hind margin set at right angles to the body.

There exists considerable confusion in the literature over various seasonal forms and races. Verity (1916) stated for instance "The migratory habits of *P. brassicae* have probably contributed in maintaining the lack of variation observed in the whole of Europe. Seasonal dimorphism is however, well marked in the whole of its range". Never-the-less he later (Verity, 1947) illustrated and listed many seasonal forms. These forms will be discussed below under their respective names. The fact that so many of them have appeared in the Cambridge stock and that it is rarely possible to decide between them, leads me to the opinion that all colour and marking variations in *brassicae* are due to environmental factors modifying the facies with the result that, given the appropriate weather conditions a form believed peculiar to one region can appear in another. It does seem quite obvious that overwintered pupae do produce specimens with darker undersides and paler black markings (*chariclea* Stephens). But all other slight colour and size variations—and they are but slight on the whole—run gradually into each other and vary enormously from year to year and indeed from month to month in the continuously brooded Cambridge stock.

In the account which follows I have not been able to see all the named forms, although I have had examples of many, in order to compare with my own bred specimens. In some cases it has not been possible either to get an expert translation of the original description nor, in two or three cases even track down the original reference. Never-the-less it is felt that even these should be included in the list of varieties to follow for the sake of completeness. In the majority of cases, however, I have personally looked

at the original references, some of which I discovered, had been misquoted previously. Those not tracked down are from references quoted, but without title, by Graham-Smith & Graham-Smith (1929-30).

Varieties

In so far as they are known to me, all the various varieties, forms, aberrations, and races of *brassicæ* are described below in alphabetical order.

albinensis Gardiner (1962)

This variety is characterised by the absence of any black pigment in the wingscales or body hairs. The imago has difficulty in emerging from the chrysalis. It is due to a recessive allele and its origin and breeding from the 'Cambridge' *brassicæ* stock has been described by Gardiner (1962).

aestiva Zeller (1847).

This name was applied to the second generation specimens and as interpreted by Verity (1908) really applies only to South European *brassicæ*. Whether or not successive broods should have differing names, is a matter of opinion. To my mind many of the differing forms of *brassicæ* blend into each other and it is usually quite possible to find the 'wrong' form amongst the right ones (as specified) at any given time. Over the many years of breeding the same strain so many of the named forms have turned up, at times in quantity, it is, in my opinion, certain that they are due to climatic factors which of course vary not only from region to region but also from season to season. There is also confirmed evidence that differing foodplants (coupled perhaps with semi-starvation) and temperature of rearing can affect the facies of the adult.

aestivalis Turati (1924)

This is a variety of race *cyniphia* Turati, which occurs in Cyrenaica and in which the underside of the male is described as whitish-green instead of greenish-yellow. Specimens of *cyniphia* can be produced from the Cambridge stock (see below under *cyniphia*) and the underside colour of these may or may not also be of var. *aestivalis*. It is probably environmental, caused by hot dry conditions but since underside colouration changes can also be caused by multifactorial factors, genetic isolation of the North African population cannot altogether be dismissed.

aligata Cabeau (1924)

Is a synonym of *fasciata* Kiefer (1918)

alpina Rocci (1919)

Erected to describe a population found above 1,200 m. in the Piedmontese Alps, where it is univoltine and the single generation possesses characters of both the spring (*chariclea*) and summer (*aestiva*) forms.

anthrax G-S and G-S (1930) (*syn. nov.*) (Fig. 14)

Described from a male in which the undersides of the hindwings are so densely suffused with black scales that they have a very dark appearance. I have bred nomotypical examples as illustrated by the Graham-Smiths' and such dark undersides appear to be common in examples I have from Spain, Malta, Chile and from weakly diapausing pupae. In my opinion, this is the opposite extreme to *pallida* and one end of a continuous variation controlled by multiple alleles.

After careful consideration and examination of examples including the Graham-Smiths' original material I am also of the opinion that *anthrax* as described cannot be separated from *nigroviridescens* Rocci (1919) which takes precedence and it must therefore fall as a synonym. See further discussion under *nigroviridescens*.

The Graham-Smiths suggested that a specimen, exhibited by Leeds (1909) "with undersides of the hindwings a very distinct blue" was perhaps an example of this aberration. In this they were mistaken for I have seen this specimen which is undoubtedly *coerulea*. Furthermore later in their paper the Graham-Smiths state that this same specimen is a very marked example of their ab. *pallida*!

autumnalis Rocci (1919)

According to Rocci this is the form of specimens found in October through November around Genoa and the Ligurian litoral. It is described as smaller than *chariclea* but larger than *lepidii* or *meridionalis*, and has slightly differing colour than typical. Here again we have what I consider an environmental form, not really distinguishable from many others.

aurea Moseley (1896)

Is a synonym of *flava* Kane (1893).

aversomaculata Lempke (1953)

A variety known only in the male where there is a spot formed by black scales on the underside of the forewing near the apex. An occasional specimen has been found in both the 'Cambridge' *brassicae* and in the *cheiranthi* hybrids but otherwise this variety has not been investigated.

azorensis Rebel (1917)

There is obviously some confusion over this one. Specimens from the Azores have been described both as a sub-species and as "indistinguishable from typical *brassicae*".

I would suggest that here is a clear case of facies in any particular year being directly modified by climatic factors. In support of this is the fact that a number of authors (see Verity, 1907 and Graham-Smith and Graham-Smith, 1930) had previously considered it as the European spring form *chariclea*.

basi-nigrescens Graham-Smith and Graham-Smith (1930) (**syn. nov.**)

Although figured in their work (as a copy of a previous line engraving) Graham-Smith and Graham-Smith did not describe, but designated the specimen captured at Leicester in 1842 (Plant, 1844) as the type and I have not been able to trace its present whereabouts. The veinal shading as is shown in the illustration in the Graham-Smith paper does not exist in the original illustration to Plant's note, which is dated 1844, although the date 1843 is given by the Graham-Smiths'. Further discussion on this and other subdivisions of *nigrescens*, will be given under that variety, of which it is in fact a synonym.

biligata Cabeau (1925)

Is a synonym of *striata* Rocci (1919).

bi-nigronotata Graham-Smith and Graham-Smith (1929)

Occurs only in the male. In addition to the male spot of *nigronotata* (see below) there is an additional spot between nervures 1 and 2. Such specimens exist in the Graham-Smiths' material but I have never come across this variety in any specimens bred by me.

carnea Graham-Smith and Graham-Smith (1930)

Described most unsatisfactorily by the Graham-Smiths' as follows:—"Newman (1916) exhibited two pairs (a part of a series) of *Pieris brassicae* bred from wild Aberdeenshire larvae, the males especially showing a decided pink colouration all over the wings". They make no further comment nor do they illustrate the variety. Since no type can now be designated and for the reasons given below, I propose this variety be suppressed.

The pink colouration can be produced in two ways, both of which I have tried. The first is by staining with meconium from another specimen just as eclosion occurs and before wing expansion. The second, which only sometimes produce the pink suffusion, is to kill the specimen while the wings are still soft and the same time rupture one or more of the wing nervures thereby causing leakage of fluid onto the wings. Apart from these purpose-produced specimens, I have examples which appeared postmortem after passing through a potassium cyanide killing-bottle. Usually the effect is partial and it is more common for the hindwing to be affected.

It is perhaps interesting to note the Graham-Smiths' quotation comes from the reports of exhibits shown at a meeting of the Entomological Society of London on March 15th 1916. Newman, however, had already exhibited them a few days earlier at a meeting of the South London Entomological and Natural History Society on March 9th, 1916 and their exhibition report gives more information. Both reports are to be found on the same page, 116, of the *Entomologist* for 1916. The former is already quoted above; the latter is as follows: "Mr. Newman exhibited, on behalf of A. Horne, Esq., bred specimens of *Pieris brassicae* from Aberdeen, with a very distinct pink tint over all the wings, and a Noctuid . . .". Between the two exhibition dates the specimens no doubt changed ownership. Interestingly enough these were bred specimens and I can trace no case of a wild caught pink specimen.

catoleuca Röber (1896) (Fig. 22)

This name was originally applied to second generation specimens from the Syrian region but these specimens cannot be distinguished from other *brassicae* throughout Southern Europe and Graves (1925) considers it a synonym of *verna*. As usual it can be found in both the Cambridge and virus-free stocks even in wild caught specimens from the local population.

chariclea Stephens (1828)

This is the spring form in which the intensity of all the black markings, but especially that of the apical blotch, is considerably reduced. In the majority of such specimens examined by me, from all the sources, the hindwing underside is also of a darker and greener colour than in summer brood species. The form can be produced at will by allowing the chrysalids to enter diapause and then keeping them for several months at or near freezing point. If pupae, in diapause, are kept warm, instead of being chilled, there is often a steady trickle of emergences over several months. This may well be associated with the diapause having been initiated by a minimal response. In these specimens the wingtips are usually normal but the dark underside is always present. Investigation of *chariclea* has not been undertaken in view of the fact that the *brassicae* are kept in continuous culture without diapause and are not therefore normally of this variety. It is clearly an environmental form and occurs whenever there is a diapausing stage.

cheiranthi Hübner (1806) (Figs. 17, 34)

This is the race from the Canary Islands. It is large; in my experience with fresh specimens more yellow; with all the black markings very extensive and the males all *nigronotata*. Obviously it is an isolated race and non-migratory. The larvae feed only on *Nasturtium (Tropaeolum)* (Fernandez, 1955) and when fed on cabbage I have found there is a high mortality. It pairs readily with Cambridge (and other) *brassicae* to produce an F.1 intermediate between the two parents. The F.2 shows a complete

gradation of forms between the original Parent generation thus demonstrating the multiple allele control of the black markings, size and underside colouration. How did it arise? There is a strong (but quite unprovable on present evidence) probability that it was introduced as nymotypical *brassicae* some time in the sixteenth century after the introduction of *Nasturtium* from the newly discovered Americas. Subject then to a new environment the genetic drift eventually, even quickly, produced the present facies. Already we have evidence that such a thing is happening in Chile (Gardiner, 1974). The evidence from the Hereford stock of *brassicae*, in which this English stock produced in effect specimens indistinguishable from F.1 *cheiranthi/brassicae* hybrids shows that the halfway step already exists. Gardiner (1973) has already shown that selection of the blacker specimens leads back to the *cheiranthi* end of the facies variation.

This is also the only race of *brassicae* in which the larva and pupa show a marked difference from the nymotypical form.

colliurensis Gelin (1914)

In this variety the black costal blotch on the hindwing is absent. There is considerable variation in the intensity of colour and, but to a lesser extent, the size, of this black spot. In all examples in my possession or seen by me the size and intensity is directly related to size and intensity of the other black markings on the insect; as they are reduced, so is this spot; in specimens which have been reared at high temperature; in var. *minor*; in specimens reared on white "Dutch pride" cabbage, it tends to be absent. It would appear therefore that *colliurensis* is part of the multifactorial complex governing the amount of black present and, like the other black areas, is capable of being modified by environmental conditions. *fischeri* John (1922) is a synonym.

coerulea Gardiner (1963)

In this variety the wings are of a pale blue colour and difficulty is experienced in eclosion. It has previously been shown to be due to a recessive allele (Gardiner, 1963). A particularly fine example was figured, but not named, by Frohawk (1924), Plate 3 in his famous book of British Butterflies.

cyniphia Turati (1924)

Described to distinguish a race occurring in Eastern Libya (Cyrenaica), they are allegedly small with reduced black markings. The upper side of the hindwing is said to be greenish-white and the underside greenish-yellow. Here again we have a race of which specimens appear in the Cambridge *brassicae* and in the virus-free stock. The matter is confused, however, as my own specimens from Derna do not agree with Turati's description and appear to be perfectly ordinary nymotypical, *brassicae* in both their size and facies. In my opinion therefore *cyniphia* can be considered an environmental form and by no means confined to Cyrenaica.

cyniphiodes Rocci (1930) (*syn. nov.*)

Described as having the female resembling *cyniphia* with small spots and the subtriangular mark extremely short, its lower extremity hardly reaching the level of the upper dorsal spot. It is dusted with white in its apical portion and crossed or interrupted by the nervures. Here again we have another example of pale specimens and these occur in the Cambridge stock either when fed on white (Dutch pride) cabbage or are reared at high temperatures. In any case I really do not consider one can tell it apart from *cyniphia* and the name should be sunk as a synonym.

The cause of the blue colour is apparently due to xanthopteron and erythropteron which are present in normal *brassicae* (Harmsen, 1964). *elongata* Gelin (1914) (Fig. 28)

This was described as with marked narrowing of all four wings. The type was a small specimen (50 mm.) but not so small as to be referable to *ab. minor*. Such distorted specimens occur from time to time in all bred stocks of *brassicae* and are due to mechanical deformation in the pupal stage. Gelin did in fact suggest this in his original description and I concur in the fact that it is a teratological specimen. *emigrisea* Rocci (1919) (**syn. nov.**)

I consider this to be synonymous with *vazquezi*.

fasciata Kiefer (1918) (Figs. 10, 13, 15, 16)

In this variety the discal spots are joined to each other and to the apical blotch by a sprinkling of black scales. The Cambridge stock has produced virtually no such specimens but the cross *brassicae* x *cheiranthi* are invariably all strongly *fasciata*, as was also a brood of *brassicae* originating from Hereford. When taken to the F.2 an infinite series is produced and it is not really possible to define the point at which '*fasciata*' fades out, or, alternately merges into '*cheiranthi*' or some of the other named varieties. In all the tens of thousands of specimens seen, when *fasciata* occurs it is present equally on both upper and under wing surfaces and on the under surface of the sibling males when present in the female. The use of the names *infra-fasciata* Graham-Smith and Graham-Smith and *supra-fasciata* Graham-Smith and Graham-Smith are therefore superfluous and these names must sink as synonyms.

The situation governing this variety is clearly very complex. It occurs regularly in the isolated races *cheiranthi*, *nepalensis* Doubl., and *wollastoni* Butl. When produced by the cross *brassicae* x *cheiranthi*, the F.2 produces an infinite graded series but when the ends and middle of this series are crossed *inter se* they tend to reproduce themselves and, as has been shown (Gardiner, 1973) for *cheiranthi* we eventually return to the original parental forms. The stock from Hereford was clearly unusual in that *fasciata* just appeared shortly after it was obtained and these bred true.

Could this be a chance combination of alleles which, given the right conditions of isolation would be capable of forming a new subspecies?

In the late 1920's the Graham-Smiths reported a high percentage of *fasciata* from Aberdeenshire stock, often combined with other varietal forms. All of these were very 'weak' in the sense that the extra black scaling consisted of a small proportion of black scales scattered amongst the white. In the specimen illustrated by for example Frohawk (1934) as *fasciata* these black scales are very extensive and the joining of the normal black areas becomes continuous. This variety does not occur in the Cambridge stock and this fact, together with its unexpected and very strong appearance in the Hereford stock, its occasional and variable appearance in the other stocks, and the evidence from the *cheiranthi* leads to the opinion that, given the right combination of genes, *fasciata* will appear, and once there selective breeding can maintain its strength.

fischeri John (1922)

Is a synonym of *colliurensis* Gelin (1914) but in any case the type of John's *fischeri* as illustrated is *P. rapae* L.

flava Kroulikovski (1902)

Is a synonym of *flava* Kane (1893).

flava Fischer (1925)

Is a synonym of *flava* Kane (1893).

flavus Frohawk (1938)

Is a synonym of *flava* Kane (1893).

flavopicta Rocci (1919)

This name is applied to specimens with very pale underside colouring to the hindwings. Rocci's original description (translated) is "from the base of the hindwing underside yellowish slightly dusted with black". It is in fact one end of the continuous variability in underside appearance. It should not be confused with *jauni* (*seq*) as has been suggested by Goodson (in lit). but which is of entirely different aspect and in which the pupal colour is also affected.

flava Kane (1893)

The wings of a lemon-yellow colour. This appears to be the rarest of all the varieties, although quite common in the related *P. napi* L. Two specimens have turned up in the Cambridge stock and unfortunately it was not possible to breed from them. In my opinion, it is due to a recessive allele, as in *coerulea* and may well also be coupled with difficulty in eclosion.

The names *aurea* Mosley (1896); *lutea* Röber (1907); *flavus* Frohawk (1938) and *brassicae-flava* Fischer (1925) have all been applied to a yellow form of *brassicae*. The description of each author varies and the only real method of comparison would be to get all their respective specimens side by side. Kane's *flava* is in fact the specimen recorded (but not named) by Mosely who then, three years later named the same specimen *aurea*. Perhaps the earliest specimen was that recorded (but again not named) by Schoyen in 1885. Kane described both these specimens as sulphur-yellow whereas Mosley (who was of course describing the same specimen) likened the ground colour to golden-yellow. Röber's *aurea* was described as bright yellow. Frohawk's *flavus* is sulphur yellow and Fischer's figure of *brassicae-flava* is canary yellow. In these circumstances I consider, as have others before me, that the name *flava* Kane applies to all yellow forms of *brassicae* and all other names are synonyms. The name *flava* Krulikovsky (1902) falls as already occupied.

fuscognata Lempke (1953) (Figs. 8, 9)

The dark markings on the upperside of the wings brown-black. I am a bit suspicious of this variety and strongly suspect it is due to chance environmental conditions. I have two such male specimen and a few others in which the effect is bilateral and which are known to have been produced postmortem so it is certain that this form can be produced as the result of some accidental contamination or chemical change under certain (but unidentified) conditions. One of the former was bred from onto the F.4 without obtaining anything but normal *brassicae*. It is my opinion that the browning of the black colour is either due to its being overridden with pink (meconium, as for example *carnea*) or a change due to chance contact with some chemical or perhaps fungal spores or other. Exposure to direct sunlight over a period of several weeks does not produce it.

glaseri Muller (1925) (Figs. 27, 29)

Absence of terminal black streak. This is another aspect of the multiple allelic control of size and intensity of the black markings. Appears occasionally in Cambridge stock.

griseopicta Rocci (1919) (syn. nov.)

In this variety the female is described as having the black markings pale grey instead of the normal black and it occurs solely in the first (spring) generation. I consider this to be merely a pale form of *chariclea* Stephens (1828) as his description of his var. B: "with the apical spot of the anterior wings unclouded, very pale, cinerous . . ." exactly fits the above description. In any case the name *vasquezi* Oberthur (1913) would have priority when this form occurs in the summer generation, as it sometimes does.

gynandra Rocci (1930)

Created as a name for a halved gynandromorph caught at Milan, the name is unnecessary and the use of such a term for gynandromorphic Lepidoptera has not in fact been generally followed.

gynandromorphs

Examples of both halved and partial gynandromorphs appear from time to time in the Cambridge stock. A number of sexual mosaics appeared in the Hereford Stock and two or three partial examples in the *cheiranthi* hybrids, while two examples were found in the early days of the virus-free stock. I do not consider that any special naming of these is required and a full account has already been published (Gardiner, 1973). It seems quite clear that, although rare, gynandromorphism, complete or partial, is of regular occurrence in *brassicae*.

henriettae Pionneau (1924)

Is a synonym of *vasquezi* Oberthur (1913).

homæosis

This name is applied to specimens where the pattern or part thereof of one wing is repeated on another wing where it does not normally occur. Occasional specimens are known, three of which occurred at one time in the *brassicae/cheiranthi* hybrid stock. One of these was illustrated by Gardiner (1963) and an earlier example by the Graham-Smiths (1930). No other examples are known to me and I suspect they are due to miscegenation when pairing occurs between isolated stocks—something which chance migration could ensure as a regular happening.

infratrinotata Caruel (1954) (syn. nov.)

As described this variety consists of a male *infraciata* (see below) with an additional spot, composed of a mass of grey scales, situated in line with the other spots not far from the costa. But such a spot is of course *aversomaculata*! Whether a combination of two or more varieties should receive yet a third name is a matter for opinion. I do not think so. In any case this type of specimen occurs in a few of the *cheiranthi* hybrids.

infra-fasciata Graham-Smith and Graham-Smith (1929) (syn. nov.) (Figs. 10, 13)

The Graham-Smiths' applied this name to *fasciata* occurring only on the underside of the wing. I agree with Lempke (1953) that there is no known example. I have examined the specimen labelled as type in the Graham-Smiths' material. The underside is indeed faintly *fasciata* but so also is the upperside, sufficiently so in relation to the total relative weak scaling, in my opinion, to invalidate the use of a separate name which therefore sinks as synonym of *fasciata*.

italorum Stauder (1921)

Another local form named from some specimens taken in the Apennines. Again I am of opinion this is environmental and does not occur every year in its type locality.

jauni Gardiner (1963)

Another variety due to a recessive allele (Gardiner 1963), in which both the chrysalis and the hindwing of the adult are affected, being a golden colour. This variety is interesting in that it is the only known instance in *brassicae* of a gene effecting two stages of the insect. In all other instances this is not so, indeed it is known that the chrysalis may be of several colours without any affect on the adult (Gardiner, 1974). This variety appeared in the virus-free stock and has never been seen elsewhere. It was unfortunately lost before it could be more fully investigated and in spite of many years continued breeding of the stock has not reappeared.

lacticolor Lempke (1953)

The ground colour of all wings not white but creamy. It is not easy to decide whether this may be a partial stage towards var. *flava* or even a form like *jauni* but with the golden colour transferred to the upperside. I have some *cheiranthi* hybrids of this form -- indeed the hindwing is even more extreme, being of an orange colour along the fore-edge. Sometimes whole batches of the Cambridge stock specimens are creamy rather than white.

There is a definite tendency for weakly diapausing specimens, emerged by constant warmth without prior chilling to be creamy rather than white. The whiter specimens in fact seem to be those which are produced under warmer conditions, although *cheiranthi* is an exception. This rather argues that it may be caused by some, at present unknown, combination of environmental factors. It is at any rate impossible to tell in a graded series exactly at which point the term *lacticolor* should be applied and it does seem to be near the middle point of a range of colour from an almost pure white to the bright yellow of *flava* even though I am of the opinion this is produced by a different cause.

lepidii Röber (1907)

This name was applied by Röber to the summer form on the grounds that it differed from the spring form. Here we again have a form whose facies is caused by the environmental conditions and which grades into all the other seasonal and local named forms. It does of course occur in all stocks bred by me.

longomaculata Lempke (1953)

The discal spots distinctly lengthened. They do indeed vary in size and at times there is a distinct cut-off along the edge of the nervures instead of the spots spreading over. This gives them an elongated look. Additionally the spots elongate very markedly in races *cheiranthi*, *wollastoni*, and *nepalensis*, and in some *fasciata* forms, but the effect is obscured as they thicken also. This variety would seem therefore to be part of the multi-factorial complex and to be brought about by certain combinations of the alleles involved. Spots of normal size, but otherwise elongated, I have not come across.

lutea Röber (1907)

Is a synonym of *flava* Kane (1893).

major Verity (1947)

A varietal name applied by Verity to larger than normal specimens. But what is normal size? It depends on various factors; *cheiranthi* for instance are larger than normal and so are any specimens I have bred which are both well fed, not too crowded and not too hot. Size is relative; there is a continuous graded series from the 25 mm. of small *minor* to the 90 mm. of *cheiranthi* and in my opinion the name is illogical and ill-applied since, as defined by Verity (translated): "gigantic with an expanse of 62 to

66 mm. and the length of the hindwing from 55 to 36". Unfortunately the parameter of measuring are not given. Never-the-less I have a complete range of specimens going up to 90 mm. and many normal British examples are of the size quoted by Verity.

The size of *brassicae* appear to vary according to two factors. First, it would seem to be genetic in some cases. For instance all pure bred race *cheiranthi* reared by me are larger than typical *brassicae*. The hybrid is of intermediate size, and the F.2 generation produces a range of size, which are quite clearly coupled with the wing markings:— the larger specimens with the most *cheiranthi*-like facies and the smaller specimens the more typical *brassicae* facies.

The size of the adults can also be varied by environmental factors, those being reared at low temperatures and low densities, (10-15°C) being markedly larger than those reared at 25-30°C and high densities.

marginata Graham-Smith and Graham-Smith (1929)

This has a band of black scales running along the costa and termen of the upper surface of the hindwing. According to the Graham-Smiths' it is particularly prevalent in *brassicae* from the Eastern half of its range but certainly also occurs in European examples, but not *cheiranthi*. It is confined to the male and appears also to be associated with *nigronotata*. It is of course always present in the related species *P. deota* Nicér and *P. brassicoides* Guérin.

marginavenata McLeod (1968)

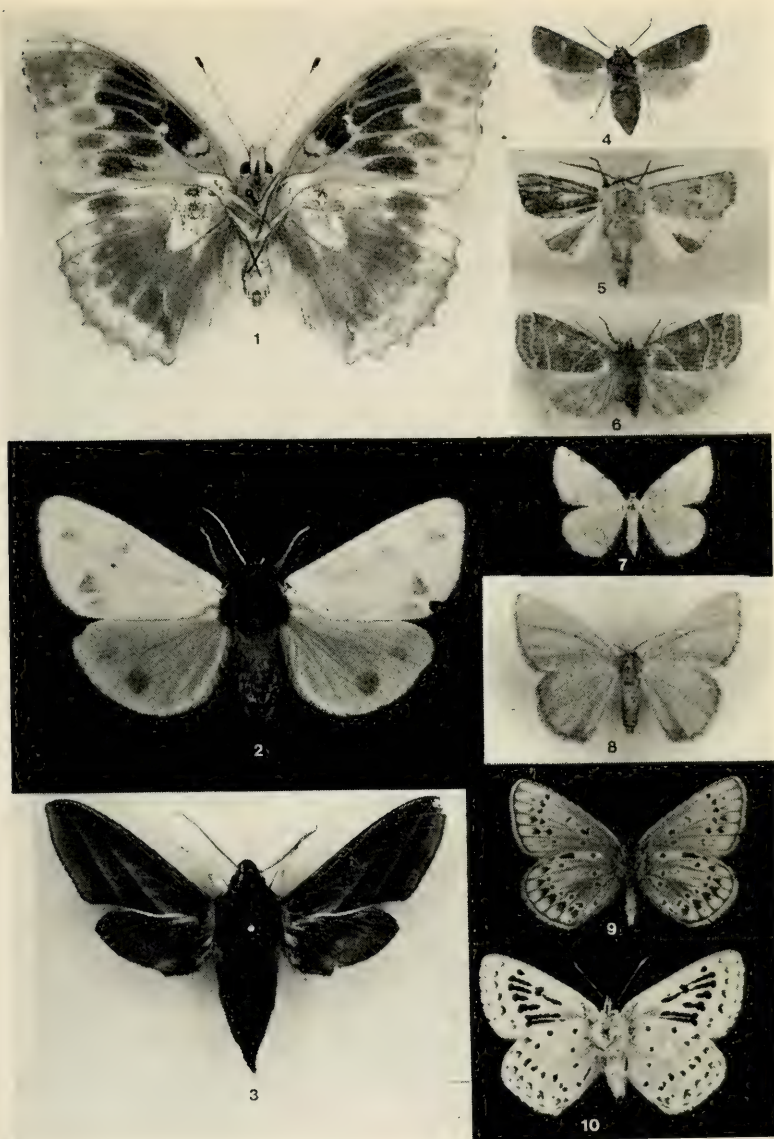
This variety originated in a sub-division of the Cambridge stock. It is characterised by the veins on the under-side of the male hindwing being stressed by borders of black and grey scales tapering towards the margins.

maria Mellaerts (1926)

As described by van Mellaerts this variety has the two dots in the female joined by a sprinkling of black scales. It does not also have the dots joined to the apical blotch and since the type of *fasciata* does have all three black areas so joined, it should be considered a separate variety and I cannot therefore agree with Lempke's suggestion (1953) that the name is illogical and should fall as a synonym of *fasciata*. This variety is quite common in the various *cheiranthi* hybrids that were produced and continues to appear in the *cheiranthi* hybrids strain still maintained at the Glass House Crops Research Institute, Littlehampton and was also common in the Hereford stock.

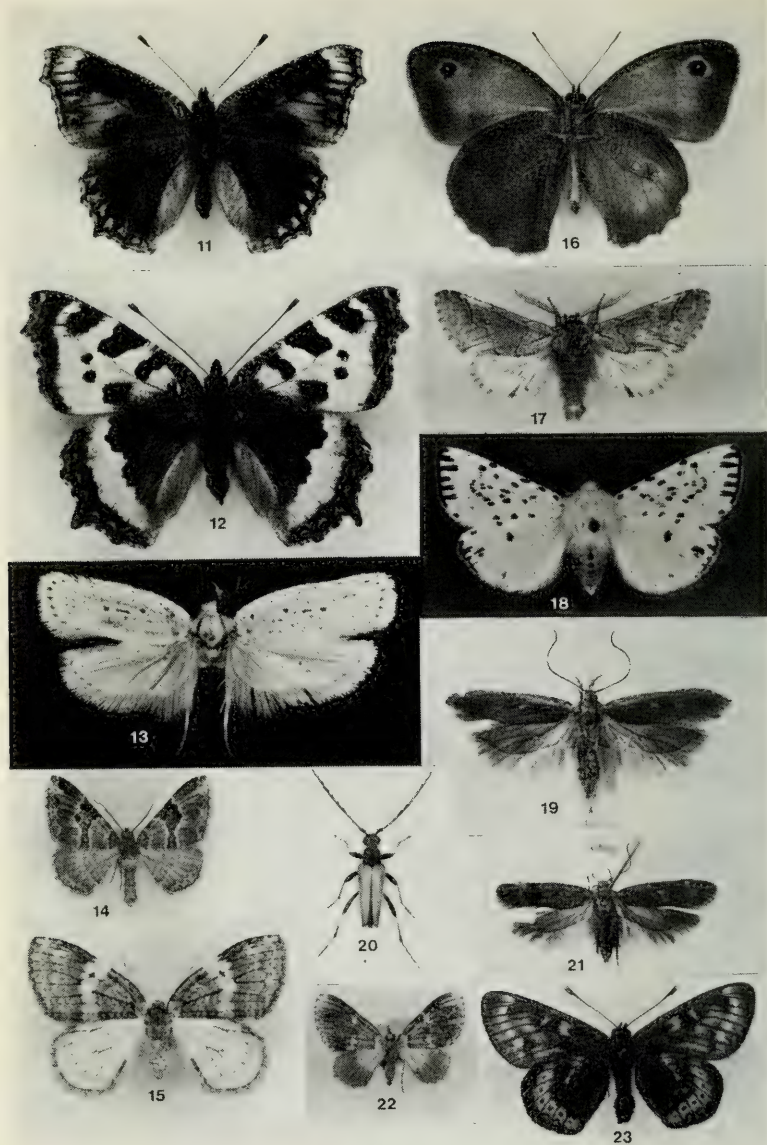
minor Ksienchopolsky (1911)

The name applied to small specimens. It has already been shown that this variety is environmental, being produced by semistarvation of the larvae (Gardiner, 1963). Never-the-less extra small larvae are sometimes noticed in a batch of normally fed healthy stock. Attempts have been made to rear these but without any adults being obtained. Usually the larva dies, but three or four chrysalids were obtained, very small, one of which weighed only 98 mg. (normally 300-400 mgm.). All died. It is therefore just possible that some of the *minor* in collections originated from such small larvae and not from the more probable cause of semistarvation. Un-suitable food, such as Dutch pride cabbage, may also produce these specimens.



ANNUAL EXHIBITION (1978)

1. *Argynnis paphia* (L.) ab. ♀ (Watson, R. W. & A.) (temperature experiment).
 2. *Arcitia caja* (L.) ab. (G. E. Higgs). 3. *Deilephila elpenor* (L.) ab. (C. E. Pearce).
 4. *Eriopygodes imbecilla* (F.) ♀ (B. Goater). 5. *Agrotis cinerea* (D. & S.) inter-sex,
 (P. Sokoloff). 6. *Cosmia trapezina* (L.) ab. *nigra* Tutt (K. Tuck). 7. *Lomographa*
trimaculata (Vill.) (B. G. Withers). 8. *Comibaena pustulata* (Hufn.) ab. (P. A.
 Martin). 9. *Polyommatus icarus* (Rott.) ab. (L. D. Young). 10. *Lysandra coridon*
 (Poda) ab. *antidigitata* B. & L. ♂ (R. C. Revels).



11. *Aglais urticae* (L.) temperature experiment (A. D. A. Russwurm & H. G. M. Middleton). 12. *A. urticae*, ab. *lutea* Raynor (S. F. Imber & B. Jewson). 13. *Agonopterix bipunctosa* (Curtis) (X2) (D. H. Sterling). 14. *Xanthorhoe fluctuata* ab. (B. Skinner). 15. *Oporinia dilutata* (D. & S.) ab. (A. S. Harmer). 16. *Maniola jurtina* (L.) ab. *atrescens* Leeds (A. D. Russwurm & Middleton). 17. *Diloba caeruleocephala* (L.) ab. (E. H. Wild). 18. *Spilosoma lubricipeda* (L.) ab. (G. Howard). 19. *Gelechia sabinella* Z. (X2). 21. *G. scotinella* H.-S. (X2) (both A. N. B. Simpson). 20. *Leptura rubra* (L.) (P. J. Hodge). 22. *Acasis vireiata* (Hübner) ab. (I. R. Sims). 23. *Eurodryas aurinia* (Rott.) ab. *melanoleuca* Cabeau (A. S. Harmer).

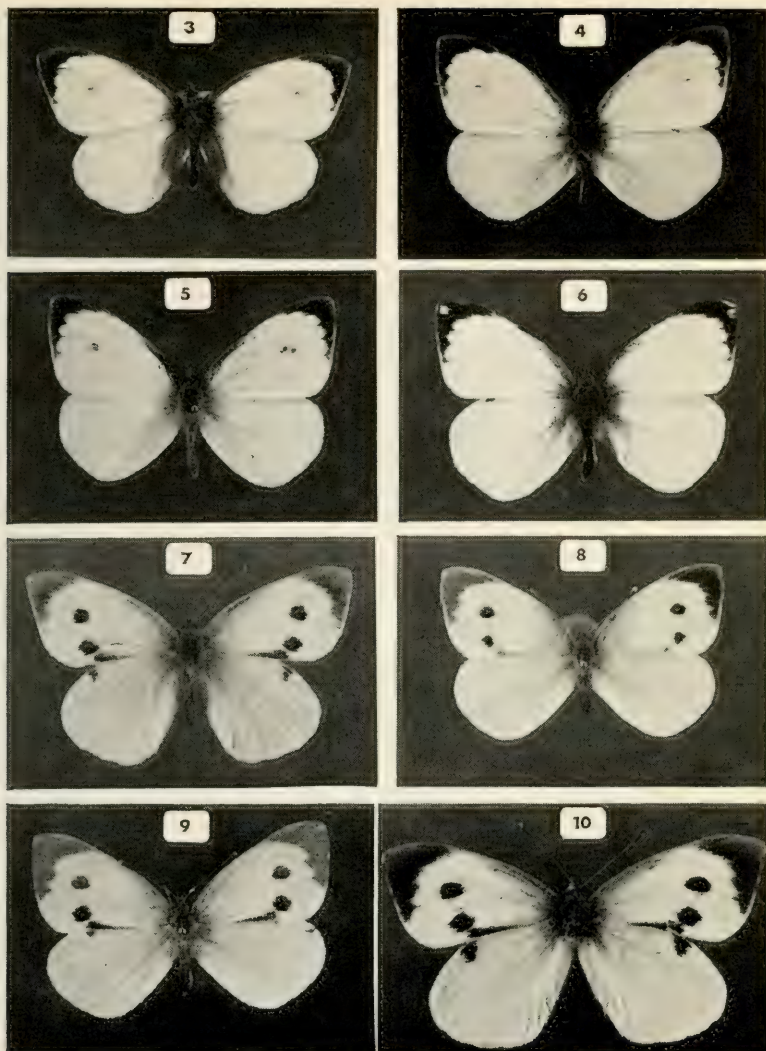


Fig. 3. *ab. nigronotata*, Arnage.
 Fig. 4. *ab. nigronotata*, Hereford.
 Fig. 5. Simulated *ab. nigronotata* (Sales missing).
 Fig. 6. Example from Dover with a white apical spot in the normally black area of the wingtip.
 Fig. 7. *ab. vazquezi* Oberthur, Arnage.
 Fig. 8. Example with left apical spot brown (*ab. fuscognata* Lempke).
 Fig. 9. Example with both apical blotches brown (*ab. fuscognata* Lempke).
 Fig. 10. Upperside of *ab. infrafasciata* G-S a G-S. Type specimen. Note black scaling between the spots.

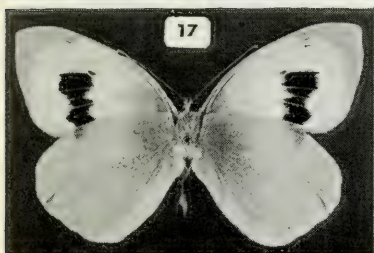
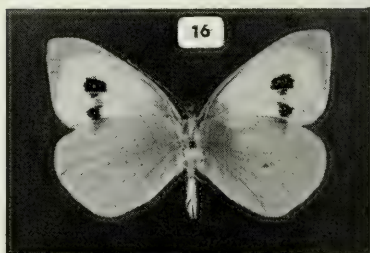
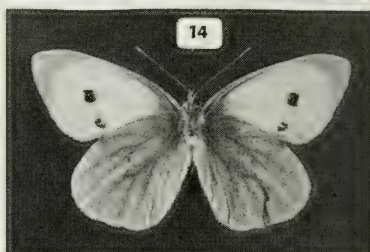


Fig. 11. ab. *pallida* G-S & G-S. The type specimen.

Fig. 12. Dark underside example from Alicante, Spain.

Fig. 13. Underside of ab. *infra-fasciata* G-S & G-S. The type specimen (see Fig. 10 for upperside).

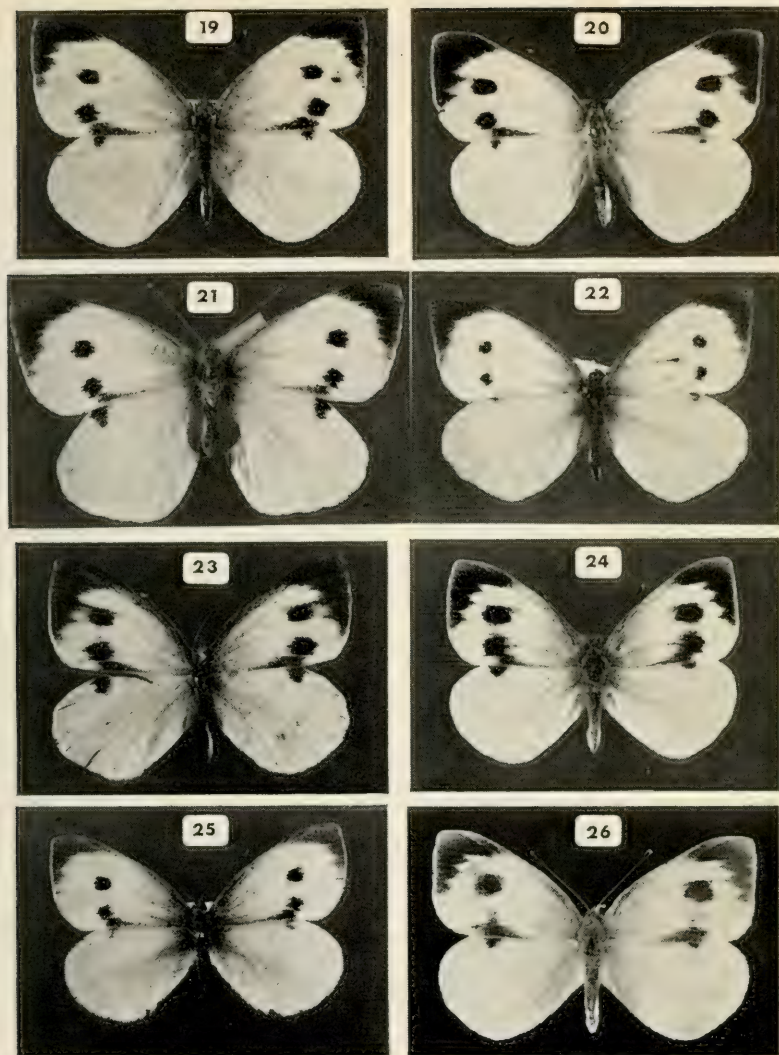
Fig. 14. ab. *nigrovirescens* Rocci (= *anthrax* G-S & G-S).

Fig. 15. Underside of typical ab. *fasciata* Kieffer from Arnage.

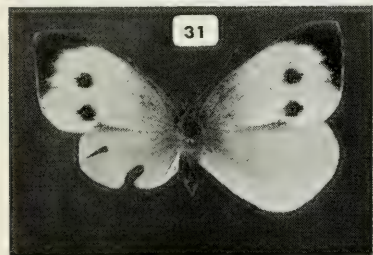
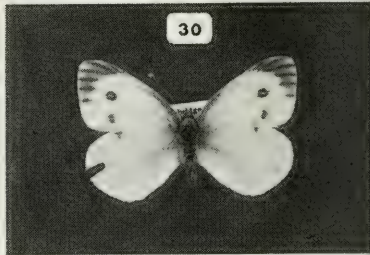
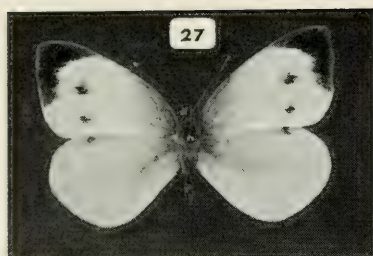
Fig. 16. Underside of typical ab. *fasciata* Kieffer from Hereford.

Fig. 17. Underside of typical male race *cheiranthi* Hubner (= extreme *fasciata* Kieffer).

Fig. 18. Underside of nymotypical Cambridge stock *brassicae*.



- Fig. 19. Typical female example from Bavaria.
 Fig. 20. Female from Cyprus. Note *ab. striata*.
 Fig. 21. Female example from Morocco.
 Fig. 22. Female *cataleuca* from Tuscany.
 Fig. 23. Female of race *nepalensis* from Bengal.
 Fig. 24. Female from Hereford. Note similarities to *nepalensis*.
 Fig. 25. A rather pale female from Italy; could be referred to *meridionalis* Rocci.
 Fig. 26. Another female from Hereford. Note virtual absence of lower discal spot (= *ab. reducta* Fritsch).



- Fig. 27. ab. *glaseri* Muller, Cambridge stock.
 Fig. 28. ab. *glaseri* Muller combined with ab. *reducta* Fritsch. Cambridge.
 Fig. 30. An unusual Cambridge example bred on 'Dutch Pride' cabbage.
 Fig. 31. Teratological specimen showing mechanical deformation of left hindwing. Cambridge stock.
 Fig. 32. Teratological specimen. An otherwise typical Cambridge female with unequal wing development.
 Fig. 33. Cambridge female with loss of black scaling on one side only.
 Fig. 34. Teratological specimen of race *cheiranthi* Hubner with unequal wing development. Left-hand wings are extreme ab. *maria* Mellaerts while righthand are *fasciata* Kieffer.

meridionalis Rocci (1919) (Fig. 25)

This is another pale form of *brassicae* localised in Italy. Again I believe this to be another manifestation of environmental factors as such forms appear from time to time in the Cambridge and virus-free stocks.

nana Rocci (1919)

Is a synonym of *minor* Ksienchopolsky (1911).

nepalensis Gray (1846) Fig. 23)

This is the Himalayan race, and is sufficiently isolated by mountains and desert to avoid internal or external migration from its range. It is characterised by having more extensive black areas than the nymotypical but these are extremely variable and some examples are not separable from type. In particular, however, it shows a marked percentage of *marginata* and *strigata*. In addition *fasciata* and *nigronotata* are often present.

I have no experience of breeding this race. It is known to be sometimes a pest on cabbage crops but I suspect it has other foodplants. Some of the Hereford examples bred by me were similar, as indeed have been some of the *cheiranthi* hybrids, and I have no doubt that *nepalensis* is controlled by multiple alleles and that, having such a wide area of distribution (unlike the Island races) there has been less opportunity to stabilize into a uniform pattern of facies.

nigrescens Cockerell (1889)

Bramwell (1869) described a black specimen thus: "It is a female and is of a uniform black dusky colour, both on the upper and undersides; the black spots on the wings are quite distinct being of a much more intense and shining black than the ground colour". The Graham-Smiths (1929-30) introduced the name *semi-nigrescens* and *basi-nigrescens* for partial (as opposed to uniform) dusky brown colouring on the wings and both Gardiner 1974 and Wilde 1957 carefully avoided creating new names for their specimens which did not fit the descriptions of the above three forms. Care also needs to be taken to distinguish *nigrescens* in which the scales are grey in colour (Gardiner 1974) from specimens in which the scales are malformed being upturned at their edges and have a 'mealy' or 'shaggy' appearance, which gives the same effect through optical illusion as does the grey colour of true *nigrescens*. I have examined the type of *semi-nigrescens* and it is of this form. The type of *basi-nigrescens* is, by designation, the specimen captured by Plant in 1843 of which there is a good colour illustration in Morris 1857, and it certainly appears to be due to grey scales as in true *nigrescens*. We therefore have the situation where *nigrescens* and *semi-nigrescens* are due to different causes.

I have had a number of examples of the 'mealy' or 'shaggy' variety all of them amongst broods of the recessive varieties *coerulea* and *albinensis*. In no sense can they be referred to *nigrescens* nor do they show colouring called for in the description of the type *basi-nigrescens* by the Graham-Smiths. It is quite clear to me that these 'mealy' examples are due to faulty eclosion, and would be better not named. To return to *nigrescens*, the Graham-Smiths describe the variety this: "The parts usually white are dark, greenish grey on both upper and underside, while the usual dark markings are distinct". They figure a completely black suffused example. They then go on to say that "Cockerell (1889) gave the name to a female captured two miles from Perth in 1868 and thus described by Bramwell" (Bramwell, 1869). But this is just what Cockerell did *not* do. In his article on the variation of insects most of his definitions are the briefest of the brief and his full statement as regards *brassicae* is as follows "Pieris *brassicae nigrescens*, Newman, Brit. Butt., 165". If we now turn to New-

mans book (Newman, 1868) we find on page 165. "At page 471 of the second volume of the 'Zoologist', Mr. J. Plant of Leicester, figures a variety of this butterfly with a sharply defined black patch at the base of all the wings. At p.258 of the fourth volume of the 'Entomologist' Mr. J. M. Bramwell of Perth mentions that he has in his collection a female and of a uniform dusky black colour". Plant's specimen must obviously take priority over Bramwell's and since we have both male (Plant 1844) and female (Bramwell 1869) the former is by designation, due to line precedence the type, and the latter the neallotype. This interpretation has the great advantage of leaving *nigrescens* as a variety subject to considerable variation and therefore capable of accommodating the partial dusky specimens which have been reported by Gardiner and Wilde. Var. *basi-nigrescens* consequently falls as synonym of *nigrescens*. This variety is obviously of great rarity and is most likely due to a fortuitous mishap in early cell division which concentrates some black scales where they do not normally occur. The only recent specimens known to me are those of Wilde (1957) from Germany and my own from the Cambridge stock (Gardiner 1974). This last was partial and had the effect confined to one side. There are in the British Museum (Natural History) several specimens with areas of intense black scaling, but they cannot be strictly be referred to *nigrescens*, although I feel they are due to the same cause.

nigronotata Jachontov (1903) (Figs. 3, 4)

In this variety there is a streak or oblong patch of black scales on the upper side of the male forewing between nervures 3 and 4 and just terminal to the discal cell. Although described from a Western Russian specimen this form of male is the most usual in *brassicae* on the edge of its range, particularly in the races *cheiranthi*, *wollastoni* and *nepalensis*. It was recorded as present in 1.7% of the specimens from Aberdeen by the Graham-Smiths. I have never come across this variety in either Cambridge or virus-free stock. It occurred amongst the *cheiranthi* hybrids however, as one might expect, and also commonly in the Hereford stock. The extent of the black is quite variable, from a few black scales, just visible, to a very prominent and intense black streak. Its shape is invariably different to the round or square dot found in the female. Its concentration in isolated races and occasional appearance when it breeds true — from time to time elsewhere leads me to conclude that it is due to a combination of two or more alleles.

nigropunctata Walcourt (1920)

It is a synonym of *posteromaculata* Verity (1911).

nigrovirescens Rocci (1919) (Fig. 14)

In this variety the underside of the hindwings are densely suffused with black scales giving a very dark appearance. The name *anthrax* Graham-Smith and Graham-Smith must be considered a synonym. This is yet another case of its being impossible to say where one variety begins and the next ends, *pallida* dissolves into type into *venata* into *nigrovirescens*. The colouring of the *brassicae* underside seems to be dependent on locality and I would like to put forward the suggestion that it is due to selective pressure by predators. For instance *cheiranthi* has a very light yellow-buff, some examples almost orange, in colour with virtually no strewing of black scales. It feeds only on *Tropaeolum* (Fernandez, 1955) in the Canary Islands, and when settled amongst this foodplant or feeding from flowers of the island flora, it really is an inconspicuous insect, whereas a dark underside would stand out amongst the green and the yellowing leaves of

Tropaeolum. Specimens I have from Malta and Spain, however, are mostly of this variety and so too are those from Chile. I have already (Gardiner 1974b) put forward the theory that this dark underside colour is due to pressure from predators and more suited to the survival of *brassicae* in its new environment of South America.

obenbergi Tykac (1947)

Described from a summer brood example, this variety has the ground colour fundamentally of a yellow colour but the apex grey and the underside "light green" powered black with the veins brown. I have not seen the type and can only conjecture that it does in fact differ from *flava* with which it might perhaps be confused from the description given.

obscurata Oberthur

Oberthur stated it had all the wings of a dusky dark grey. As described this is a synonym of *nigrescens* Cockerell (1889) as redefined in present paper.

ocellata-loberi Kraut (1938)

Described from a female which has the upper discal spot of a steel blue, or light blue with a dull silver sheen, appearing as a metallic "eye" with a black border, giving to the insect an exotic appearance. I have not seen this specimen, nor come across another example. I am inclined to the belief that it is due to some mechanical defect in the scales.

ottonis Röber (1907)

This name was given to spring specimens from Fergana but Verity (1908) illustrated such specimens and was of the opinion there was "no reason to distinguish them particularly". I cannot separate these from other spring-form *chariclea* either and the name is therefore a synonym of *chariclea pallida* Graham-Smith and Graham Smith (1930) Fig. 11)

As described "The undersides of the hindwing and of the apical areas of the forewings are pale, lacking to a great extent the yellow colour normally present". In most cases in the spring generation, the black pigmentation commonly present on the hindwing is slightly developed. This variety is simply one end of the range varying from very pale to very dark colouration of the underside. It occurs from time to time in all my stocks and has already been commented on under *nigro-iridescens*.

parvomaculata Rocci (1919)

In the female the upperside spots not larger than those of *P. rapae* and the apical mark pale grey. Several such examples have appeared in the Cambridge stock. No two are quite alike and some (although they cannot strictly be called this name), having only one, it may be either, of the spots reduced. It should not be confused with the very pale examples sometimes produced by environmental conditions, as it is part of the multifactorial complex covering spot size and intensity.

perflava Lempke (1953).

As described 'Ground colour of the underside of hindwings and the apex, of the forewings deep yellow'. Lempke (1955) knew only females of the spring brood. I have had examples of *cheiranthi* and *brassicae/cheiranthi* hybrids such as described but tending rather to orange particularly along the costa of the hindwing. It seems probable that this is a more extreme form of *pallida*. It does not, however, appear to be *jauni* with which it might perhaps be confused.

plasschaerti Dufrane (1912)

Is a synonym of *venata* Verity (1908), see below.

postice-ochreatea Verity (1919)

This name is applied to first brood females of Northern races (including Britain) which have the upperside of the hindwing a bright ochreous colour. It also occurs in summer brood specimens at times and is part of the series from almost dead-white to nearly orange that occur. It is not possible to say where this variety begins or ends.

posteromaculata Verity (1909)

Verity's original description is "Il est intéressant de remarquer que chez la ♀ on rencontre quelquefois une forme ayant une tache noire sur le disque des postérieures correspondent à celle qui est constant chez *deota* et qui s'observe quelquefois aussi chez la ♀ de *P. manni* forme *rossii*, ainsi que chez *P. napi* forme *napaeae* et très rarement même chez *rapae*; le nom de *posteromaculata* (page 331) proposé pour *napaeae* doit, à mon avis, servir pour toutes ces espèces".

The french word 'tache' should be translated as 'spot' whereas in the two specimens illustrated by the Graham-Smiths only a light speckling of black appears and while this variety is clearly not too uncommon, the degree of black present varies to a large extent and perhaps only when the black spot is as clear as it is in *P. deota* de Niceville, should the name be applied. This variety has in fact only occurred with me in a few females of *brassicae/cheiranthi* hybrid broods.

pseudocataleuca Rocci (1929)

Another local form named from specimens obtained on the Tuscan Apennines in Italy. Again environmental; variable from year to year and grading into other forms, it occurs in both Cambridge and virus-free stocks.

punctigera Graham-Smith and Graham-Smith (1930)

As mentioned by the Graham-Smiths this variety is sometimes seen in Himalayan specimens. I too have only seen it in examples of race *nepalensis*. It is characterised by having black spots or radial streaks on the upper surface of the hindwing. This patterning is normal in the related *P. deota* Nicér, *P. canidia* Sparrm, and *P. brassicoides* Guérin.

rammei Knop (1923)

In this variety the apical blotch is traversed by the nervures traceable as four yellow-brown streaks. The Graham-Smiths quote several examples and go on to state that recently emerged specimens can rub the tips of their wings in such a manner that *rammei* is simulated. I have examined several such specimens under the microscope and the normal black scales are lacking or very sparse in the streaked area.

I have a few examples, in particular a rather striking one from Chile. All were noticed postmortem and all give me the impression of being artificial in some way. I am of the opinion therefore that this variety is due to some environmental factor, possibly difficulty in clearing the pupal skin causing rubbing or perhaps a haemolymphal leak towards the ends of certain nervures. This opinion is confirmed by the fact that by very carefully rubbing the apical blotch of fresh specimens between finger and thumb, examples referable to *rammei* can be produced.

radiata Röber

I do not have any information on this variety.

reducta Fritsch (1913) (Figs. 26, 29)

In this variety the lower discal spot in the female is absent. Although not so stated in the original description, all the examples I have seen have the black absent on both upper and underside of the wing. Generally, but not always, it is accompanied by a reduction in size and intensity of the other black markings. I have a series of transitional forms collected over the years from the Cambridge stock and also a rather striking example from *cheiranthi* hybrid stock.

semi-nigrescens Graham-Smith and Graham-Smith (1930)

As defined by the Graham-Smiths and as already mentioned examples of this variety are due to mechanical deformation of the wing scales and there is no relationship with *nigrescens*. Examples with such deformation occur from time to time in all stocks except the *cheiranthi* hybrids and are particularly prevalent combined with vars. *coerulea* and *albinensis separata* Pionneau (1928)

Described for a specimen where on the underside of the forewing the lower discal spot is divided into two parts. From time to time examples occur where one or other of the discal spots, either on the upper or the underside is divided into two distinct halves by a band of white scaling. There is insufficient evidence to show whether it is due to some mechanical, genetic, or environmental effect or is a true genetic aberration.

striata Rocci (1919) (Fig. 20)

In this variety the apical blotch is joined to the upper discal spot by lines of black scales along the nervures 3 and 4. This variety is very common in races *wollastoni*, *nepalensis* and *cheiranthi*. It often appears from time to time in specimens from many localities and is frequently but not invariably associated with *fasciata*. Its extent also can vary from weak black tracery along the nervures to a complete solid black bar confluent between the apical blotch and black spot. This variety was common among the *cheiranthi* hybrids and the Hereford stock but I have not otherwise bred it.

The variety is clearly part of the multifactorial complex governing the extent and size of the black markings. I consider *biligata* Cabeau (1925) to be a synonym.

sublutea Turati (1924)

In this variety the black scales which are normally present at the base of the wings on the upper surface are absent. It was originally described from examples of the race *cyniphia*, but is not present in any of these in my possession or seen by me, including examples from Cyrenaica. In specimens with much reduced black markings generally the black wingbase scaling is also much reduced and of course *ab. albinensis* and *coerulea* also lack the black scaling, but for other reasons.

supra-fasciata Graham-Smith and Graham-Smith (1929) (**syn. nov.**)

Neither Lempke (1953) nor I agree that this form really exists as we have never come across a specimen. The type is not among the Graham-Smiths material in my possession. As already stated earlier, and in view of the doubt created by a re-examination of the type of *infra-fasciata*, I consider the name should be sunk as a synonym of *fasciata*.

teratological specimens (Figs. 31, 32, 34)

From time to time specimens of insects are found in which the anatomy is some way abnormal. I have one specimen of *brassicae* in which the abdominal segments are twisted, with one of them being wedged-shaped. This was first noticed in the larva and can now be seen best in the cast chrysalis skin. Many other examples have occurred in which the wings are distorted. Similar effects can be produced by deliberate mechanical damage to the appropriate area on the chrysalis and the appearance of many of the examples lead me to the conclusion they are due to constriction and pressure on the wingbud area by the silken retaining girdle spun by the larva.

In some specimens the wings are larger on one side. While this could be explained by other causes an equally valid explanation is the similar one of mechanical damage affecting the full functioning of the expansion mechanism.

tertia Verity (1919)

Created to describe third brood examples (which occur particularly in the Mediterranean region) and is described as midway in appearance between 2nd and 4th broods. In view of the variability of facies according to seasonal and climatic variations it is not possible to separate *tertia* with any certainty from either typical or *catoleuca* (2nd brood).

trimacula Rocci (1919) (*syn. nov.*)

This name was erected for those examples in which both *fasciata* and *striata* were present. It should be borne in mind, however, that Kieffer's illustration of the type of *fasciata* is also *striata*; that is to say, the apical blotch is joined to the costal dot, as well as the two dots being joined together with black scales. The name is therefore a synonym of *fasciata*.

ultimogenata Verity (1909)

This was sunk as a synonym of *autumnales* Rocci (1919) by Verity in later work (Verity, 1947).

In this variety the apical blotches are very pale, being ashy-grey in colour. The effect is produced by a quantity of the normal black scales being replaced by white ones. Although apparently common in the spring broods from Southern Europe (Verity 1916) I have a few summer brood examples from the Cambridge stock. Verity (1916) who originally figured an example in *Rhopalocera Palaeartica*, then considered it the culminating form of the spring brood generation. It is of course very similar to *chariclea*. I concur with Verity that it is the culminating form of the spring brood, and further, I suggest that it may be due to the environmental cause of the chrysalis being subjected to a mild winter.

venata Verity (1908)

In this variety the underside basal area of the wings are distinctly dusted with violet grey scales. In the female this occurs on the upperside also. Named by Verity to cover examples from Morocco, where it appears to be the normal form. It has also been seen occasionally in specimens from other areas and I have two examples from the Cambridge stock. The specimen shown in Fig. 21 from Morocco does not meet Verity's description.

I would suggest that this is another manifestation of the background colour change which takes place in response to predator pressure and then stabilises. The suggestion that the explanation could be that the violet is produced by the exceptionally strong sunlight of North Africa is rather unlikely since similar violet tinged specimens do not seem to have been recorded from Cyrenaica or Palestine.

wollastoni Butler (1885)*verna* Zeller (1847)

Graves (1925) considers this second generation form to be a synonym of *aestiva* Zeller and Verity (1947) agreed with this view.

vasquezi Oberthur (1913) (Fig. 7)

This is the race from Madeira. The black markings are not so extreme as in *cheiranthi* but the race is characterised by being strongly ab. *fasciata* and the underside is undoubtedly darker and greener than in nymotypical specimens. The larvae are the same. I have bred this race but was unable to obtain cross pairings to other *brassicacae*. Race *wollastoni* would appear to be due, as I believe has happened with *cheiranthi* and is happening in Chile, to selective pressure of predators stabilising the facies to fit in with their surroundings and I suggest also that the original introduction took place only a few hundred years ago.

Discussion

Variation in *P. brassicae* falls into four main groups: (1) Those in which there is a major colour change and which is controlled by a recessive allele: the varieties *coerulea*, *albinensis* and probably *flava* fall into this category. (2) Those in which the amount and intensity of the black markings varies. These I consider to be controlled by multiple alleles but to be capable of modification by environmental factors. (3) Those in which the underside colour varies. This I consider to be due to multiple alleles but again modifiable by environmental factors. (4) Miscellaneous variation which may be due to various other factors not at present fully understood. In this group I include gynandromorphs, *nigrescens*, pink, brown or grey apical spots which turn up at random but of which there is certainly some evidence that they are due to chance mechanical or unusual environmental conditions.

Throughout its range the first brood of the year which is derived from diapausing pupae, differs from later broods derived from pupae of short-lived duration. It is lighter in colour (due to less black and more white scales) on the upperside, but darker in colour on the underside of the hindwing. Imagines derived from pupae weakly in diapause tend to have the first-brood underside facies, but non-diapause type upperside. By splitting of eggbatches and rearing under the appropriate conditions it is possible to have all three forms in the sibs of one pairing. It is quite clear therefore that the first or spring brood of the year (*chariclea*) is environmentally controlled.

In addition to this spring form, various authors have considered that second third and fourth broods are also deserving of a separate name. In addition to these a considerable number of local forms have also been given a name. There is absolutely no doubt that, over its range, the facies, does vary considerably, in size intensity of the white background colour, intensity of colour of the black spots, and also the colour of the underside of the hindwing. But is this variation enough, or constant enough, to justify so many names being used? I think not. *P. brassicae* is a noted migrant. Except therefore at the extremes of its range, where geographically isolated populations occur, there is a constant intermingling of all these local forms. This could well explain why there has been, indeed still is, so much confusion and synonymy concerning them. Many of these forms have been illustrated by various authors (Röber 1907; Verity, 1907; 1947). If we take a quantity of ova laid by an individual of my Cambridge stock *brassicae* and rear them under a variety of different conditions, then the resulting imagines will fit the description or illustrations to most of these local named forms of *brassicae*. When I rear *brassicae* from distant locations in Cambridge they too vary with the conditions of rearing rather than fitting in with the named form from the area whence they came. (This does not apply to isolated races, like *cheiranthi*, which are genetically controlled and are discussed below). In any particular area too, over a period of years, even when the climate is relative stable and constant, there will be a period of exceptional weather and the *brassicae* facies will change from what it normally is in that area. This, coupled with migration, explains the confusion over local forms in the literature and indeed perhaps explains why a name was given, for I believe that some local forms were named (*alpina* for instance) because it was noticed they were different from usual and it could well be that this difference was caused by exceptionally abnormal climatic conditions in a particular year or two in that area. That such

plasticity is inherent in *brassicae* is confirmed by both the Cambridge and virus-free stocks, bred under varying conditions as they have been, producing so many of the named forms.

At the geographically isolated extremes of its range we have, however, other conditions prevailing. There is no migration. There may well be selective predation pressure not apparent elsewhere. We have already seen in the Aberdeen material studied by the Graham-Smiths (Graham-Smith and Graham-Smith 1930) and more recently in the Hereford stock, how otherwise typical British *brassicae* can suddenly turn up specimens half-way towards race *cheiranthi*; and it has been shown (Gardiner, 1973) how selection of breeding adults can lead further towards *cheiranthi* (or indeed *vice-versa*). Once established such genetic combinations of multiple alleles will breed true, the more so if there is good cause for this particular combination to have some selective advantage.

Again with the underside colour. This clearly is modified by climatic factors as can be seen from *chariclea* and weakly dispaying specimens. Never-the-less in certain areas light or dark forms of the underside do predominate. The most likely explanation of this is again selection pressure of predators. The light yellow underside of *cheiranthi* fits in so much better with *Tropaeolium* foilage than it would or does — on cabbages. This is, however, something that requires much further investigation and again, apart from the geographically isolated races, there must be a constant mixing of the genetic combinations brought about by migration. Since it appears that most migration takes a northerly direction one would expect *brassicae* at the south of its range to show a more stable facies. In the specimens looked at by me this appears to be the case.

ACKNOWLEDGEMENTS

The number of people who have helped me one way or the other with *Pieris brassicae* over very many years is very large indeed. To all those who may remember doing so, very many thanks. In particular, however, I feel I should thank Sir Vincent Wigglesworth for allowing the use of rearing facilities at the ARC Unit of Insect Physiology and my colleague Dr. W. A. L. David for his interest and help. The drawing of the illustrations was by Mr. John Rodford.

REFERENCES

- Bramwell, J. M. (1869). Black specimen of *Pieris brassicae* and *P. rapae*. *Entomologist*, **4**: 258-259.
- Butler, A. G. (1886). Description of a hitherto unnamed butterfly from Madeira. *Ann. Mag. Nat. Hist.*, **17**: 430.
- Cabeau, C. (1924). Aberrations de Lépidoptères. *Rev. Mens. Soc. Ent. Namur.*, **24**: 25.
- Cabeau, C. (1925). Aberrations de Lépidoptères. *Rev. Mens. Soc. Ent. Namur.*, **25**: 38-39.
- Caruel, M. (1954). Revision des formes et aberrations du Catalogue des Rhopalocères de France. *Rev. France Lepidopt.*, **14**: 147-153.
- Cockerell, T. D. A. (1889). On the variation of Insects. I. suffusion and melanism. *Ent.*, **22**: 54-56.
- David, W. A. L. & Gardiner, B. O. C. (1952). Laboratory breeding of *Pieris brassicae* L. and *Apanteles glomeratus* L. *Proc. R. Ent. Soc. Lond. (A)*, **27**: 54-56.
- David, W. A. L. & Gardiner, B. O. C. (1965). Resistance of *Pieris brassicae* (Linnaeus) to granulosis virus and the virulence of the virus from different host races. *Jour. Invert. Pathol.*, **7**: 285-290.
- David, W. A. L. & Gardiner, B. O. C. (1966). Breeding *Pieris brassicae* apparently free from granulosis virus. *Jour. Invert. Pathol.*, 325-333.
- Dufranc, A. (1912). Piérides de Belgique. *Rev. Men. Soc. Ent. Namur.*, **12**: 23-25.
- Fernandez, J. M. (1955). Evolucion de la fauna Canariense. Inst. de Estud. Canarios. Tenerife.

- Fischer, E. (1925). In: OBERTHUR C. Lépidoptères d'Europe et d'Algérie: Quelques variations nouvelles ou aberrantes de France et d'Espagne. *Lep. Comp.*, **22**: (2) 1-16.
- Fritsch, W. (1913). Lepidopterologische Beobachtungen. *Ent. Rund.*, **30**: 46-47.
- Frohawke, F. W. (1926). Natural History of British Butterflies. *Hutchinson and Co.*, 206. 207pp.
- Frohawke, F. W. (1934). The complete book of British Butterflies. London. Ward, Lock, and Co., 384pp.
- Frohawke, F. W. (1938). Varieties of British Butterflies. Ward, Lock and Co. Ltd., London.
- Gardiner, B. O. C. (1962). An albino form of *Pieris brassicae* Linnaeus (Lep. Pieridae). *Ent. Gaz.*, **13**: 97-100.
- Gardiner, B. O. C. (1963). Genetic and environmental variation in *Pieris brassicae*. *Jour. Res. Lepidopt.*, **2**: 127-136.
- Gardiner, B. O. C. (1973). Gynandromorphism in *Pieris brassicae* L. *Jour. Res. Lepidopt.*, **11**: 129-140.
- Gardiner, B. O. C. (1974a). *Pieris brassicae* L. established in Chile; another palearctic pest crosses the Atlantic. *Jour. Lep. Soc.*, **28**: 269-277.
- Gardiner, B. O. C. (1974b). Observations on green pupae in *Papilio machaon* L. and *Pieris brassicae* L. *Wilhelm Roux's Archiv.*, **176**: 13-22.
- Gardiner, B. O. C. Hybrids between typical *Pieris brassicae* L. and race *cheiranthi* Hueb. In prep.
- Gardiner, B. O. C. (1974c). An unusual aberration of *Pieris brassicae* (Linnaeus) (Lep. Pieridae). *Ent. Gaz.*, 186-187.
- Gélin, H. (1914). Note sur quelques formes de Lycènes et de Piérides de la faune française. *Bull. Soc. Ent. France.*, 186-187.
- Graham-Smith, G. S. & Graham-Smith, W. (1929-30). *Pieris brassicae* L., with special reference to aberrations from Aberdeenshire. *Ent. Rec. & J. Var.*, **41**: 157-161; 173-180. **42**: 1-7; 17-22.
- Graves, P. P. (1925). The Rhopalocera and Grypocera of Palestine and Trans-jordan. *Trans. ent. Soc. Lond.*, 1925: 17-125.
- Gray, G. R. (1846). Lepidopterous Insects from Nepal. London.
- Harmson, R. D. (1954). Genetically controlled variation in Pteridine content of *Pieris brassicae* L. *Nature*, **204**: 1111.
- Jachontov, A. A. (1903). Aberratziya *Pieris brassicae* (Lepidoptera Pieridae). *Rev. Russe d' Ent.*, **3**: 38.
- John, K. (1922). Neue Lepidoperen-Formen. *Ent. Zeit.*, **36**: 33.
- Kane, (1893). A Catalogue of the Lepidoptera of Ireland. Rhopalocera. Pieridae. *Entomologist*, **26**: 117-121.
- Kiefer, H. (1918). Eine neue form von *Pieris brassicae* L. *Zeitsch. Oest. ent. Ver.*, **3**: 122.
- Knop, T. (1923). *Pieris brassicae* L. ♀ ab. Rammei nov. ab. *Ent. Zeit.*, **36**: 68.
- Kraut, W. (1938). *Pieris brassicae* L. ab. ocellata loberi Kraut. ab. nova. *Ent. Zeit.*, **51**: 353.
- Kroulikovsky, L. (1902). Petites notices lépidoptérologiques. IV *Rev. Russe Ent.*, **2**: 221-224.
- Ksienschopolsky, A. V. (1911). *Ges. Erf. Wolhyniens.*, 8.
- Lempke (1953). Catalogus der Nederlandse Macrolepidopteran. *Tijds. v. Entomol.*, **96**: 239-305.
- McLeod, L. (1968). A new aberration of *Pieris brassicae* (Linn) Lepidoptera Pieridae. *Ent. Rec.* **80**: 127-129.
- Van Mellaerts, L. (1926). Aberrationes de Lépidoptères. *Lambillonnes*, **1**: 82-84.
- Morris, F. O. (1857). A History of British Butterflies, Groombridge and Sons, London.
- Mosley, S. L. (1896). An illustrated catalogue of varieties of British Lepidoptera. *Nat. Journ.* 3rd Suppl. to vol. V pt. 5. 1-28.
- Muller, E. (1925). Eine neue form v. *Pieris brassicae* L. *Internat. ent. Zeit.*, **18**: 276.
- Newman, E. (1858). An illustrated Natural History of British Butterflies and Moths. David Bogue. London.

- Oberthur, C. (1896). Etudes d'entomologie. De la variation chez les Lépidoptères. *Etude d'Entom.*, **20**: 1-74.
- Oberthur, C. (1913). Les Lépidoptères de la Californie. *Etude de Lepid. Comp.*, **9**: 73-89.
- Pionneau, J. (1924). Nouveautés lépidopterologiques pour la faune girondine avec la description de deux formes nouvelles. *Misc. Ent.* **27**: 57-58.
- Pionneau, P. (1928). Sur quelques Rhopalocères Paléarctiques *L'Echange.*, **44**: 3-4.
- Plant, J. (1843). Note on a singular variety of the large cabbage butterfly. *Zoologist.*, **1**: 471.
- Rebel (1917). *Ann. Hofmus Wieh.*, **31**: 16.
- Rober, J. (1896). *Ent. Nachricht.*, **22**: 81.
- Rober, J. (1907). Pieridae. In: Seitz *Macrolepidoptera of the Palaearctic Fauna*. Vol. 1 Stuttgart.
- Robinson, R. (1971). *Lepidoptera Genetics*. Pergamon Press. Oxford. 687pp.
- Rocci, V. (1919). Osservazioni sui lepidotteri di Liguria. *Atti. Soc. Ligustica Sc. Nat.*, 1-44.
- Rocci, V. (1929). Lepidotteri di Liguria. *Mem. Soc. Ent. It.*, **8**: 97.
- Rocci, V. (1930). Sulla forma autunnale in Lombardia di *Mancipium brassicae* L. (Lep.). *Boll. Soc. Ent. It.*, **62**: 15-17.
- Schoyen (1885). *Tijdschr. Ent.*, p.214.
- Stauder, H. (1921). *Deutsche Ent. Zeitsch. Iris*, **35**: 26.
- Stephens, J. F. (1828). Illustrations of British Entomology. I. 16.
- Turati, E. (1924). Spedizione Lepidotterologica in Cirenaica, 1921-1922. *Atti. Soc. It. di Storia Nat.*, **63**: 21-191
- Turati, E. (1925). Missione Zoologica del Dr. E. Festa in Cirenaica: Lepidotteri. *Boll. Mus. di Zool. ed Anat. comp. della R. Univ. Torino*. **39**: 1-9.
- Tyakac, J. (1947). *Pieris brassicae* L. gen. aest. *Lepidii* Rob. ab. *obenbergeri* N. ab. *Acta Soc. Ent. Czech.*, **44**: 119.
- Verity, R. (1905-11). Rhopalocera Palaearctica. Florence, 1905-1911.
- Verity, R. (1916). The British races of Butterflies: their relationships and nomenclature. *Ent. Rec. and J. var.*, **28**: 97.
- Verity, R. (1919). Seasonal Polymorphism and races of some European Grypocera. *Ent. Rec.*, **31**: 87-89.
- Verity, R. (1947). *Le Falfalle Diurne D'Italia*. Vol. II: Papilionida. Casa Editrice Marzocco, Firenze.
- Walcourt, E. de H. B. (1920). Présence d'un point noir dans l'espace compris les nervures 3 et 4 du dessus des ailes postérieures chez les ♀ de nos trois Pierides communes. *Rev. Men. Soc. Ent. Namur.*, **20**: 15-16.
- Wilde, H. (1957). Ein interessanter Zuchterfolg bei *Pieris brassicae* L. *Ent. Zeits.*, **67**: 257.
- Zeller, P. C. (1847). Über die auf einer Reise nach Italien und Sicilien beobachteten Schmetterlingsarten von P. E. Zeller. *Isis*, **3**: 214-233.

OCYUSA NITIDIVENTRIS (FAGEL) (COL., STAPHYLINIDAE)

NEW TO BRITAIN

by S. A. WILLIAMS

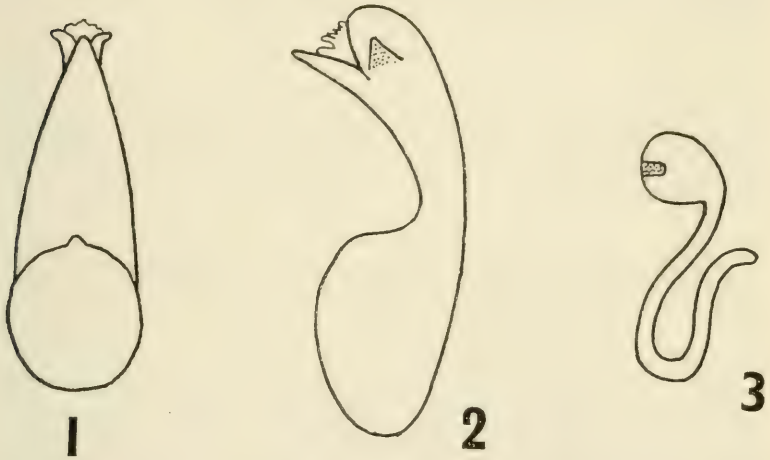
(79 Cedar Drive, Sutton at Hone, nr. Dartford, DA4 9EW, Kent)

In 1965 Dr. R. O. S. Clarke gave me a specimen of *Ocyusa* that he was unfamiliar with. It was collected from under a stone at Ringinglow, near Sheffield, on 6th November 1964. It was unknown to me and not referable to any British *Ocyusa*, but eventually after much correspondence with entomologists and institutions in this country and abroad, it was determined as *Ocyusa nitidiventris* (Fagel). This insect was first described from specimens collected in Spain (Madrid and Castille) and was originally placed in the genus *Cousya* (Fagel, G., 1958, *Bull. Ann. Soc. R. Ent. Belg.*, **94**, IX-X: 247-8).

In addition to Dr. Clarke's specimen, I have now seen examples of *nitidiventris* from four more localities in Britain (and three localities in West Germany) as follows: Oxford, Washford, 26.v.1925, 1 ex. (Cameron coll.); N. Devon, Braunton Burrows, iv.1928, 1 ex. (K. G. Blair); Kent,

Maidstone, 30.v.1975, 6 exs. in pitfall traps at Lees chalk pit organised by The Institute of Terrestrial Ecology and Mr. E. G. Philp; London, S.E.7, Charlton, 14.v.1977, 1 ex. (A. A. Allen) at the roots of herbage on dry heathy ground above the old sandpits. From the evidence available it appears to favour dry habitats on well drained soil.

When compared with other species of the genus, *nitidiventris* is readily recognised by its general, rather narrow appearance and in particular by its strongly convex pronotum, which is clearly narrower than the elytra. However, such a comparison is made difficult by the rarity of *O. defecta* Mulsant and Rey and *nigrata* (Fairmaire and Laboulbène) which are unfortunately the two insects that it most closely resembles (particularly *nigrata*). *O. defecta*, for instance, has only been taken twice in Britain and for the present work it proved easier to obtain continental examples. Specimens of *nigrata* are easier to refer to as there are a few in the British Museum (Nat. Hist.).



Figs. 1-3. *Ocyuca nitidiventris* (Fagel). 1, ventral view of median lobe of aedeagus, 2, lateral view of same, 3, spermatheca.

The following key will help separate *nitidiventris* from *nigrata* and *defecta*:—

- 1 Pronotum strongly convex, longer than broad (6:5) or quadrate, clearly narrower at the shoulders than the elytra, with or without a small depression opposite the scutellum; elytra at the suture no longer than the pronotum (body shining, usually with strong, more diffuse punctures on the elytra and terga, those on the disc of the elytra separated by about two diameters). Length 2.5-3.2 mm. *nitidiventris* (Fagel)
- Pronotum flatter, less convex, quadrate only slightly narrower than the elytra at the shoulders, with or without a distinct depression opposite the scutellum; elytra at the suture longer than the pronotum

- 2 Pronotum with a distinct depression opposite the scutellum; body shining; puncturation as *nitidiventris*. Length 2.5-3.2 mm.
 *nigrata* (Fairmaire and Laboulbène)
- Pronotum without a depression; body less shining; elytra and terga with weaker, closer punctures, those on the disc of the elytra separated by about one diameter. Length 2.3-2.5 mm.
 *defecta* Mulsant and Rey

O. nitidiventris is readily separated from the remaining two species in the genus *maura* (Erichson) and *hibernica* (Rye). *O. maura* has the fourth antennal segment longer than broad, whilst in *nitidiventris* it is transverse or at the most quadrate, also the punctures on the pronotum are much closer than on the elytra, whilst in *nitidiventris* they are more diffuse. The long hind tarsi will readily distinguish *hibernica*. The male of *nitidiventris* has the eighth sternite prolonged a character shared with *hibernica*.

I have not had sufficient material to study the genitalia of all the critical species, however in the single female of *nigrata* that I have been able to examine the spermatheca is very similar indeed to that of *nitidiventris*.

ACKNOWLEDGEMENTS

I am indebted to the following for their kind help: Mr. A. A. Allen, Mr. L. Baert of the Institut Royal des Sciences Naturelles de Belgique, Dr. G. Benick, Dr. R. O. S. Clarke, Mr. P. M. Hammond of the British Museum (Nat. Hist.), Mr. C. Johnson of the Manchester Museum and Dr. G. A. Lohse.

CHANGES IN LONDON'S INSECT FAUNA IN THE LAST 100 YEARS

by ALAN E. STUBBS

(Nature Conservancy Council, 19-20 Belgrave Square, London SW1X 8PY)

When invited to contribute to a London Natural History Society symposium on this theme in 1976, my preparation soon made me realise how little information was readily available beyond pure guess-work. I found myself speaking of a major city which, for well over a century has had the greatest concentration of active field entomologists anywhere in the world. Generations of us have our interest kindled, often in our youth, by the fascinating creatures we found sharing our urban existence, and have developed our knowledge of them by studying the insects on our door-step. Yet past generations have left us a very inadequate record.

As a Society our records, as at field meetings, focus on the countryside to which we escape, though the 'field' begins in our garden or even within our houses. The topic seemed eminently suitable for a discussion-meeting; it took place in the Society's rooms on March 24th 1977 and our official Proceedings (10: 108) gave it a bare three lines; but the contributions I hope, deserve a fuller, permanent record. There has been a growing feeling within the Society that some such meetings should be reported in our Proceedings for the benefit of both full and country members. Whilst those of us living in London sometimes envy people in the country, perhaps at least we can show them that the capital is an interesting place for the entomologist.

The opening address was directed at inner and true suburban London and has here been supplemented by detail left out of the talk. The discussion ranged into the countryside fringe, generally keeping within the L.N.H.S. 20 mile radius of St. Pauls. Contributions have been rearranged to some extent to keep themes grouped together and some of the discussion which continued informally after the meeting has been included. On occasion editorial comment is added in brackets.

OPENING ADDRESS ILLUSTRATED BY SLIDES

London, even inner London, is not without a great deal of interest and one can readily think of other cities and urban areas where the entomological interest may be much poorer. The nearest most Londoners get to realising the existence of insects is seeing a show case of tropical butterflies for sale in Knightsbridge, yet little does the general public realise that large spectacular native insects thrive within the heart of the capital.

Thinking back to the London of 100 years ago, the greatest change we would notice is that the horse was the main means of transport on the streets. We can still see the old stables, now converted to garages and flats in the mews behind impressive frontages of Victorian buildings. There must have been many interesting insects in and around horse manure and hot straw. We seem to have no record, but Mr. E. Bradford has suggested that the micro moths *Pyralis farinalis* (L.), *Hypsopygia costalis* (F.) and *Trichophaga tapetzella* (L.) should have been common yet now they are rarities. The few central London stables are no doubt rather too hygienic nowadays.

Our own homes and gardens provide a major sanctuary for insects. With growing hygiene conciousness and our use of DDT and other insecticides, the insects in our homes may have decreased. It has been said that the flea suffered a major setback with the introduction of the vacuum-cleaner in the 1920's since the eggs and larvae were less successful in escaping attention in carpets and crannies. The bed-bug is now a rarity though I have not heard any hemipterists bemoaning the fact. The house fly, *Musca domestica* L., which as late as the 1940's and 50's was presented as the scourge of mankind is in relatively low numbers in most parts of London today. Perhaps the DDT campaign assisted in the decline, but my own childhood memory was that such flies, though possibly not this species, were abundant in the house in the post-war era of keeping chickens in our garden, and their decline was rapid once this form of mini-farming ceased.

Gardens are of many different ages and types and the variety of building development in and around London must contribute to the diversity of insects. My own garden in Hanwell, Middlesex, was of the 1920's era yet only a mile away friends with late 1800's gardens were getting very different moth faunas in the mid-1950's. Within central London, the garden of Buckingham Palace has yielded many interesting insects, including 500 species of lepidoptera. Among the many native moths, Dr. J. Bradley has recorded additions to our London fauna such as *Monochroa hornigi* (Staudinger) found nowhere else in Britain and *Caloptilia azalela* (Brants) which established on the Azaleas in 1972 and is otherwise only known on the outskirts. However, most Londoners have modest estates but because of the limes in the streets and the sorts of trees and plants in our gardens, even the general public stumbles across Lime Hawk *Mimastilia* (L.), Privet Hawk *Sphinx ligustri* L., Eyed Hawk *Smerinthus ocellata* (L.) and other large exotic-looking species, besides a wealth of small insects which often remain unseen and unrecorded even by entomologists. The

sorts of plants which are popular with gardeners must fluctuate enormously over the years and this in turn must affect the occurrence and abundance of certain species. Larkspur is currently quite popular and it supports the Golden Plusia moth, *Polychrysis moneta* (Fab.), first recorded in London in 1892 after its discovery as a British species in 1890. The leaf-mining fly *Phytomyza aquilegiae* Hardy on *Aquilegia* is locally common, yet native wild plants are rare in the countryside around London.

Modern housing design is often not only devoid of human values but also of insect values as well. The tower block with its surrounding mown lawns is an impoverished area for insects. The open-plan front lawns of modern housing estates also lack the character of former London suburbia. As land values rise, there is increasing pressure for the grounds of large houses to be broken up as small housing lots for office blocks and other developments. Thus the character of London is changing, and the insects often lose out.

One should not forget communal gardens in the form of allotments. These have been a major feature of suburban London. Since the second world war there has been a decline in their use so that many acres of wilderness were available to insects. By the late 1960's they were being sold off as building plots but the down-swing in the state of the nation's economy has encouraged again a renewed enthusiasm for cultivating allotments.

The use of insecticides since the war must have had a profound but unknown effect. To some extent the layman now realises that destroying predator as well as pest is not a good thing and manufacturers are becoming conscious of the need to make safer and more specific sprays.

Our squares and parks are a famed feature of London. Many of these areas must have changed enormously over the last 160 years. We are now familiar with the mown lawns, even for an area the size of Hyde Park, and many exotic trees and shrubs are planted. Some of the introduced plants are virtually useless to insects, for instance the London Plane is renowned for the Vapourer Moth, *Orgyia antiqua* (L.), and (*) little else, but other introductions such as the Lombardy Poplar have been readily colonised by a rich native fauna including large species such as the Poplar Hawk, *Laothoe populi* (L.) and Puss moth, *Cerura vinula* (L.). Innumerable species have colonised London because of the very artificial conditions, including for instance the hot house and other insects at Kew Gardens. Waste ground is a widespread feature within London, but its abundance has varied and seems to be declining. The bomb sites of Cripplegate were surveyed by London Natural History Society and as a result there is a record of the rich variety of insects which took advantage of new patches of weeds; the Elephant Hawk, *Deilephila elpenor* (L.) was one of the more spectacular species to become abundant. The environment was, however, a demanding one with high temperatures and arid conditions such that sawflies and various other insects did not establish themselves in the same variety as Lepidoptera. Apart from temporary sanctuaries on idle building sites there are fewer such opportunities now. Until recently rubbish dumps were widespread in the suburbs and provided excellent places for both plants and insects; species such as the House Cricket, *Acheta domestica* (L.),

[**Acrionicta aceris* (L.) was also characteristic before world war one, but has survived in Inner London less well than the tree.—Editor.]

were locally abundant. In recent years less land-demanding forms of waste disposal have become employed and our tips are often grassed over to make way for football fields and other uses. However, despite this decline, waste ground is still plentiful in the suburbs to anyone prepared to search out odd corners.

London has undoubtedly gained many species over the last 100 years and several species have already been mentioned. Some reflect a general establishment in the south-east. For instance the Scots Pine is said to have been an introduction into southern England early last century, so now with pines planted in London, the Pine Hawk, *Hyloicus pinastri* (L.) has established itself. However, in other cases one does not know whether there is a loss or gain, as with the various flies and beetles associated with large mammal burrows. The rabbit has declined and is now mainly a surface dweller but the fox has in recent years become strongly established and to a limited extent provides another set of burrows. Rabbit fleas are presumably scarcer.

Some of the gains have used London as a springboard for invading other parts of the country. Mr. P. Hammond has already spoken to the Society about such introduced beetles as *Aridius bifasciatus* (Reitter); it is possible to produce maps with rings around London showing the dates of its progressive radiation outwards. The case of the Waved Black Moth, *Parascotia fuliginaria* (L.) is less clear. It was first found in London Docks and later turned up on previously well-known heathlands in Surrey and more recently further afield. Whether this is a real spread or simply lepidopterists getting their eye in is difficult to say. Some additions to London's fauna have been through taxonomic advances and the realisation that one species is in fact two. Undoubtedly there have been losses; but these are not always easy to prove. The Great Green Bush Cricket, *Tettigonia viridissima* L. once lived on Battersea marshes, and we have certainly lost it, perhaps in this century. Species living in ponds and canals have lost much of their habitat due to infilling, pollution and over-enthusiastic amenity management, including overstocking with ducks and fish. The London Naturalist compilation of dragonfly records published in 1948 has been well outdated by further declines.

We are today witnessing one of the most serious natural losses, which could not have been predicted even 10 years ago. The Elm, such a dominant feature of many parts of London and its suburbs is seemingly doomed by dutch elm disease and with it the rich fauna it supports. The White-letter Hairstreak, *Strymonidia w-album* (Knoch), which at last has become common in parts of the London fringe has its days numbered. The White-spotted Pinion, *Cosmia diffinis* (L.) and Lesser-spotted Pinion, *C. affinis* (L.) occur well within London, and these too have no other foodplant. The nationally rare hoverfly, *Mallota cimbiciformis* (Fall.) was known to have been breeding in elm rot holes in Hyde Park in 1953 and may well have continued until the elms were removed. In some parts of London the Stag Beetle, *Lucanus cervus* (L.), has been thriving on elm, so local decline may be imminent though fortunately in some other areas of London it must be dependent on other trees. The only hope for the foliage-feeding species is to adapt to the small sucker growth which locally remains and is apparently able to withstand the disease.

There are species which have become adapted to London. Perhaps this is a common feature at an unrecognised physiological level but it is easiest to appreciate with so-called industrial melanism. The Peppered Moth,

Biston betularia (L.) is the best known example, but there are of course a number of other moths with the same genetic trait. There seems to be no record of the date of first appearance of black Peppered Moths in London but it may well have been about 100 years ago.

Some gains are transient. For instance, the migrant butterflies appear in greater or lesser numbers from year to year. Others may or may not be here to stay, such as the Speckled Wood, *Pararge aegeria* (L.), which in the last few years has appeared even in St. James' Park. Examples of the latter type may simply be a reflection of a good summer or two, since in 1976 Meadow Brown, *Maniola jurtina* (L.), and other butterflies have appeared in gardens where they were not seen before.

It is tempting to look forward into the next 100 years but we can probably no more predict the appearance of London in the year 2077 than could the first members of our Society have foreseen the nature of London today. We can, however, suggest future trends which we regard as useful and perhaps influence planners and others who are beginning to think in terms of urban conservation. We know that we would like to see our few remaining wild inner London commons remain wild rather than be reduced to mown lawns with a few planted exotic trees. The trees that are planted in parks should include native species and if they are to be exotic, then why not those which will support a wide range of interesting native insects such as the Lombardy Poplar. At last planners are questioning the wisdom of tower-block planning, with associated sterile lawns, and we would no doubt wish to associate ourselves with those who prefer more traditional housing with gardens. The provision of wilderness-areas for playgrounds and walking, instead of a monotonous green carpet, seems sensible and can we not have a more natural treatment of ponds and lakes? To keep Britain tidy, at vast public expense, may not always be necessary or even desirable, and is detrimental to wild flowers and those interesting beasties associated with them. Many children are encouraged to find interest in the insects of a fantasy nursery world, yet it is only a few of us who keep that interest alive into the real world of creatures of equal fascination around us. Since future members of the Society will often be brought up, and live the rest of their lives, in urban areas, perhaps we should ensure that London, and other places, in which we live and work, do remain fascinating places for the entomologist.

DISCUSSION

MR. C. O. HAMMOND spoke of the loss of aquatic insects and the destruction of terrestrial habitat. Dragonflies had become much scarcer, even common species such as *Pyrhosoma nymphula* (Sulzer) suffering from the slightest pollution. However, he noted that *Ischnura elegans* (Van der Liden) was one of the few to be tolerant of mild pollution and as a consequence it is now becoming widespread. He predicted that other insects may adapt to pollution in time. On the Basingstoke Canal, Surrey, 40 years ago there were 23 species of Dragonflies, today these are reduced to about 3 and the present drastic 'improvement' may see the loss of even these. The dipterous fauna of his home ground at Wood Green, North London was illustrated in a series of slides. In the immediate post-war period two-thirds of the insects pictured in his book 'Flies of the British Isles' were taken within a few hundred yards of his home; today he would find only one-sixth — a ratio of 4:1. One of the worst events was spraying of stinging nettles in Scout Park since the herbicide seeped into an excellent pond,

and he had never since seen attractive aquatic species such as *Oxycera trilineata* (Fab.), *O. pulchella* Mg., *Odontomyia viridula* (Fab.), *Stratiomys potamida* (Mg.) and *Sepedon spegea* (Fab.). Though the pond had recovered, it was so isolated within an urban area that recolonisation by these scarce flies seems unlikely. The ground surrounding the pond used to contain 100 species of wildflowers, but spraying and mowing has reduced the flowers; and terrestrial diptera such as *Xanthogramma pedissequum* (Harris), *Coremacera tristis* (Harris) and *Physocephala rufipes* (Fab.) are no longer found. At Bookham Common, Surrey, he blamed cutting and burning of sensitive areas as the reason for the loss of the rare parasitic flies *Alophora hemiptera* (Fab.) and *Gymnosoma rotundatum* (L.). However, he admitted some gains, even at Wood Green. A slide showed a press cutting '*Volucella zonaria* (Poda) found in Wood Green' and in 1960 readers used to headlines of murder, robber and rape would be relieved to find it was a large harmless wasp-like hoverfly; it has bred ever since in this area and become common in S.E. England. A related species which also breeds in wasps' nests *V. inanis* (L.) has established in the last ten years. The dragonfly *Aeshna mixta* Latr. was a rare immigrant in Britain until 40 years ago when it was first found breeding. It is now quite common all around the London area.

The President, Mr. R. TUBBS, felt that we should do more to encourage those responsible for the management of commons. This led Mr. S. N. JACOBS to comment on the declining value of Hayes Common, Kent, due to bracken invasion; it was probably too late to anything now.

Mr. K. EVANS reported the loss of the Chalk form of the Silver-studded Blue, *Plebejus argus* (L.) form *cretaceus* Tutt, from east Surrey due to land-use change.

The President asked if anyone had surveyed Beddington Sewage Farm, Surrey in view of its apparent natural history value. Mr. K. EVANS said that only casual recording had been carried out by lepidopterists, but he agreed the site ought to have an interesting fauna. Mr. A. M. HUTSON referred to the extensive collecting by the late L. Parmenter who found a rich dipterous fauna there in the 1950's, but unfortunately the area is now drastically changed and the water meadows have gone.

Mr. N. COOKE spoke of the value of ivy on old brick walls since at times, as when in flower, large numbers of insects congregate about this plant. Dr. C. G. M. DE WORMS spoke of his experience as L.N.H.S. recorder of Lepidoptera for the past 25 years. He felt the picture was not black and that the position was more positive than negative. Three-quarters of the British macro-lepidoptera have been taken in the London area and the list is increasing. The plentiful parks inside London were still good sanctuaries. A moth trap run by Bushby at the Zoological Gardens had produced remarkable results in the early 1950's, as had Dr. Bradley's survey at Buckingham Palace where, for example, the occurrence of buckthorn-feeding Geometridae was unexpected. Inner London squares have been producing much more in recent years, for instance south-coast species such as the Varied Coronet, *Hadena compta* (D. & S.) (which feeds on Sweet William) have arrived. In reference to outer London, he said that there had been more Purple Emperor, *Apatura iris* (L.), at Bookham Common in 1976 than ever before.

The Goat Moth, *Cossus cossus* (L.), received several comments as a result of Dr. de Worms finishing by saying that it was once a common

insect of outer London and that he suspected that infected trees had been removed as a hygiene measure by local authorities. Mr. K. EVANS said he had never seen the Goat Moth in the London area (he has recently completed a survey of east Surrey including suburbia). Mr. E. WILD said that he formerly found larvae at Mitcham and Croydon, but there has been no sign of the species in the last 30 years. Mr. J. M. CHALMERS-HUNT had never seen the species in the London area but he knew of a report of larvae in a tree that was cut down in Regent's Park in 1860 which, according to J. R. Hind, "laid open a 'grubbery' of about sixty larvae, some two dozen of which were handed over to me in a flower pot. The ensemble formed quite a nosegay. The man who operated on the tree said he was almost stifled when he first disturbed their privacy" (*Entomologist's Weekly Intelligencer* No. 236: 19-20 (1861)).

Mr. B. K. WEST reported that in the early 1950's *Cossus* was strongly established by the A2 road at Bexley, Kent in Balsam Poplars. Infestation was so heavy that the tops of the trees were completely dead above 30 ft. and he had on one occasion found 100 larvae and an evening visit would reveal up to six moths. The trees were cut down by Kent County Council. (A. STUBBS found six larvae in an oak just east of Southall, Middlesex, in 1958. The tree was cut down the following year to make way for an electricity sub-station. A golf course a mile away had live oaks which had clearly been heavily infested in the past. He has never been able to find an infested tree in the London area since).

Mr. CHALMERS-HUNT was able to give two examples of micro-moths where the best chance of finding the species is in London. The Tineid, *Triaxomasia caprimulgella* (Stainton) occurs in Hyde Park (breeding in decaying wood) and *Glyphipteryx linneella* is found on lime bark in such localities as St. James Park. He also knew of several species which were spreading within the London environs from Kent in recent years, such as the Least Carpet, *Idaea vulpinaria* (H.-S.). Other species are spreading in from the west. Mr. K. EVANS remarked on the appearance at Croydon in the last 5 years of the Black Rustic, *Aporophyla nigra* (Haworth). He commented that whilst minor ecological changes must affect some species, others just seemed to keep going regardless. Mr. G. PRIOR gave further example of a moth which in his experience was easier to find in London than outside. The Toadflax Paug, *Eupithecia linariata* D. & S.) and its host plant were plentiful within N.W. London. Emphasis was placed on the importance of abandoned railway lines, shunting areas and other waste ground for insects in London. He spoke highly of the squalid areas in the Boroughs of Harrow and Brent such as Neasden.

The clearwing moths of N.W. Kent provided a tale of woe. Mr. B. K. WEST spoke of his experience of the mid 1950's compared with the present day. The Hornet Clearwing, *Sesia apiformis* (Clerk), used to be in pollarded black poplar, but is gone. The Red-belted Clearwing, *Conopia myopaeformis* (Borkh.), was on apple trees; the trees are still there but the moth has gone — perhaps parasites are to blame. The Currant Clearwing, *Synanthedon salmachus* (L.) seems now absent, despite searching. In some unrelated moths, a similar loss has occurred, as with the Black Arches, *Lymantria monacha* (L.), which used to occur at Bexley, and the Rosy Marbled, *Elaphria venustula* (Hübner), has gone from Joyden's Wood. Mr. CHALMERS-HUNT provided some reassurance by saying that *C. myopaeformis* probably still occurs at Wood Green, North London. Mr. WEST also mentioned that the Brown-tail, *Euproctis chrysorrhoea* (L.), is spreading.

In the last 3-4 years it has crossed to the west of the Darent River near Dartford, Kent and is also now in the local parks at Barking, Essex. Dr. Bradley commented after the meeting, that this species has started to turn up at Buckingham Palace.

Industrial melanism attracted comment. Mr. A. A. ALLEN referred to recent studies on *Biston betularia* in the Liverpool-Manchester area which showed a small increase of the typical form following reduction of air pollution. Mr. WEST had noticed some increase in the typical form in London, but in 1976 there were more melanies than usual which evened out the situation to one of no change. In the late 1950's the black form of the Pale Brindled Beauty, *Apocheima pilosaria* (D. & S.) was abundant in Joyden's Wood, Kent, but this form has now been replaced by a dull dark form. After the meeting Dr. Bradley mentioned that he too had found an increase in typical *B. betularia* until 1976 when 95% were black at Buckingham Palace (possibly a drought related effect).

Mr. E. WILD has collected in the Croydon area for 50 years and currently lives at Selsdon. Several species had only appeared in the last 15 years, including the Pale Shining Brown, *Polia bombycina* (Hufn.), which is currently on the increase; *Entephria flavicincta* (Hub.), which has occurred over the last 6 years; *Aporophyla nigra* (Haw.) ♀ and the Alder Moth, *Acrionicta alni* (L.), which is spreading into the suburbs. The Alder Kitten, *Harpyia bicuspis* (Bork.), now occurs at Limpsfield and seems to be moving into suburbia. The Heart and Club, *Agrotis clavis* (Hufn.), is generally thought of as a coastal species but last year there were 500 recorded to light at Selsdon. *Idaea vulpinaria* is moving up the Wandle Valley., presumably coming from Abbey Wood, Kent; and *Ostrinia nubilalis* (Hubn.) is now common. The Garden Dart, *Euxoa nigricans* L., is an example of a species occurring in gardens and allotments but rarely in the countryside; last year it was plentiful and very variable. Among the declining species around Croydon are the *Cerura vinula* which is now less common and *Orgyia antiqua* of which very few are now seen. Mr. Chalmers-Hunt however, stated that the last species is still abundant within central London, probably being more common here than anywhere else in Britain.

The President commented on the loss of the Brayling, *Hipparchia semele* (L.) from Wimbledon Common. In his experience Mitcham Common was the best place in Britain for varieties of Small Copper, *Lycaena phlaeas* (Fab.). The status of the Stag Beetle was taken up by several people. Mr. EVANS said that despite the millions of tons of concrete dominating the redevelopment of Croydon, this insect occurs in profusion and it seems quite happy in the now small gardens and odd corners. The opening speaker was prompted to cite the late A. E. Gardiner who considered it was quite happy burrowing through the subterranean parts of fence posts. The fences of Croydon are apparently still standing! Mr. JACOBS once found 13 young larvae in an oak post in his garden. After the meeting, Mr. A. WEAL spoke of fluctuating numbers in the still frequent population at Chingford. He remembers a particular abundance in 1953 when he picked up 50 quite casually. In Epping Forest, only 3 miles away, it is doubtful whether there is a single authentic breeding record. According to the local press the Chingford variety has the habit of hovering with a glaring gaze and then pouncing on old ladies (recorded here for posterity, should habits not change in the next 100 years).

The only other beetle to be mentioned was *Graphoderus cinereus* (L.), which Professor OWEN said had recently colonised Black Pond, Esher

Common, Surrey. Mr. B. JACKSON has lived 200 ft. up at the top of a tower block at Ilford and gave some interesting comment after the meeting following the introductory remarks about modern building design. Though the building was only 3 years old, the Marbled Beauty *Cryphia domestica* (Hufn.), was abundant, with larvae regularly walking in through the window. They were breeding in profusion on moss, an unusual foodplant. An m.v. light trap run on the roof was very productive, with Hawk Moths being common. The aculeate Hymenoptera were discussed by Mr. G. R. Else. Though collectors were few, there had been a succession of specialists in the London area such as Saunders, Shuckards, Smith, Enoch and more recently Guichard and Yarrow. Early last century, localities such as Highgate, Hammersmith and Battersa Fields, yielded interesting faunas but even by the 1860's Smith lamented the deterioration of Hampstead Heath. The latter locality lost 75 species by 1900 according to G. M. Spooner. During the second world war whole colonies may have been destroyed by digging for sand bags, but with some recompense that vertical sided sand pits offered a new habitat for nesting. Another well documented site is Bushy Park with over 140 species in a fauna which has seen both losses and gains. One species, *Ectemnius dives* (L. & B.) was possibly imported in timber and was first found in Britain in 1926 at Norwood; the species is now spreading in Southern England, perhaps along railway lines.

It was of interest to note that the Wood Ant, *Formica rufa* L. was recorded from Kensington Gardens in 1831 and from Hampstead Heath in 1839 since it is now absent from within London. Professor OWEN mentioned that it is still found on the Surrey outskirts at Oxshott.

Dr. B. MACNULTY drew attention to the important feature of London that its temperature is 3-4 degrees higher than the surrounding countryside which he considered attracted the moths in. He was critical of the liberal use of insecticide by gardeners and unlike some earlier speakers he considered that there used to be many more green patches than there are today. Professor OWEN said that he had found 20 species of beetle in his garden at Epsom which he had seen nowhere else. He continued that most people keep a record of what they find in their garden and such data would be of considerable historical value if only there was an archive where it could be lodged. This was a cue for Mr. J. HEATH, who recalled that the Biological Records Centre acts as an archive for all invertebrate data, regardless of whether a special scheme is operating or not.

CONCLUSIONS

Some very interesting points (raised by eighteen members) came out of the discussion. Many of the changes are due inevitably to the loss, alteration or pollution of habitat. Acquatic life in particular has suffered. Some other changes which have undefinable causes include losses such as the Goat Moth or gains in species showing expansion in range. Such categories of change are features paralleled in most parts of Britain and are by no means specific to London. It is no easy matter to recognise types of change which are unique to London. There are examples of insects which seem easier to find in London and its suburbs than in the countryside, and perhaps with more historical information we would have been able to recognise a growing adaptation of insects to urban life.

The subject is certainly of interest to London entomologists and in the year 2077 future members will be looking back to the record we have left them. The suggestion of archiving records from our gardens is worth further consideration by the Society, perhaps providing stimulus by promoting a

garden search year at 10 year intervals — that really would provide an historical record of immense interest to future generations of members. The need for recording level of abundance or scarcity is very apparent. It is hoped that the meeting will have made us aware of the sort of notes, exhibits and communications which we might offer to our Society in order to assist the record for the future.

PROCEEDINGS

Thursday 27th July 1978

The President, Mr. G. PRIOR, in the chair.

EXHIBITS

Dr. A. A. ALLEN. — A specimen of *Boloria euphrosyne* (L.) (Lep., Nymphalidae) taken at Arundel, Sussex, on 31.v.1978, of which the left hind-wing was one-third the usual size. Its flight had been unaffected and only on capture was abnormality discovered. Also two ♂ of *Limerodes arctiventris* (Boie) (Hym., Ichneumonidae) captured on 15.vii. 1978 at Arundel, Sussex, while flying over low scrub-land in the evening sun. Apart from the uncommonness of the species and the fact that its host is unknown, the exhibitor drew attention to the variable colouring of the abdomen, entirely black in one of the males exhibited, but (the more usual form) red-coloured in its apical part in the other. The exhibitor thought that collecting lepidoptera pupae in grass stems in the above locality might reveal which species was its host. He also showed some colour photographs from a book entitled "Insects" recently published by Time-Life in the Netherlands and particularly to the pictures illustrating experiments by Dr. Williams of Harvard University in 1942 on Robin moths, *Hyalophora cecropia* (L.) during metamorphosis.

Mr. G. PRIOR — Four larvae of *Eupithecia lariciata* (Freyer) (two from Royston, two from Watlington) showing extremes of dimorphism (brown and green forms).

MEMBERSHIP

Mr. G. M. BURTON, his name having been read for the second time, was duly declared elected a member.

COMMUNICATIONS

Mr. G. PRIOR reported that a couple of *Eupithecia absinthiata* (Clerck) had remained in cop. for three days, whereas a few hours was normal in this genus.

Mr. R. S. TUBBS had found a concentration of *Aphantopus hyperantus* (L.) ab. *arete* in a wood near Winchester and had obtained ova from a female of this form, which lacked white rings on its underside.

Slides were then shewn by Messrs. Agassiz, Ashby, Allen, Merrifield, and Wiltshire. At the end the President said that it was regrettable such an interesting lot had been shown to so small a house and suggested that some of the slide-exhibitors might give a full-length talk on their photographs and there would then be time for a full-length discussion of the topics evoked. This was with reference to Mr. Ashby's stimulating pictures of experiments of letting moths settle on backgrounds of their own choosing, which appeared relevant to the problem of procrystis and how the moth orientated itself to take advantage of its own markings. The Rev. D. Agassiz shewed, among other subjects, aquatic greenhouses where exotic moths had been found breeding which were resistant to spraying; Dr. Allen, endo-parasites on Lepidopterous larvae; Mr. Merrifield, habitats

and insects at Bovey-Tracey, Devon; and Mr. Wiltshire, larvae and pupae of *Nymphalis polychloros* (L.) and other species of lepidoptera.

Thursday 14th September 1978

The President, Mr. G. PRIOR, in the chair.

The President announced with regret the deaths of three older members: Messrs. C. Wainwright, a member since nearly fifty years; L. W. Siggs, since thirty years; and R. C. R. Crewdson, since 1933; the last-named having presided over the Lancashire and Cheshire Entomological Society, for many years.

EXHIBITS

Dr. A. A. ALLEN — Living larvae and five females of *Paracystola acroxantha* Meyr. (Lep., Oecophoridae) all captured at roof-top light at Dawlish, Devon in late July or early August; a ♂ seen unfortunately escaped. Sixty-six ova were obtained from the captured moths. About one-third were put into cold storage, but the others hatched in mid-August. *Eucalyptus* was offered as a pabulum and was readily accepted by the newly hatched larvae, thus providing the first record of the species' food-plant. While still in Devon the exhibitor was able to continue to provide this tree's foliage. The larvae fed gregariously in groups of six to seven, eating the outer surface of the leaf and living in the eaten depressions which were spun over with grey silk. After their first meal the larvae changed colour from whitish to pale greenish with a shining brown head. They became very active if the leaf on which they fed was turned upright but always returned to the feeding web. One or two larvae preferred to eat at the base of a shoot of *Eucalyptus* but this was exceptional. Bay and palm foliage were also offered but not eaten. However, on 13.vii a few larvae were observed to be feeding at the edge of a leaf of a *Berberis* sp.: this proved later to be a secondary foodplant, the first choice remaining *Eucalyptus*. A few were now as large as 7 mm. in length and were more solitary when exhibited. They sometimes ate withered *Eucalyptus* leaves but preferred fresh ones. A few of the eggs from cold storage hatched and the larvae fed slowly in the same manner. As the exhibitor had now obtained nine specimens of this moth in three consecutive years he considered that this showed *P. acroxantha* to be established in the Dawlish area. He acknowledged gratefully the assistance of the guest-house proprietress in Dawlish, especially for the delivery, after his departure and return to Reigate, of fresh foliage of *Eucalyptus* to him there.

Dr. ALLEN also exhibited a male *Hoplismenus bidentatus* Gmelin (Hym., Ichneumonidae) captured flying low over wild herbs on Hackhurst Downs, Gomshall, Surrey, 16.vii.1978. The species, which has been recorded as a parasite of Vanessa and Satyrid butterflies, appears to be rare. An additional point of note was that the key from which it was determined contains an apparent error: the hind tibiae of the male are stated as being ivory, whereas the exhibited example and a few ♂ specimens in the National collection (B.M.N.H.) all had entirely black tibiae, but all had the 3rd and 4th segments of the hind tarsi ivory, together with all of the 2nd segment except for the extreme base; the extreme base of the 5th tarsal segment was also ivory. Presumably one should read tarsi for tibiae in the key.

H. N. E. ALSTON and A. J. HALSTEAD — (i) *Bruchidius dorsalis* Fahr. ((Col., Bruchidae) (the Gleditschia seed-beetle); these began emerging in April from seed pods collected in Rome, Italy, December last year. The host plant is a *Gleditschia* sp., probably the honey locust, *G. triacanthos*.

which is a N. American tree grown in Europe for ornamental purposes. This and other *Gleditschia* spp. are grown in Britain but they rarely set seed here, so this bruchid beetle is unlikely to be found here, except in imported seed. The beetles have bred and produced a second generation in the dry seeds. Attempts at rearing them on pea, broad beans and french bean seeds were unsuccessful. (ii) Knopper gall on oak, cause by *Andricus quercus-calicis* Burgsd. (Hym., Cynipidae), a comparatively recent addition to the range of cynipid gall-wasps attacking oak (*Quercus robur*) in this country. It has occurred in the Channel Isles for many years but was not recorded on the British mainland until 1961 when it was found in Northamptonshire. It remained scarce at first but after 1970 began to spread and has now become quite common in parts of Surrey and is also recorded from Devon, Somerset, Wilts., Warwick, Leics., Beds., Norfolk, Essex, Glos., Hants., Herts., Lincs., and Suffolk. Eggs are laid in the developing acorns which become converted into thick-walled, domed structures. Each gall contains a single, thin-walled, larval chamber. When galls first appear in August, they are yellowish green and sticky; later they become dry, brown and woody. The galls fall to the ground in the autumn and the larva pupates inside the gall. On the Continent, females emerge in the spring and lay eggs on the catkins of Turkey oak, *Quercus cerris*. These catkin-galls give rise to both males and females which, after mating, produce the acorn knopper galls. Many oak cynipid wasps have a life cycle that involves an alteration between sexual and asexual generations causing different types of gall, and in some of these species the sexual generation is not obligatory.

Lt. Col. A. M. EMMET — *Caloptilia rufipennella* (Hübner.), new to Scotland, four adults reared 16-19.viii.1978 from larvae taken on 19.vii.78 in Yair Hill forest, Selkirkshire. Larval cones were also observed on sycamore (*Acer pseudoplatanus*) in Northumberland (VC68); Dumfriesshire (VC72); Peebleshire (VC78); and Berwickshire (VC81). The species has hitherto been recorded only from Essex, Cambridgeshire, Norfolk, Suffolk, and Lincolnshire. Also larval mine and folded leaves of alder (*Alnus glutinosus*) taken beside Loch Lomond in Dumbartonshire. These apparently show the feeding of *Caloptilia falconipennella* (Hübner.), a species not recorded from Scotland. The map reference of the locality is 27/3203. Maps were also shewn of the distribution of both moths in the British Isles.

I. SIMS — A variety of *Acasis viretata* (Hübner.) (Lep., Geometridae) taken at Rothamsted Light-trap site no. 305, Chigwell Row, Essex, on 8.viii.1978, also a more typical example, taken in the same trap on 30.vii.1978, for comparison.

P. A. SOKOLOFF — examples of the dusky thorn (*Ennomos fuscantaria* (Haw.)) from Orpington, Kent, including an aberration in which the two cross-lines of the fore-wing are missing.

MEMBERSHIP

The obligation book was signed by Mr. A. J. Halstead.

COMMUNICATIONS

R. S. BRETHERTON reported that migrants were few this year in both Surrey and Devon. Other members also reported rather similarly.

J. M. CHALMERS-HUNT reported that a reliable observer had seen one example of *Nymphalis antiopa* (L.) in Kent; he and Dr. ALLEN reported that *Argynnis paphia* (L.) was flying as late as September (Breconshire and Haselmere respectively); but Dr. I. WATKINSON reported that he had seen one example of a second brood of *Diaphora mendica* (Clerck) in Kent, an exceptional occurrence.

Dr. A. A. ALLEN then gave an illustrated talk on "An outline of the biology of the Ichneumonidea, with particular reference to those parasiting Lepidoptera". This began by mentioning the two families composing the superfamily and the venational and abdominal characters thereof. Various aspects of the biology were expounded, and the lecturer ended by appealing to lepidopterists to retain their bred parasites.

28th September 1978

The Vice-President, The Rev. D. J. L. Agassiz in the chair.

EXHIBITS

Dr. A. A. ALLEN — Two ♂ examples of *Syzeuctus maculatorius* (F.) (Hym., Ichneumonidae) swept from heather on moorland near Dawlish, Devon, 5.viii.1978. A third ♂ was similarly obtained 11.viii.78. The species appears to be rare, nearly all the records coming from heaths around Swanage, Dorset. The only host from which it has been recorded is *Oncocera genistella* Dup. (Lep., Pyralidae). The species is most distinctive with black and bright yellow contrasting colours and apically infumated wings.

J. M. CHALMERS-HUNT — A larva taken at Dungeness on 19th September which other members identified as an immature *Lasiocampa quercus* (L.) (Lepidoptera).

Lt. Col. A. M. EMMET — Larval feeding believed to be that of *Epinotia fraternana* (Haworth) on *Abies grandis* collected at Chalkney Wood, Earls Colne, Essex, 26.ix.1978.

C. O. HAMMOND — A specimen of *Strangalia aurulenta* (F.) (Col., Cerambycidae) from Stover Lake, Bovey Tracey, Devon; collected on 21.viii.78, this striking beetle was flying in circles above birch-logs which had been put down over a marshy spot at the end of the lake.

MEMBERSHIP

The following, their names having been read for a second time, were duly declared elected as members: — Miss L. Vigne, and Messrs. J. J. Taylor, S. F. Taylor, F. R. Pratt, M. D. Laux and K. D. Z. Samuels. The obligation book was signed by Messrs. P. Jewess and M. R. Brown.

ANNOUNCEMENTS

Mr. J. HEATH said that the European Lepidopterists' Society, of which he himself was the British branch secretary, had now attained a membership of 500 members but that the British membership was still disproportionately low. He therefore left some leaflets about it in the hope more would join.

COMMUNICATIONS

C. G. M. DE WORMS said that the late summer and early autumn had been good, and he himself had spent five or six days on Guernsey where the commonest butterfly seemed to be the speckled wood (*Pararge aegeria* (L.)) and the moths *Agrotis trux* (Hübner) and *Eilema caniola* (Hübner) had been very prevalent; he had also noted a pale form of *Lasiocampa trifolii* (D. & S.), *Leucochlaena oditis* (Hübner), *Mythimna putrescens* (Hübner) and *Scotopteryx peribolata* (Hübner), the last-named not being known from other parts of the British Isles.

K. EVANS stated that *Aporophyla nigra* (Haworth), never noted near Croydon before 1969 and previously scarce in S.E. England, seemed now well established there, and he had noted forty specimens in his trap there in the last ten days. Mr. E. Wilde agreed and added that *Polymixis flavicincta* (D. & S.) had also become commoner recently at Croydon. I. WATKINSON stated that in N. Kent *Rhyacia simulans* (Hufn.), not hitherto authentically recorded there, a male was caught on 28.ix.78 at Boughton, and *Eumichtis lichenea* (Hübner) was now (both) established and common. He asked members who might obtain apple-feeding examples of *Phyllonorycter cydoniella* (D. & S.) (Gracillariidae) kindly to submit specimens to him, since this species was originally thought to be specific to quince (*Cydonia*) and was often confused with *P. blancadella* (F.). R. F. BRETHERTON said that *R. simulans* was not a regular immigrant and there had been previous scattered records of it in Surrey. Mr. G. ELSE reported a dearth of the regular immigrants at Freshwater, I.O.W. about 28.viii although an example of *Agrius convolvuli* (L.) had been taken, and a few *Colias crocea*.

M. W. F. TWEEDIE then gave an illustrated lecture on "Insects in Australasia 1977" which justified the large afflux of members to hear him and see his latest photographs. These, as usual, covered different orders of insect and also plants and trees. Apart from appreciating the high quality of these and the clear exposition of the speaker, members showed their interest in the phenomena illustrated by posing various questions at the end.

COMMENTS ON THE EXHIBITS

It was mentioned that *Strangalia aurulenta* had been recorded by Huggins from S. Ireland about 1950; another record, in 1965, was from Arundel Park.

12th October 1978

The President, Mr. G. PRIOR, in the chair.

The President announced with regret the deaths of the following members: — Brigadier H. L. Lewis, author of "Butterflies of the World", and J. Welton, aged 24.

EXHIBITS

Dr. A. A. ALLEN — A male specimen of *Teleiodes alburnella* (Z.) (Lep., Gelechiidae) captured to actinic light at Reigate, Surrey, 28.vii.1978; the larva feeds on birch. It is apparently moving southwards in Britain. Also a couple of *Netelia testaceus* Gravenhorst (Hym., Ichneumonidae), the ♀ captured flying in late afternoon sunlight on Seaford cliffs, Sussex, 4.ix, and the ♀ take to m.v. light on 11.viii, at Holcombe, Devon, both this summer, the ♂ being larger. The genus comprises ectoparasites mainly of the Lepidoptera; the fertilised black eggs of the female are carried on the outside of the ovipositor until a suitable host is found. Thirdly two females of *Platylabus decipiens* Wesm. (Hym., Ichneumonidae), bred 10.vi.1978 from two pupae of *Perconia strigillaria* (Hübner) (Lep., Geometridae), found as larvae by Mr. C. Hart on 30.iv.78 on Horsell Common, Woking, Surrey. The larvae pupated soon after capture. The species is apparently a rare insect; the exhibitor had found no literary record of its having previously been found on this moth.

Lt. Col. A. M. EMMET — Specimens of *Cosmiotes consortella* (Stainton) (Lep., Elachistidae) taken at various dates in Essex from 1966 to 1978, also two taken at Balyconneely, West Galway on 4.vi.68 and 23.viii.69;

and a specimen bred by Mr. J. L. Gregory at St. Austell, Cornwall on 1.iv.1971. Specimens of *C. freyerella* (Hübner) and *stabilella* (Frey) were shown for comparison. *C. consortella* was regarded as conspecific with *C. freyerella* by Meyrick; consequently it was overlooked for many years. It was restored to the British list in 1951 by Dr. J. D. Bradley under the name *C. exiguella* (Frey), a name since shewn to be a junior synonym of *consortella*. A map was shown showing the distribution of the records made before and after *G. consortella* was regarded as conspecific with *C. freyerella*; it was suggested that the discontinuity was due to under-recording rather than the absence of the species. The life history was unknown, the single bred specimen having emerged fortuitously in a cage which was being used to rear Noctuid larvae on grass.

G. PRIOR — three immature larvae feeding on tomato foliage, which some members thought were *Lacanobia oleracea* (L.).

Dr. I. WATKINSON — photo-micrographs of larval tubercles and spiracles of noctuid larvae of the Heliothidinae, up to magnifications of 60,000, some being of taxonomic importance for distinguishing one species from another; also, of a hatched ovum of *Phyllonorycter* sp. electroscanned at X 550.

COMMUNICATIONS

Dr. I. WATKINSON reported *Lithophane leautieri hesperica* Boursin from Canterbury, E. Kent, in early October. Various members reported a few late immigrant lepidoptera due to the improved weather, and Dr. ALLEN reported having found a larva of *Acrionicta rumicis* (L.) feeding on *Cupressus*.

Slides were then shewn by four members; R. K. Merrifield shewed landscape scenes using infra-red and normal colour film; Dr. Ian Watkinson, shewed the damage done to apple blossom by *Argyresthia cornella* (F.); Mrs. Murphy of spiders and habitats in the United States; and Dr. Allen, mostly of Lepidoptera larvae.

COMMENTS ON EXHIBITS

Lt. Col. A. M. EMMET said that *T. alburnella* had been found fairly widespread in Essex, whence he knew it from Snaresbrook; however, a description of its spinnings was still required.

9th November 1978

The President Mr. G. PRIOR in the chair.

EXHIBITS

Dr. A. A. ALLEN — two examples of *Barylypa insidiator* Foerster (Hym., Ichneumonidae), captured flying low over heather in afternoon sunshine, Hankley Common, Tilford, Surrey, 30.viii.1978. Two other species of the genus are known from Britain; all three are very rare, possibly overlooked. Many species of the sub-family, Anomalinae, to which they belong, show a preference for dry heaths and moors. Also a few examples of both sexes of *Microgaster subcompletus* Nees (Hym., Braconidae) bred from a full-grown larva of *Vanessa atalanta* (L.) (Lep., Nymphalidae) swept from nettle (*Urtica*) on 2.ix.1978 on the coast at Littlehampton, Sussex. The gregarious parasites appeared from the host the following day and proceeded to spin their rather large white, woolly cocoons. The adults emerged therefrom on 16.ix. The species is a notorious parasite of *atalanta* (as well as of *Pleuroptya ruralis* (Scop.) (Lep., Pyralidae) and may be responsible for the scarcity of the Red Admiral Butterfly in some years.

COMMUNICATIONS

Dr. A. A. ALLEN said that he had obtained eggs from the moths hatching from *Paracystola acroxantha* Meyrick bred ex ovis obtained in Devon recently, and would bring them next meeting for distribution.

Messrs. E. WILD and R. BREIHERTON both reported that a second wave of immigrant lepidoptera had arrived in Southern England, as evidenced by the appearance of *Orthonama obstipata* (F.) in Surrey light-traps; there were also reports of *Mythimna unipuncta* (Haw.) on the South Coast during the last ten days, but whereas the October 7-15 migration appeared to have come from the south-east, this second, rather small, migration, seemed, to judge by wind records, to be from the south-west.

Dr. WATKINSON reported that he had had *Udea ferrugalis* (Hüb.) and *M. unipuncta* to his light-trap near Canterbury, Kent, on November 3-6.

Mr. G. PRIOR reported that *Emmelina monodactyla* (L.) had been numerous on fences and shop windows in N. London suburbs recently.

Members also discussed cannibalism in lepidopterous larvae.

A discussion on the Annual Dinner and Exhibition then ensued. The President expressed appreciation of the work done by the ladies in providing refreshments and stated that a reservation at Chelsea Town Hall for October 27th next year for the Exhibition had been made, a week later being impossible.

Dr. A. A. ALLEN then exhibited, and spoke about, some slides showing the life-cycle of *Paracystola croxantha* Meyr. and certain cannibal larvae in action, and winter and spring months at rest.

The President having expressed the audience's appreciation of these, the meeting came to a conclusion somewhat sooner than the usual hour.

Thursday 23rd November 1978

The President Mr. G. PRIOR in the chair.

EXHIBITS

Dr. A. A. ALLEN — A single female of *Apanteles callunae* Nixon (Hym., Braconidae), bred 9.vii.1978 from an unidentifiable species of Geometrid on heather, 30.vii.1978, on moors near Dawlish, Devon. The larva was killed 1.viii, the parasite maggot constructing a pale-lemon cocoon, also exhibited, attached by its base, on a spray of heather. The species *callunae* does not appear to be recorded very frequently, possibly being overlooked. All previous records have been found from moorland or heath and it is perhaps likely that the species is to be found in this locality only. The only known host published, known to the exhibitor, was the Noctuid *Anarta myrtilli* (L.). Also larvae and bred adults of *Paracystola acroxantha* Meyr. (Lep., Oecophoridae).

MEMBERSHIP

Their names having been read a second time, the following were declared duly elected: — Messrs. M. R. Downer, D. L. Furnell, I. I. McFadyen, Hon. Colin Philips, D. L. J. Quicke, I. P. Rix, and G. S. Vick, B.Sc., J. A. Whellan, F.R.E.S.

COMMUNICATIONS

Lt. Col. A. M. EMMET stated that the determination of larvae on *Abies grandis*, reported on September last meeting, had proved correct. He also said with reference to the Field Guide of Smaller British Moths, that the Council had now selected a printer, and a set-up sample was awaited.

E. H. WILD reported that breeding *Rhodometra sacraria* (L.) at 75 Fahrenheit he had had hatchings all within 48 hours of each other; of the ten females, seven were typical but none had red markings.

R. BRETHERTON reported that the autumnal immigration had continued through mid-November, the chief species concerned being *Mythimna unipuncta* (Haw.) which was extremely numerous on the south coast of England and the west coast of Ireland, far outnumbering such species as *Nomophila noctuella* (D. & S.) and *Autographa gamma* (L.); only one *Hippotion celerio* (L.) had been noted. The immigrants had hardly penetrated inland. Confirmation for Essex of this state of affairs was offered by Lt. Col. A. M. EMMET, who stated that at Bradwell-on Sea on the coast of that county *M. unipuncta* had been five times as numerous as *A. gamma*. The observer being Mr. A. J. DEWICK.

Dr. I. WILKINSON reported that forty-five members had attended at a meeting of the Kent entomologists near Faversham; the next such meeting would be on April 6th 1979.

Dr. J. MASON then gave an illustrated talk on "Insect photography in the tropics". Among the creatures shown on the screen were: ants, butterflies, spiders, millipedes, land-crabs, fiddler crabs, and bats of Trinidad, Africa, Malaysia, Ceylon, and India. The lecture drew a large audience of interested members and evoked much interest.

COMMENTS ON EXHIBITS

Lt. Col. A. M. EMMET, congratulating Dr. Allen on his work on *Paracystola acroxantha* Meyrick, stated that Dr. Bradley had decided, on the basis of this work, to remove the asterisk against the species in the British check list, being satisfied that the moth was a breeding resident in Britain.

Wednesday December 6th 1978

JOINT MEETING WITH THE ROYAL ENTOMOLOGICAL SOCIETY

The President of the R.E.S., Prof. J. D. GILLETT, in the chair.

The first joint meeting took place at 41 Queens Gate; there was a full house, with some obliged to stand; congestion might have been intolerable had a one-day railway strike affecting residents in Surrey not reduced the numbers somewhat.

The President succinctly conducted business which concerned the host society and then welcomed visitors to the meeting especially those from our society and from Europe; the theme for the more serious part of the evening being: "The European Insect Fauna in relation to Britain", he hinted that we might be dealing with a sort of "Common Market for Insects".

RELATIONS OF THE RESIDENT BRITISH LEPIDOPTERA TO THE EUROPEAN FAUNA

Mr. E. P. WILTSHIRE then spoke for about a quarter of an hour on the above theme, with special regard to the resident Lepidoptera. He drew attention to Mr. R. S. Bretherton's 1968 Presidential Address (see these Proceedings Vol. 1 (1): 4-15), and quoted the comparative numbers there given for the species in the butterfly faunas of Britain and its neighbours. It was natural that on the extreme N.W. edge of Eurasia, the species-number should decrease toward the west and north, particularly in island faunas; the further from the warm latitudes and the centres of dispersal, the more pronounced the decrease, and this impoverishment was enhanced by a sea-barrier responsible for non-arrival or extinction after arrival of species.

Maps prepared by Mr. J. Heath were used to illustrate ranges of ten species of butterfly or moth representing seven faunal elements; the latter were groups of species with roughly corresponding present distributions; naturally each species had its own ecological peculiarity and its own distri-

bution differing in detail from that of every other; some were expanding and on the up-grade, while others were stationary, localised, or declining; the expanding ones perhaps indicate the future and the declining ones the past.

Three elements together formed the great majority of the British lepidopterous fauna: Euro-Pacific, Euro-Siberian, and Euroriental (West Palearctic). Four other elements formed a smaller fraction of our fauna and of these only one or two were truly European; Lusitanian (Atlanto-Mediterranean), Holarctic, Boreo-Alpine, (Arctic-Alpine), and European; the last contained perhaps the most enigmatic distributions of all.

The two species chosen to represent the Euro-Pacific range were *Inachis io* (L.) (peacock butterfly) and *Photedes elymi* (Tr.) (limegrass moth) contrasted strongly for the former was almost ubiquitous, the latter limited mainly to one species of grass on Northern coasts.

Melitaea cinxia (L.) (Glanville fritillary butterfly) was the Euro-Siberian representative, in Britain severely localised to off-shore islands of the extreme south, and limited also to high peaks towards its own southern limits (e.g. the Middle East) but widely distributed over a vast central band extending from Western Europe to the Amur at least. For the Euro-orientals, *Quercusia quercus* (L.) (purple hairstreak butterfly), and *Xestia xanthographa* (D. & S.) (square-spot rustic moth) were another contrasting pair of representatives, the former generic to oak trees from Britain to S.W. Iran and the latter, a herbivore, more ubiquitous over a very similar territory.

The selected Lusitanian representative was the purely coastal moth *Mythimna litoralis* (Curtis) (shore wainscot), localised and specific to one kind of dune-grass from N. Germany, through Britain to N.W. Africa and S. France. Mentioned *en passant* as in the same category was *Lithophane leautieri* Boisd. (Blair's Shoulder-knot), whose recent arrival and continued expansion in the British Isles was the result of recent plantations in N.W. France and S. England of *Cupressus macrocarpa* (Westw.) the Monterey Cypress.

The Holarctic representative, *Itame brunneata* (Thunb.) (Rannoch looper) inhabited the Scottish highlands, the European Alps and also a broad band in the northern latitudes of the Old and New Worlds. The Boreo-Alpine representative was another Scottish highland specialist *Xestia alpicola* (Zett.) (northern dart), but was more widespread in Scandinavia and also inhabited the Alps.

Finally the selected representatives of the purely European category were another contrasting pair: *Erebia epiphron* Knock (mountain ringlet butterfly) which had disjunct habitats and ranged from the north of Britain to the Pyrenees and the Alps, but was absent from Scandinavia; and *Photedes morrisii* (Dale) (Bond's wainscot moth) severely localised on Northern coasts, specific to a single kind of grass which, surprisingly, was not purely coastal but widespread, the moth being also found in East Central Europe, the Apennines and reportedly also the Balkan mountains.

Questions and contributions from the audience then followed; Dr. G. R. COOPE'S contribution was noteworthy, concerning the Coleoptera which he has been studying. Glacial British Coleoptera, he said, were perfectly preserved and could be exactly determined and dated; the results were unexpected, e.g. a glacial British beetle species now survived no nearer than Tibet. In his view, deductions from present distributions could often be misleading. Mr. J. Heath, referring to the butterfly statistics cited from Bretherton 1968, mentioned that Iceland had no Rhopalocera.

The chair then waved a wand transforming the meeting into a *conversazione* at which mulled wine circulated. This proved thoroughly enjoyable to all, but provided no matter for record here, except that a brief mention of the various exhibits on the theme should be made: these related to other groups of insects, e.g. the Colorado beetle, the Curculionidae and the aphids, whose ranges of expansions and retreats were well displayed.

Thursday December 14th 1978

The President, Mr. G. PRIOR, in the chair.

The President regretted to announce the death of Sir Henry B. Lawson, of Pirbright, Surrey, a member since 1927.

EXHIBITS

Dr. A. A. ALLEN—Three females and one male of *Apanteles calodetta* Nixon (Hym., Braconidae) four of a brood of twelve bred from larva of *Eriogaster lanestrus* (L.) (Lep., Lasiocampidae). About twelve quite young host larvae were found in a web on birch (*Betula*) in Sweden on 17.vi.1977 by Mr. C. B. Ashby. The larvae developed normally until nearly mature, when several *Apanteles* larvae appeared from nearly every host, proceeding to spin their small, yellowish buff cocoons amongst the larval hairs. The twelve cocoons of the exhibited brood were given to the exhibitors on 13.x and were kept over-winter indoors; some eventually hatched in mid-summer 1978. Only five adults appeared; on opening two intact cocoons the exhibitors found a dead larva in each. The species is very infrequent, having been first described by Dr. Nixon in 1973 from a series bred in Mid-Sweden from the same host; the present series contained the first known male example. The exhibitor expressed his thanks to Mr. Ashby for the gift of the cocoons, which he so thoughtfully retained.

R. FAIRCLOUGH—Five examples of *Teleiodes decorella* (Haworth) (= *humeralis* (Zeller) (Lep., Gelechiidae), two being so melanic that the black mark on the costa was indistinguishable. The local moth is to be found in Surrey but is rather uncommon.

T. G. HOWARTH (on behalf of V. W. PHILPOTT)—a living specimen of *Mythimna unipuncta* (Haworth), the White-speck Wainscot moth (Lep., Noctuidae) taken at his m.v. light on the night of December 9/10, also living larvae of the same species, in various instars, bred from a female taken on November 10/11 at Weymouth, Dorset. Mr. Philpott reported having seen 37 specimens of *unipuncta* since November 2/3, and twenty-five on the night of November 10/11. During recent years he has seen the moth regularly though in fewer numbers than this year and believes it may have established itself at Weymouth.

S. A. KNILL-JONES—larvae of *Mythimna unipuncta* bred from several females obtained at m.v. light at Freshwater, I.O.W. on November 11th, when a total of ten specimens of this moth were taken.

B. SKINNER—The first British recorded specimen of *Athetis hospes* Freyer (Lep., Noctuidae) taken at m.v. light on the Lizard Peninsula, Cornwall, by J. Porter on August 27th 1978; identified by M. R. Honey of the British Museum (Nat. Hist.).

MATTERS ARISING FROM THE MINUTES

It was announced that Mr. Fairclough, in response to a recent request, had donated a vacuum cleaner for use in the library. The President invited volunteers to operate it.

MEMBERSHIP

The following names were read for the first time: — Messrs. T. A. Wickett B.Sc., F.R.A.S., and P. H. Sterling; also Miss. C. Haddon, M.A., and Miss Helen Mary Wilk, and the Dundee Museum and Art Galleries.

ANNOUNCEMENTS

The President said that the Joint Meeting with the Royal Entomological Society on December 6th had been a great success and he had received suggestion that it might well be made an annual event.

COMMUNICATIONS

R. F. BRETHERTON commenting on the dates of capture of *Mythimna unipuncta* as reported above, pointed out that a frost had occurred between the two periods of capture, which suggested that if this had killed off the first arrivals, the second lot must be a second immigration. Arrivals in S.W. Ireland were even more numerous than in S. England, 114 examples having been found in one night in a single trap at Cork. There was no proof of the moth having survived an English winter in the wild, and he hoped members with larvae would experiment by exposing some of these to wild out-door conditions on the south-west coast to see if survival there was climatically possible.

S. BAKER stated that although greatest numbers were along the coasts a few specimens had also been recorded inland, e.g. one example at Reading on 8th November.

Other members mentioned records of migrant butterflies having been observed in the south-west of England, including *Cynthia cardui* (L.) (painted lady) on December 4th in S. Devon and A. S. WHEELER mentioned a late viewing of *V. atalanta* (L.) at Pagham Harbour, Selsey, Sussex, but, as R. F. BRETHERTON said, migrant butterflies were scarce this autumn, as compared with migrant moths.

Mr. A. KENNARD then gave an illustrated talk on "The Large Blue — lessons and achievements in insect conservation", dealing mainly with the history of *Maculinea arion* (L.) in S.W. England in recent years. A lively discussion, lasting some thirty minutes, followed this, proving the great interest evoked by the lecturer.

FIELD MEETINGS

RANMORE, SURREY — May 27th 1978

Leader — M. GREY

Nine members attended the meeting, the intention being to compare conditions in the surrounding woodlands with the adjacent chalk downland slopes. Leaving the leader's house, the party had an enjoyable but unproductive walk through the woods. A female *Aethalura punctulata* (D & S.) was found at rest on a tree trunk and kept by one of the party for eggs. After returning to the house for tea and other forms of refreshment the leader took the party to an area of chalk downland owned by the Wotton Estate. Permission had kindly been given by Mr. John Evelyne for the party to collect on this area during the afternoon and night — the rest of the downland being owned by the National Trust.

Although the lateness of the season was generally apparent ten species of Rhopalocera were recorded including *H. lucina* (L.) which, despite an abundance of foodplant, has become scarce in the area. Mr. Paul Sokoloff supplied a list of the 'micros' as follows: — "*Panacalia leuwenhockella* (L.) was common on the downs, flying in the bright sunshine together with beautifully fresh first-brood specimens of the *Pyrausta species aurata* (Scop.),

purpuralis (L.), and *nigrata* (Scop.). Tortricids flushed from the herbage were generally the common species such as *Syndemis musculana* (Hübner), *Cydia juniella* (Clerck) and *Pammene rhediella* (Clerck), although it was interesting to see singletons of *Cochylis atricapitana* (Stephens) and a late *Acleris cristana* (D. & S.). At dusk *Elachista biatomella* (Stainton) was present in considerable numbers, by far the dominant member of the *Elachista* group, there being only a few specimens of *E. argentella* (Clerck), *Biselachista cinereopunctella* (Haworth) and *Stephensia brunnichella* (L.)".

Three members stayed on to run lights during the night and total forty-five species of 'macros' were recorded. Of particular interest were *Agrotis cinerea* (D. & S.), which were very fresh, including one which was apparently an asymmetric intersex variety, *Nola confusalis* (H.-S.) and an early *Sphinx ligustri* L.

Numbers were noticeably down on average for the time of year due to the general lateness of the season.

During the afternoon on the downs a large, long tailed bright emerald green bird was seen by several of the members flying into some trees. This caused some concern regarding the strength of the leader's refreshment. However, it proved to be a ring-necked parakeet *Psittacula krameri*, many of which have escaped from captivity and are apparently breeding in the wild in several of the southern counties.

HAYLING ISLAND, HANTS. — 3rd June 1978

Leader — A. J. PICKLES

Illness prevented the scheduled joint leaders, Mr. W. Collinson and Mr. R. W. Watson from attending but good luck and helpful advice from the Secretary made up for the leader's lack of detailed knowledge of the area.

Six members and a further three members of their families assembled in the car park adjacent to the Synah Golf Club at 6 p.m. and spent the first two hours searching the shore area in front of the golf links, largely for micros but also for the larvae of *Lasiocampa trifolii* (D. & S.), one of the objectives of the meeting. This species was found commonly on both Tree Lupin which abounds here, and grass growing amongst the Tree Lupins. A large number of *Polyommatus icarus* (Rott) were noted at rest on grass stems, often as many as three to a stem. Other butterflies noted at the same time were: *Lycæna phloëas* (Linn.) and *Coenonympha pamphilus* (Linn.). *Aspitates ochrearia* (Rossi) was also commonly put up, and was later to be found at the traps. Amongst the micros found in this area, and so far identified were: six larvae of *Psyche casta* (Pallas) on posts at the entrance to the car park, and imagines of *Plutella xylostella* (Linn.) and *Eudonia angustea* (Curt.).

As dusk was falling the party moved to the far end of the golf course where permission had been obtained to park cars within the golf course only a short distance from the sand dunes. A few larval webs of *Malacosoma neustria* (Linn.) greeted us by the gate. A mixture of nine m.v. and actinic traps were run along the edges of the dunes, two traps for unfortunately short time due to mechanical failure.

Members also successfully searched the marram grass on the beach for larvae of *Mythimna litoralis* (Curt.), examples of *Agrotis ripae* (Hübner) being found at the same time expanding their wings. The fourth objective of the meeting, *Sideridis albicolon* (Hübner), turned up at the lights fairly late.

Among species recorded at the lights and not seen earlier were: *Aethes smeathmanniana* (Fab.), *Pyla fusca* (Haw.), *Epirrhoe galiata* (D. & S.).

Perizoma albulata (D. & S.), *Lobophora halterata* (Hufn.), *Menophora abruptaria* (Thumb.), *Serraca punctinalis* (Scop.), *Macrothylacia rub* (Linn.), *Deilephila porcellus* (Linn.), *Arctia villica* (Linn.), (nearly all of which exhibited elongated cream markings at the base of the forewings as compared with the typical), *Diaphora mendica* (Clerk.), *Ceramica pisi* (Linn.), *Acronicta megacephala* (D. & S.) and *Autographa gamma* (Linn.).

The meeting ended at about 2.30 a.m. The automatic sprinklers which started watering the greens and their surroundings added some last minute excitement as they drenched some of the members who were staggering across the golf course under the weight of generators and equipment.

SWANAGE — June 10/11th 1978

Leader — Mr. P. J. BAKER

Six members arrived for this meeting to be met with weather which followed the pattern of that for several previous meetings at this venue — cool and dull with a persistent N.W. wind.

Following previous reports, a number of stands of figwort on the edges of the car park were examined and large numbers of larvae of *Cucullia verbasci* (L.) were found. Some were only 10 mm. long but others were in their penultimate instar. Checking other reports of extensive defoliation by "tent caterpillars" the tenanted webs of *Ypsolopha* spp. were found to be common on blackthorn, as were numerous but isolated larvae of *Malacosoma neustria* (L.).

The weather restricted flight activity but never-the-less several *Polyommatus icarus* (Rott), *Erynnis tages* (L.), and *Ochlodes venata* (B. & G.) were noted and *Electrophaes corylata* (Thun.) and *Camptogramma bilineata* (L.) were flushed. The most remarkable record was possibly that made by a member who spotted a pupa of *Strymonidia w-album* (Knock) attached to the underside of a branch of wych elm — which species of tree still appears to be quite healthy in the area.

Working the holm oak, hawthorn and blackthorn showed that larvae were somewhat backward with usual spring species on these pabula still being much in evidence. Some stands of wild rose produced large numbers of larva of *Anticlea badiata* (D. & S.) whilst the majority of these plants were completely devoid of insects. Extensive growths of the sea pink along the cliff edge were checked and signs of *Bembecia muscaeformis* (Esp.) were possibly found though no stages of this insect were seen. Whilst checking the sea pink, fine specimens of the bee orchid were seen, and further plants were found later, scattered in suitable locations further inland. Another plant which was common over large areas was the kidney-vetch but its associated butterfly was not seen.

A striking feature of this meeting was the large number of sea birds seen — many of which had nests in various parts of the cliffs. The guillemot was much in evidence and one small ledge at near sea level was densely populated by these birds which reminded one of miniature penguins. They were constantly in motion, flying low over the water or joining small flocks of similar birds on the surface. As the sea was clear it was easy to watch their submarine activities as they covered quite considerable distances under water and stayed submerged for quite extensive periods. Also noted were large numbers of several species of gulls, kittewakes, doves, cormorants, jackdaws and — almost certainly — a pair of puffins. On the grassy slopes inland several pairs of redstarts were noted.

One of the party found an unusual Homopteron near the cliff edge.

This was subsequently identified by another member as *Centrotus cornutus* (L.) which is said to be rare in Britain. This insect is most remarkable in its appearance as it mimics a thorn.

At dusk the cloud cleared and there was a sharp temperature drop which discouraged most of those present from running lights. However, a couple of the more intrepid set up in a sheltered spot on the lighthouse road and were able to add a few records to the list: *Hada nana* (Hufn.), *Mythimna pallens* (L.), *Apamea sordens* (Hufn.), *Procus* spp., *Agrotis cinerea* (D. & S.), *Charanyca trigrammica* (Hufn.), *Lacanobia w-latinum* (Hufn.), *Agrotis exclamationis* (L.), *Opisthograptis luteolata* (L.), *Dasychira pudibunda* (L.), *Spilosoma lutea* (Hufn.), *S. lubricipeda* (L.), *Eupithecia exiguata* (Hübner), *Phlogophora meticulosa* (L.), *Hoplodrina ambigua* (D. & S.), *Phalera bucephala* (L.), *Sphinx ligustri* (L.), *Aspitates ochrearia* (Ross.), *Apamea monoglypha* (Hufn.)

ANDREWS AND MEANFIELD WOODS, SOREHAM, KENT —

25th June 1978

Leaders — P. SOKOLOFF and M. CHALMERS-HUNT

A dozen people attended this meeting which was held in a locality threatened with building a motor-way. Despite a poor weather-report, the party enjoyed a fair amount of sunshine and except for a few drops of rain it remained dry the whole day and there was little wind.

It was hoped to see two species of Lepidoptera in particular: *Plebejus argus* (L.) ssp. *cretacea* Tutt, the large chalk form of the silver-studded blue, which had been taken before on the downs adjoining the wood by Baron de Worms some years ago; and, the larva of *Ptycholomoides aeriferanus* (H.-S.). We saw no sign of *P. argus*; indeed, butterflies were remarkably scarce in this late year and this exceptionally cold and sunless June. As for *P. aeriferanus*, search of the larches where P. Sokoloff found the larvae in 1977 and bred two moths, revealed only one tenanted spinning of the shoots, from which it was hoped an imago of the local Tortricoid moth would emerge.

Among the more interesting moths noted were: *Olindia schumacherana* (F.), *Alabona geoffrella* (L.), *Strophedra nitidana* (F.), *Dichrorampha sequana* (Hübner), *Coleophora laricella* (Hübner) (cases on larch), *Eana incanana* (Steph.) (many holed seed-heads of blue-bell (*Endymion*), but all empty except one containing a full-grown larva), and *Hydrelia flammeolaria* (Hufn.).

Mr. Dolling (British Museum) reported the following Diptera: *Mereodon equestris* (F.), narcissus fly; Orthoptera: *Leptophyes punctatissimus* (Bosc.), and Hemiptera — Heteroptera: *Psallus perrisi* Wagner, *Orthotylus nassatus* (F.), *Stenodema laevigatum* (L.), etc.

A new member, A. J. Halstead, coming over from Woking, reported Diptera: *Phytomyza ilicis* Curtis on *Ilex aquifolius*, holly; *P. sphondylii* (Rob. in G.) on hogweed, *Agromyza nana* (Meigen) on red clover, *Taxomyia taxi* (Inch.), artichoke-gall-midge on yew, *Jaapiella veronicae* (Vall.), speedwell gall-midge, *Dasyneura glechomae* (Kieff.) on ground ivy, and *Iteomyia capreae* (Winn.) on *Salix caprea*, among other related Diptera. Also Coleoptera: *Gallerucella viburni* (Payk.) extensively defoliating bushes of *Viburnum opulus* (guelder rose), *Rhynchaenus fagi* (L.) (beech-leaf-mining weevil); and the long-horn beetle *Leiopus nebulosus* (L.), also some Acarina records (gall-mites on ash, field maple, etc.).

BOTLEY WOOD, HANTS. — 1st-2nd July 1978

Leader — DR. J. R. LANGMAID

Twenty members and guests attended all or part of a day/night meeting at this insect-rich area of woodland.

The day was dull and rather cold; and unfortunately very little was seen on the wing. Three species of figwort weevils were recorded, and ten species of leafhoppers. In lepidoptera, an unsuccessful search was made for *Acosmetia caliginosa* (Hübner), but all hope must not be abandoned for its rediscovery here. Cases of nine species of *Coleophora* were found, including those of *C. vibicella* (Hübner) and *C. inulae* Wocke.

As dusk fell the wind dropped, the temperature rose, as did the spirits of the assembled company. The wood comfortably accommodated about ten lights, and a very large number of moths came in. From the four members who sent me a list of their captures and records, a total of two hundred and fourteen species were recorded, including *Choristoneura diversana* (Hübner) (a new vice-county record), *Pseudosciaphila branderiana* (L.), *Apotomis lieana* (D. & S.) = *turbidana* (Hübner), *Ancylis laetana* (Fab.), *A. obtusana* (Haw.), *A. mitterbacheriana* (D. & S.), *Epinotia demarniana* (F.v.R.), *Tethea or* (D & S.), *Euphyia unangulata* (Haw.), *Lobophora halterata* (Hufn.), *Angerona prunaria* (L.), *Aethalura punctulata* (D. & S.), *Cucullia verbasci* (L.), and *Elaphria venustula* (Hübner).

Another new vice-county record was made earlier in the day when larvae of *Agonopterix scopariella* (Hein.) were beaten from broom.

Our thanks are extended to the Forestry Commission for their courtesy and helpful co-operation, and it is hoped to run another meeting here next year.

HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS

Recent additions to this series include parts on the Thysanoptera, two families of aphids, and a completely new edition of Kloet and Hincks Checklist of the Coleoptera and Strepsiptera. Thirty seven other Handbooks are currently in print.

A full list of available Handbooks can be obtained from the Royal Entomological Society, 41 Queens Gate, LONDON, SW7 5HU.

CURRENT LITERATURE**BOOK REVIEWS**

Catálogo sistemático dos macrolepidópteros de Portugal by Maria Amélia da Silva Cruz e Timótea Gonçalves. Faculdade de Ciências do Porto, 1977. 48 pp, no price stated.

This Catalogue meets a long felt want, as previous lists of Portuguese Macrolepidoptera are very incomplete. It will be particularly interesting to British lepidopterists because Portugal is one of the origins for many species which are immigrants to Britain and Ireland, and also because its fauna, at the extreme west of Europe, is well worth exploration by visitors. The short introduction is given an English translation, and there is a useful bibliography.

Under the title "Macrolepidoptera" the Psychidae (22 Portuguese species) are included, but otherwise its scope agrees with that made familiar in England by South. Vernacular names are not given. The scientific nomenclature is bizarre and in places out of date, since for different groups of families it uses the work of five different authorities, dating variously from 1947 to 1970. Species are generally shown at nominotypical level without indication of sub-species, except where two or more sub-species are stated

to occur in Portugal: these are listed as separate taxa. Doubtful and sporadically immigrant species are shown separately. There are too many typographical errors: otherwise the printing and presentation is good.

The total number of taxa listed is about 1,000. This is much the same number as would now appear in a British list compiled on the same basis; but its composition is very different. On a rough count about 450 of the accepted Portuguese taxa would not appear in such a British list. On the other hand, Portugal lacks most of the Boreal and Euro-Siberian elements which form a large part of the British fauna.

This Catalogue is a good beginning. We hope that the authors will continue by giving some account of the distribution of species within Portugal, which would reflect the considerable diversity of its climate and terrain. And they might perhaps even tackle the Microlepidoptera also! R.F.B.

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological and Natural History Society announces that that awards may be made from this Fund for the promotion of entomological research with particular emphasis on: —

- (a) Leaf miners,
- (b) Diptera, particularly Trypetidae and Agromyzidae,
- (c) Lepidoptera, particularly Microlepidoptera,
- (d) General entomology,

in the above order of preference, having regard to the suitability of candidates and the plan of work proposed.

Awards may be made to assist travelling and other expenses necessary to field work, for the study of collections, for the attendance at conferences, or, exceptionally, for the costs of publication of finished work. In total they are not likely to exceed £300 in 1979/80.

Applicants should send a statement, if possible in sextuplicate, of their qualifications, of their plan of work, and of the precise objects and amount for which an award is sought, to A. M. Emmet, M.B.E., T.D., M.A., F.L.S., F.R.E.S., Hon. Secretary, Labrey Cottage, Victoria Gardens, Saffron Walden, Essex, CB11 3AF, as soon as possible, and in any case not later than 30th September 1970.

The Society's Publications

ILLUSTRATED PAPERS ON BRITISH MICROLEPIDOPTERA

Still available, a small number of copies of the recently published volume of twelve articles reprinted from the "South London" Proceedings between 1944 and 1957 with the twelve original colour plates.

These papers comprise LAMPRONIIDAE and ADELIDAE, LITHO-COLLETIS and OECOPHORIDAE (three parts) and ALLIED FAMILIES by S. N. A. Jacobs; PSYCHIDAE, PLUTELLIDAE and GLYPHIP-TERYGIDAE and ALLIED GENERA by L. T. Ford; CALOPTILIA and LYONETHIDAE by S. C. S. Brown; ERIOCRANIIDAE and MICROP-TERYGIDAE by J. Heath and MOMPHA by S. Wakely. For ease of use the pages and plates have been renumbered and are fully indexed accordingly; in addition there is a new appendix drawing attention to species belonging to these groups which have been added or sunk. There is also a list of species which relates names used in the text to up-to-date nomenclature and classification.

A *limited* edition of 500 copies was published in the Autumn of 1978, bound in cloth, price £9; £6 to Members of the Society. Postage, where applicable, 60p extra. Cheques should be sent to R. F. Bretherton, Esq., c.b., Folly Hill, Birtley Green, Bramley, Surrey.

A FIELD GUIDE TO THE SMALLER BRITISH LEPIDOPTERA

The Society also announces the publication, probably in late summer this year, of the above important and entirely new work, bringing up to date and uniting the well-known Guide by the late L. T. Ford, B.A., and the Supplement, both hitherto advertised on this page, with much additional matter. Advice regarding price and purchase-procedure will be issued to members at a meeting and also circulated, it is hoped, during the summer.

THE NATURAL HISTORY OF THE GARDEN OF BUCKINGHAM PALACE

(Proceedings and Transaction 1963, Part 2)

Compiled by a team of specialist.

£1.00

A LEPIDOPTERIST'S HANDBOOK

The Amateur Entomologist's Society is pleased to announce the publication of its latest Handbook, written by Richard Dickson. It is intended as a 'vade mecum' for both beginners and initiated lepidopterists and deals with all aspects of the subject in a series of eleven chapters and four appendices. There are 34 line illustrations and 13 photographs to augment the text and the binding has been sewen to meet constant use.

It is apractical book on the various facets of breeding, collecting, storing, conservation and photography of lepidoptera and should appeal to most lepidopterist. Although the various techniques relate to the British fauna, most are valid for lepidopterists anywhere.

The price is £3.00 plus postage and is available from A.E.S. Publication Agent, 137 Gleneldon Road, London, SW16 2BQ. (An invoice will be sent with orders, including postage).

CONTENTS

Annual Exhibition, The 1978	1
Bristowe, W. S., The mysterious swarms of Sepsid flies and their unpalatability to spiders	16
Carter, D. J., The National Collection of British Lepidoptera (R.C.K.)	19
Current Literature	71
Editorial	1
Field Meetings	67
Gardiner, B. O. C., A review of variation in <i>Pieris brassicae</i> (L.)	24
Hering Memorial Research Fund, the Professor	72
Proceedings	57
Stubbs, A. E., Changes in London's insect fauna in the last 100 years	48
Williams, S. A., <i>Ocyusa nitidiventris</i> (Fagel) new to Britain	46
Wiltshire, E. P., Relations of the resident British lepidoptera to the European fauna	64

MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place 27th October, in Chelsea Old Town Hall. Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary.

8521

OCTOBER 1979

Vol. 12, Parts 3/4

Proceedings and Transactions of
The British Entomological and
Natural History Society



Price £3.50

Past Presidents

1872-4	J. R. WELLMAN (dec.)	1939	H. B. WILLIAMS, LL.D., F.R.E.S. (dec.)
1875-6	A. B. FARN, F.E.S. (dec.)	1940	E. A. COCKAYNE, D.M., F.R.C.P., F.R.E.S. (dec.)
1877	J. P. BARRETT, F.E.S. (dec.)	1941	F. D. COOTE, F.R.E.S. (dec.)
1878	J. T. WILLIAMS (dec.)	1942	S. WAKELY (dec.)
1879	R. STANDEN, F.E.S. (dec.)	1943	R. J. BURTON, L.D.S., R.C.S.ENG. (dec.)
1880	A. FICKLIN (dec.)	1944	STANLEY N. A. JACOBS, F.R.E.S.
1881	V. R. PERKINS, F.E.S. (dec.)	1945-6	Capt. R. A. JACKSON, R.N., F.R.E.S. (dec.)
1882	T. R. BILLUPS, F.E.S. (dec.)	1947	L. T. FORD, B.A. (dec.)
1883	J. R. WELLMAN (dec.)	1948	Col P. A. CARDEW (dec.)
1884	W. WEST, L.D.S. (dec.)	1949	J. O. T. HOWARD, M.A. (dec.)
1885	R. SOUTH, F.E.S. (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.)
1886-7	R. ADKIN, F.E.S. (dec.)	1951	T. G. HOWARTH, B.E.M., F.R.E.S., F.Z.S.
1888-9	T. R. BILLUPS, F.E.S. (dec.)	1952	E. W. CLASSEY, F.R.E.S.
1890	J. T. CARRINGTON, F.L.S. (dec.)	1953	F. STANLEY-SMITH, F.R.E.S.
1891	W. H. TUGWELL, PH.C. (dec.)	1954	STANLEY N. A. JACOBS, S.B.ST.J., F.R.E.S.
1892	C. G. BARRETT, F.E.S. (dec.)	1955	F. D. BUCK, A.M.I.PTG.M., F.R.E.S. (dec.)
1893	J. J. WEIR, F.L.S., etc. (dec.)	1956	Lt.-Col. W. B. L. MANLEY, F.R.E.S.
1894	E. STEP, F.L.S. (dec.)	1957	B. P. MOORE, B.SC., D.PHIL., F.R.E.S.
1895	T. W. HALL, F.E.S. (dec.)	1958	N. E. HICKIN, PH.D., B.SC., F.R.E.S.
1896	R. SOUTH, F.E.S. (dec.)	1959	F. T. VALLINS, A.C.I.I., F.R.E.S. (dec.)
1897	R. ADKIN, F.E.S. (dec.)	1960	R. M. MERE, F.R.E.S. (dec.)
1898	J. W. TUTT, F.E.S. (dec.)	1961	A. M. MASSEE, O.B.E., D.SC., F.R.E.S. (dec.)
1899	A. HARRISON, F.L.S. (dec.)	1962	A. E. GARDNER, F.R.E.S. (dec.)
1900	W. J. LUCAS, B.A., F.E.S. (dec.)	1963	J. L. MESSENGER, B.A., F.R.E.S.
1901	H. S. FREMLIN, M.R.C.S., L.R.C.P., F.E.S. (dec.)	1964	C. G. ROCHE, F.C.A., F.R.E.S.
1902	F. NOAD CLARK (dec.)	1965	R. W. J. UFFEN, F.R.E.S.
1903	E. STEP, F.L.S. (dec.)	1966	J. A. C. GREENWOOD, O.B.E., F.R.E.S.
1904	A. SICH, F.E.S. (dec.)	1967	R. F. BRETHERTON, C.B., M.A., F.R.E.S.
1905	H. MAIN, B.SC., F.E.S. (dec.)	1968	B. GOATER, B.SC., F.R.E.S.
1906-7	R. ADKIN, F.E.S. (dec.)	1969	Capt. J. ELLERTON, D.S.C., R.N. (dec.)
1908-9	A. SICH, F.E.S. (dec.)	1970	B. J. MACNULTY, B.SC., PH.D., F.R.I.C., F.R.E.S.
1910-11	W. J. KAYE, F.E.S. (dec.)	1971	Col. A. M. EMMET, M.B.E., T.D., M.A.
1912-13	A. E. TONGE, F.E.S. (dec.)	1972	Prof. H. E. HINTON, PH.D., B.SC., F.R.S., F.R.E.S. (dec.)
1914-15	B. H. SMITH, B.A., F.E.S. (dec.)	1973	J. M. CHALMERS-HUNT, F.R.E.S.
1916-17	HY. J. TURNER, F.E.S. (dec.)	1974	C. MACKECHNIE JARVIS, F.L.S., F.R.E.S.
1918-19	STANLEY EDWARDS, F.L.S., etc. (dec.)	1975	M. G. MORRIS, M.A., PH.D., F.R.E.S.
1920-1	K. G. BLAIR, B.SC., F.E.S. (dec.)	1976	W. G. TREMEWAN, M.I.BIOL.
1922	E. J. BUNNETT, M.A. (dec.)	1977	R. TUBBS, O.B.E., F.R.I.B.A., F.R.E.S.
1923-4	N. D. RILEY, F.Z.S., F.E.S. (dec.)	1978	G. PRIOR, F.L.S., F.R.E.S.
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.		
1934	T. R. EAGLES (dec.)		
1935	E. E. SYMS, F.R.E.S. (dec.)		
1936	M. NIBLETT (dec.)		
1937	F. J. COULSDON (dec.)		
1938	F. STANLEY-SMITH, F.R.E.S.		

Editorial

Editor: E. P. Wiltshire, C.B.E., F.R.E.S.

Address: Wychwood, High Road, Cookham, SL6 9JS, Berks.

With the assistance of:

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

T. G. Howarth, B.E.M., F.R.E.S., F.Z.S.

M. W. F. Tweedie, M.A., F.Z.S.

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

E. S. Bradford

Published at the Society's Rooms, The Alpine Club, 74 South Audley Street, London, W.1, and printed by Charles Phipps Ltd., 225 Philip Lane, Tottenham, N15 4HL

SUBSCRIPTIONS

FROM 1 JAN. 1980 UNTIL FURTHER NOTICE, THE ENTRANCE FEE IS £1 AND SUBSCRIPTIONS, PAYABLE ANNUALLY ON 1 JAN. ARE ORDINARY AND CORPORATE MEMBERS £6, COUNTRY MEMBERS £3.50 AND JUNIOR MEMBERS £2. MEMBERS NOT PAYING BY BANKERS' ORDER SHOULD SEND THEIR SUBSCRIPTIONS WITHOUT DEMAND TO ARRIVE BY THE DUE DATE TO HON. ASST. TREAS. (SUBS.) AT "BELLARGUS", 9 ELMFIELD WAY, SANDERSTEAD, SURREY.

THE INHERITANCE OF A PALE FORM OF *GASTROPACHA QUERCIFOLIA* LINN. (LEPIDOPTERA: LASIOCAMPIDAE)

by

M. E. N. MAJERUS

(Department of Biological Sciences, University of Keele)

In volume 10 parts 1/2 of the Proceedings of the Society there occurs the report that at the meeting of the Society on 25th November 1976, Col. D. H. Sterling exhibited three specimens of *Gastropacha quercifolia* Linn. (Lappet Moth). These were described as follows: "The first a normal male taken at light at Winchester in vii. 1975, the others, a light brown form, probably ab. *meridionalis* Hormuz, unusual in England, and perhaps due to the dry hot summer." Although the report does not say so I assume these two later specimens were also taken in July 1975 at Winchester.

In 1976 I took four specimens of *Gastropacha quercifolia* at light in July, a further specimen being taken in August. All were captured in the Ringwood area of Hampshire. Three of the moths were normal males, the other two moths being a normal female and a pale female which seems to be very similar to ab. *meridionalis* specimens in the British Museum (Natural History). Both females were fertile and laid eggs.

The two resulting broods were reared, and to discover the method of control of the pale form a number of crosses were obtained from the resulting offspring.

Pairings of this species may be easily obtained by placing a three or four "day" old male in a hanging net cage with a freshly emerged female; however, as with many other species, pairing will only occur if the cage is hung outside so that it is subject to natural air movement.

One problem in rearing this species is that it usually passes the winter as a larva on the stems of the foodplant or on withered leaves. This can lead to a relatively high larval mortality in captivity, mainly due to dehydration during this period. However the problem is partially offset by the fact that the number of eggs laid is very high. In the broods in question females laid on average over 500 ova, and according to South (1939) in some cases females have been known to lay over a thousand. Due to difficulty in over-wintering larvae all larvae were kept until they had emerged from hibernation and recommenced feeding; however to keep the number of larvae being reared within reason thereafter, approximately half the surviving larvae from each brood (except broods 1 and 2) were taken at random and released. All larvae were reared on willow, and the broods, though being reared separately were all raised under similar conditions in an insectary in Egham, Surrey, so although protected from wind and rain they were subject to natural temperatures.

Table 1. Results of breeding experiments to determine the control of a pale form of *Gastropacha quercifolia*.

Brood number	Origin and phenotype of female parent	Origin and phenotype of male parent	Number of eggs laid	Number of imagines produced			
				typical female	typical male	pale female	pale male
1	Light-trapped pale	Unknown	486	114	95	0	0
2	Light-trapped typical	Unknown	561	151	160	0	0
3	Brood 1 typical	Brood 1 typical	687	69	87	5	6
4	Brood 1 typical	Brood 1 typical	521	55	50	3	4
5	Brood 1 typical	Brood 1 typical	430	46	51	4	3
6	Brood 1 typical	Brood 2 typical	703	92	105	0	0
7	Brood 1 typical	Brood 2 typical	530	63	68	0	0
8	Brood 1 typical	Brood 2 typical	586	90	96	0	0
9	Brood 2 typical	Brood 1 typical	407	70	53	0	0
10	Brood 2 typical	Brood 1 typical	391	50	49	0	0
11	Brood 2 typical	Brood 1 typical	662	84	92	0	0
12	Brood 2 typical	Brood 2 typical	504	82	74	0	0
13	Brood 2 typical	Brood 2 typical	417	36	28	0	0
14	Brood 2 typical	Brood 2 typical	588	80	70	0	0
15	Brood 3 pale	Brood 4 pale	417	0	0	81	69
16	Brood 5 pale	Brood 5 pale	562	0	0	76	72
17	Brood 3 pale	Brood 6 typical	449	71	62	0	0
18	Brood 4 pale	Brood 9 typical	484	83	70	21	27
19	Brood 6 typical	Brood 3 pale	572	72	79	0	0
20	Brood 9 typical	Brood 4 pale	312	54	47	0	0

The progeny reared from the two original light-trapped females (broods 1 and 2) were all normal in colour. Twelve further broods were produced from the progeny of broods 1 and 2 (broods 3-14 inclusive), and six F_2 generation broods (broods 15-20 inclusive) were also reared. The origins and phenotypes of the parents and the phenotypes of the progeny of all these broods are given in Table 1.

As the ratios between normal and pale forms varies between broods even though all were reared under similar conditions, the results indicate that the pale form is genetically controlled.

The progeny of brood 1, in which one parent was pale, were all typical which indicates that, unless sex linkage is involved, the pale form must be inherited as a recessive. The ratio between the two forms in broods 3-5 inclusive is approximately 15 typical to 1 pale in each case which suggests that two unlinked bi-allelic genes are involved in the inheritance of the pale form and that this form results when both genes are homozygous recessive. To give the 15:1 ratios of typical:pale forms, the parents of these three broods must all have been heterozygous for both the genes involved. Consequently, the unknown parent of brood 1 must have been homozygous dominant for both genes, and thus typical. The results of broods 15 and 16 lend further support to the hypothesis as only pale progeny are produced from pale x pale crosses which is expected if the pale form is inherited as a bi-factorial recessive and is thus pure-breeding for the pale allelomorphs.

In broods 6-14 inclusive all progeny were typical so it may be deduced that one of the parents of these broods must have been homozygous dominant for at least one of the genes in question, and as the progeny of brood 1 would seem to have been heterozygous for both genes, then the homozygous dominant parents must be those taken from brood 2 progeny. Whether both genes are homozygous dominant in the parental stock of brood 2 may not be ascertained from the progeny of either the F_1 generation broods or the few relevant F_2 generation broods (broods 17-20 inclusive). However, the exact genotype of the brood 2 parents is of little consequence in the determination of the inheritance of the pale form.

In conclusion it may be said that a pale form of *Gastropacha quercifolia* which in appearance seems to be equivalent to *ab. meridionalis* is inherited as a bi-factorial recessive the two genes involved being unlinked.

It thus seems that the most obvious implication of Col. D. H. Sterling's report, that *ab. meridionalis* may be controlled environmentally, being the result of the dry summer in 1975, is unfounded. However, the report is ambiguous due to its brevity. It may be that one or both of the alleles which produce *ab. meridionalis* have the status of little more than rare mutants in Britain where *ab. meridionalis* is generally at a disadvantage to the typical form, the exact strength of the disadvantage being in some way correlated to the oceanicity of the British climate. Thus as the climate in Britain in 1975 and 1976 was far more continental and less oceanic than usual, this may have led to the *ab. meridionalis* form being at less of a selective disadvantage than in normal years, with the result that more survived. In this way the occurrence of *ab. meridionalis* in Britain in 1975 and 1976 may be indirectly due to the hot dry summers of those years.

I would be interested to hear whether any other Lepidopterists obtained pale forms of *Gastropacha quercifolia* in Britain during 1975/1976 or indeed at any other time since 1967.

REFERENCE

South R. (1939). The Moths of the British Isles, Series one. Warne, London.

PLEBEJUS ARGUS (L.) (LEPIDOPTERA: LYCAENIDAE) IN MALTA

by JOSEPH L. CILIA

('Margerita', Flat 1, Censu Busuttill Street, Fgura, Malta)

A male specimen of the Silver Studded Blue, *Plebejus argus* Linne. was recently brought to light three years after its capture while examining several papered specimens which were collected on 15th August 1975, from Manoel Island. Manoel Island is a semi-urbanised island in the centre of Marsamxett harbour connected by a bridge to the highly urbanised Sliema area and across the harbour from Valletta. The occurrence of this species in this area is more probably a case of a sporadic visit.

Other records of various occasional visits by other species of butterflies can be traced back to 1923 when Col. Harford recorded *Danaus chrysippus* Linne. from Hastings Gardens on 4th June. This species was also recorded on 10th April 1952 by Mr. A. Valletta who took two specimens and recently on 17th October 1978 by Mr. G. Bonnett (personal communication). On 23rd May 1939 *Hipparchia algerica* Obth. was taken at Naxxar by Mr. A. Valletta. The specimen was later described as a new subspecies (*vallettai*) by G. De Lattin.

Mr. A. Valletta also recorded various other rare occurrences. *Polygonia egea* Cram. was taken on 20th March 1948 and *Euchloe belemia* Esp. on 5th April 1979. In July 1963, K. A. Harrison took *Catopsilia florella* Fab., *Euchloe ausonia* Hub., *Tarucus theophrastus* Fab. and *Philotes baton* Bergt. *Zizeeria knysna* Trim was also taken by Mr. G. Bonnett on 12th March 1978.

ACKNOWLEDGMENTS

Many thanks are due to Mr. A. Valletta for confirming my identification of the Silver Studded Blue, and also Mr. G. Bonnett for allowing me to mention his new records.

REFERENCES

- Caruana, Gatto A. (1925). Di alcune specie di farfalle erratiche catturate o osservate in Malta. *Archivium Melitense*: 6: 155-159.
- De Lattin, G. (1952) Two new subspecies of *Hipparchia semele* Lin. *Entomologist Record* 64: 335-336.
- Valletta, A. (1948). *Polygonia egea* Cramer in Malta. *Entomologist* 81: 150-151.
- Valletta, A. (1953). *Danaus chrysippus* Lin. var. *alcippus* Cram. revisits Malta. *Entomologist* 86: 57.
- Valletta, A. (1970). *Euchloe belemia* Esp. visits Malta. *Entomologist Record* 82: 215.
- Valletta, A. (1972). Butterflies of the Maltese Islands (Malta).
- Valletta, A. (1974). The Butterflies of the Maltese Islands. *Entomologist Record* 86: 196.
- Valletta, A. (1978). *Zizeeria knysna* Trim (Iysimon Hueb.) (Lep. Lycaenidae) an additional species of butterfly in the Maltese Islands. *Entomologist Record* 90: 265.

A NOTE ON BREEDING THE PINION-SPOTTED PUG, EUPITHECIA INSIGNIATA (HUBNER) LEP., GEOMETRIDAE)

by B. C. JACKSON

(38 Asthall Gardens, Barkingside, Essex)

This rather uncommon insect may be found on the wing in May. If you are fortunate enough to obtain a female you should present her with a spray of Hawthorn flowers to obtain the ova. As with many of the other 'Pugs' she will not part with her ova freely. I found that when she did she laid them singly or in pairs on the edges of the petals of the Hawthorn. The ova are round in shape and pure white matching exactly the colour of the

Hawthorn petals. The larvae commence to emerge about a week after laying and are of a very light green colour almost white. In the first instar they feed on stamens and stigma of the flower. In the second instar the larva is greyish white with a light brown line running down the whole length of the back. Some of the larvae at this stage were eating the stamens and they were standing erect from the base of the flower resembling the stamen they had devoured. Some were also beginning to eat the fresh leaves of the Hawthorn. In the third instar the larvae change to a light green colour with a light brown line down the back, at this stage most of the flowers have disappeared and they were feeding on the leaves. On 30.6.77 I examined the larvae and found they were a half inch long, colour light green and the dorsal line a reddish brown. They were now feeding on the large leaves of the Hawthorn. When at rest some of the larvae stand erect from the stems and blend in perfectly with the red and green of the Hawthorn foliage, others had a tendency to hang from the underside of the leaves with the head pointing downwards. On 6.7.77 the larvae entered their final instar, they were then an inch long, ground colour bright leaf green, the dorsal line was now broken up and resembled a row of arrow heads, these were a deep reddish brown, they had a faint yellow sub-dorsal line. There was also a reddish brown mark just above the anal claspers. On 18.7.77 larvae turned a darker bluish green colour before pupating.

They pupate one to two inches below the soil. The pupa is golden yellowish brown with olive green wing cases.

A NATIONAL SCHEME FOR MONITORING THE ABUNDANCE OF BUTTERFLIES: THE FIRST THREE YEARS

(with eight text figures)

E. POLLARD

(Institute of Terrestrial Ecology, Natural Environment Research Council, Monks Wood Experimental Station, Abbots Ripton, Huntingdon, Cambs.)

INTRODUCTION

In 1973 regular transect counts of butterflies began in Monks Wood N.N.R. in Cambridgeshire (Pollard *et al* 1975), with the aim of detecting changes in the abundance of butterflies. In 1974 and 1975 counts were made in a number of other sites in eastern England, as a pilot trial for a national scheme. In 1976 a national scheme began, financed by the Nature Conservancy Council and coordinated by the Institute of Terrestrial Ecology at Monks Wood Experimental Station. This paper is an account of the progress of the scheme in its first three years.

METHOD

Details of the method are available (Pollard 1977), and only a synopsis is given here. A route through the study area is chosen and used for regular counts from the beginning of April until the end of September. All butterflies encountered within limits to the side of and in front of the observer are recorded. Counts are made within specified times and there are also minimum weather conditions below which counts are not made. The season is divided into 26 recording weeks and the aim is to make at least one count in each week. The transect routes are divided into sections so that information is obtained on the distribution of butterflies along the route.

The mean weekly counts are used to calculate an index of abundance for each brood of each species. An example is given to illustrate this, that of the large white *Pieris brassicae* L. in Monks Wood. (Fig. 1). This species is probably not breeding in the wood so that, in this instance, the indices



Fig. 1. Mean weekly counts and index values for the large white *Pieris brassicae* L. in Monks Wood N.N.R., 1973-78. Index values are the sum of the mean weekly counts for each brood. Brood separation is by inspection of the data.

reflect numbers passing through or stopping to feed at flowers. If the different broods are not easy to distinguish then a combined seasonal index value is given. For some species, we have evidence to show that the counts are well correlated with actual abundance (Pollard 1977) but, for most, such a relationship remains a 'reasonable assumption'.

The index values are intended for year to year comparisons and not for direct comparisons between sites. This is because the index value for a particular species at a site depends very much on the route chosen.

There may be consistent differences between counts made by two recorders at the same site, one producing higher or lower counts than another. However the trends shown by different recorders at the same site are similar.

SITES

The distribution of sites in 1978 is shown in Fig. 2. Only five sites have been withdrawn from the scheme since 1976. The number is steadily growing but it is considered that it is now close to the optimum. The range of habitats is large, but semi-natural woodlands and grasslands predominate, as the majority of sites are National Nature Reserves. Farmland, forestry and urban areas are included but under-represented, as too are upland areas, where weather conditions make a complete seasonal record impossible in some years.

RESULTS

1. *As site records.*

At the simplest level the data provide a record, in a sense an inventory, of the butterfly fauna of a site as represented by the transect. This aspect of the data is illustrated in Fig. 3. Even if a transect is not repeated each year this provides a record for that year, and a further record can be made after a lapse of several years.

The relationship between the distribution of adults on the transect route, and their breeding areas will vary from species to species. For some, e.g. the dingy skipper *Erynnis tages* L. or chalkhill blue *Lysandra coridon* Poda, the agreement is likely to be very good. At the other extreme this sort of data for the large white or red admiral *Vanessa atalanta* L. is likely to be largely a reflection of the distribution of favoured flowers.

The information on the distribution of counts is valuable in assessing the effect of habitat change on butterfly numbers at a site, as will be discussed later.

2. *Phenological data*

As counts are made regularly through the season information on the flight periods of butterflies is obtained. The peak flight period of the ringlet at Monks Wood, for example (Table 1), was some three weeks later in the

Table 1. Mean weekly counts of ringlets, Monks Wood 1973-78.

Week no.	12	13	14	15	16	17	18	19	20	21	22
1973	.	0.8	43.3	115.8	103.8	35.2	8.2	.	0.1	.	.
1974	.	.	1.6	8.1	31.7	29.3	4.2	0.8	.	.	.
1975	.	.	3.0	20.8	30.0	18.0	4.6	0.2	0.3	.	.
1976	.	6.0	42.5	20.0	6.2	2.3
1977	.	.	.	0.5	0.7	2.3	2.3	1.3	0.7	.	.
1978	.	.	.	0.3	2.3	3.6	1.7	2.0	1.0	0.3	.
Date of 4th day	20	27	4	11	18	25	1	8	15	22	29
	JUNE		/	JULY			/	AUGUST			



Fig. 2. Location of sites in 1978. N.C.C. regions shown as these are used for regional analysis of data.

cool summers of 1977 and 1978 than in the very hot summer of 1976. This is because of temperature dependent differences in rates of development of the larval and pupal stages. Such differences have been shown in other

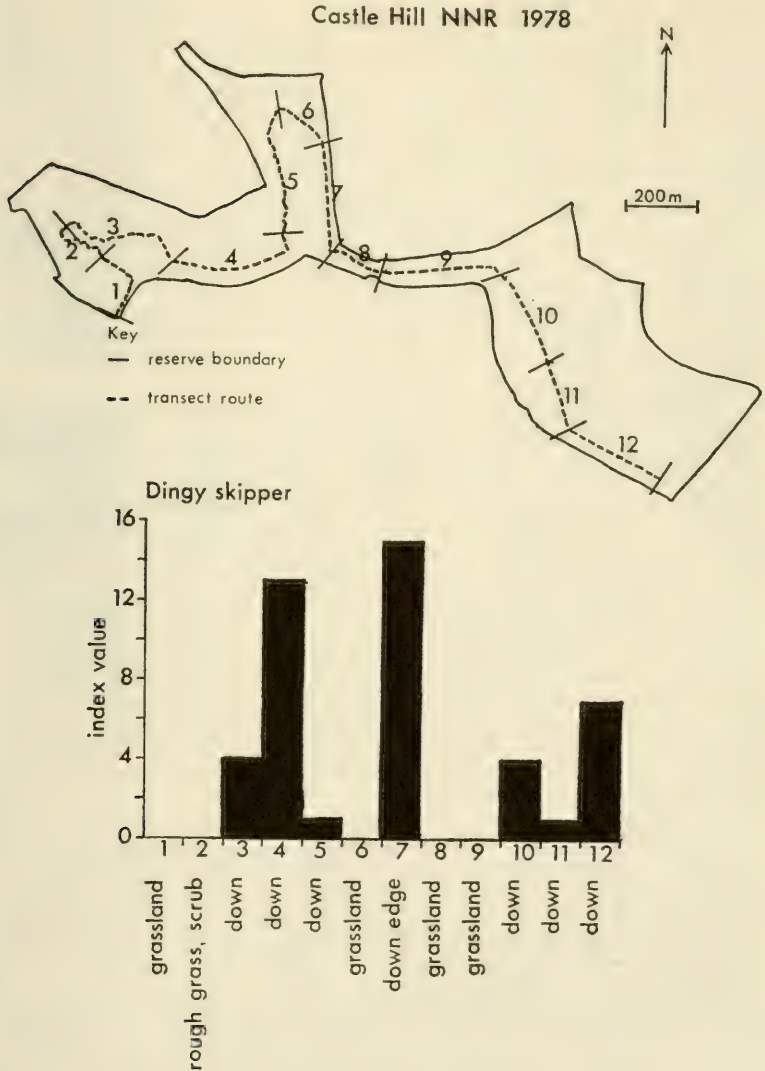


Fig. 3. Distribution of the dingy skipper *Erynnis tages* L. at Castle Hill N.N.R. 1978, Sussex, showing the association with downland turf as opposed to improved or tall grassland of various types.

species to have an effect on the mortality of these stages, as in cool seasons individuals are available to predators, especially birds, for longer periods (Thomas 1974, Pollard 1979). There are indications in the data that the abundance of the ringlet is also affected by the earlyness of the season, but the main influence on its numbers during this period is believed to have been the 1976 drought.

In addition to comparing flight periods at one site in different seasons, we can also look at geographical variation in one season. It is to be expected that in more northern sites the emergence of adults will begin later than in the south. Some selected data for the meadow brown *Maniola jurtina* L. support this view in general (Fig. 4), although the flight period begins later on the exposed Lindisfarne transect than at the two Scottish sites. However the most striking feature is that at Kingley Vale, the earliest site, the flight period is so protracted that it is also the latest site of those shown. Inspection of the data for all sites where the species is sufficiently abundant for the flight period to be determined (Fig. 5) shows that the long flight period is a feature of all the sites on chalk soils. The chalk soils probably warm up early in spring and so the early emergence is not surprising. However there is no obvious explanation for the very long flight period. The monitoring scheme has revealed an intriguing problem which could well reward further study.

3. Regional and national trends in abundance.

Methods are being considered for collating the data for a number of sites to give overall regional or national trends in the index values. In the illustration given (Fig. 6) the index values at individual sites have been summed and the ratio calculated to express the change occurring between successive broods. Similar ratios can be calculated for successive pairs of broods, using in each case all the sites which have provided data for that particular pair. If we then take as the starting point an arbitrary figure of 100 the ratios can be used to produce a collated index for a region or for all sites. Essentially this is the method used to illustrate change in the Common Bird Census (Bailey, 1967). The farmland sites in the Common Bird Census are considered to provide an index applicable to farmland in lowland Britain generally. The sites in the butterfly scheme are highly biased because of the large number of N.N.R.s. Nevertheless if, as seems likely, year to year changes are dominated by weather conditions, the changes in the collated index give a useful indication of the effect of weather or any other factors acting over a wide area. Local effects can be compared with this overall picture.

The regions used are those of the Nature Conservancy Council. If the regional data suggest very different trends in different parts, as is the case for the green-veined white *Pieris napi* L. (Fig. 6), then the national trend, based on all sites is perhaps of little value. For many species however trends have been similar over much of the country, although the large number of southern sites means that the picture given is essentially for the southern half of England and Wales.

There seems little doubt that the major influence on numbers of many species during the short period of recording has been the 1976 drought. This caused desiccation of larval food plants, while lack of moisture and nectar was harmful to adults of many species. Species which showed major declines in 1977, probably due to the drought in the previous year, were the dingy skipper, large white, small copper *Lycaena phlaeas* L., common blue *Polyommatus icarus* Rott., peacock *Inachis io* L., wall *Lasiommata*

Mean weekly count

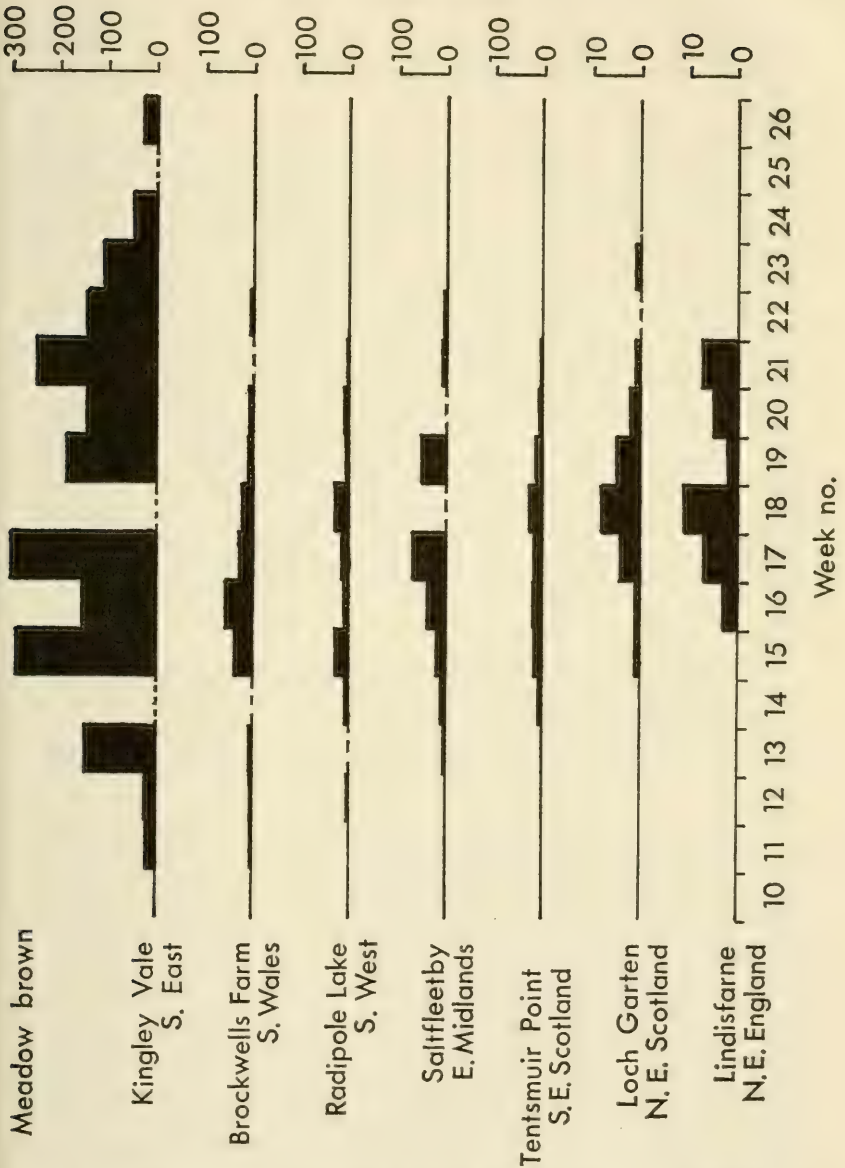


Fig. 4. Flight period of the meadow brown *Maniola jurtina* L. at a selection of sites in 1978. Site name and N.C.C. region given. Broken base line indicates no data for that week. Week 10 starts on 3 June, week 26 on 23 Sept.

megea L., speckled wood *Pararge egeria* L., and ringlet *Aphantopus hyperantus* L. Some of the double brooded species, such as the large white and common blue, showed some recovery in the second brood in 1977, and the speckled wood, which has complex overlapping broods, also increased towards the end of 1977. Although the summer of 1977 was cool and wet, these increases suggest that some species were already recovering from the drought.

The summer of 1978 was again generally a cool one, but many species showed increased index values or little change. A further surprising feature of a summer, with weather which would generally be considered very poor for butterflies, was the enormous abundance of small whites *Pieris rapae* L. and green-veined whites (Fig. 6) in eastern England. Several species which appeared to suffer most from the 1976 drought showed large increases. These included the green-veined white, speckled wood and ringlet which are associated with cool, damp habitats and may have done well in the damp summers of 1977 and 1978. Other drought affected species, the small copper, common blue, and perhaps the wall, which may be more dependent on sunny conditions have shown, at most, only small recoveries.

The similarity of trends over much of the country may be because of the overriding influence so far of the 1976 drought. In 1978 however there were a few clear regional differences, such as those for the green-veined white and the small white which were abundant in the east, while the small skipper *Thymelicus sylvestris* Poda declined in the east but increased in the west. 1978 was also notable for the small number of migrants. The trends for the red admiral (Fig. 6) and painted lady *Vanessa cardui* have been very uniform over the whole country, as might be expected.

4. Trends at individual sites

The regional and national trends, apart from their intrinsic value, will provide a background against which data from individual sites can be assessed. The period of recording is as yet too short to expect to learn much of the effects of habitat change on butterflies. A possible approach to this topic can be illustrated however by using the longer series of east midland data.

Monks Wood N.N.R. has been subject to considerable change during the period of recording 1973-78. This has mainly taken the form of ride widening. The wood was, until this century, managed by traditional coppice methods, giving a cycle of cutting which ensured that in any one year some part of the wood had been cleared. This type of management is believed to have helped to maintain the rich flora and fauna associated with many of our old woodlands. Since the abandonment of coppicing, Monks Wood, in common with many other similar woods has lost a number of its butterfly species. We cannot be sure that this is directly the result of changes in management but it seems likely that they are at least partly responsible. Since Monks Wood became a N.N.R. in 1953 there has been small scale resumption of coppicing but also, more recently, considerable opening up of rides. This has involved cutting many of the shrubs and trees within a 5m band either side of the rides in an attempt to improve the conditions available for the plants and animals of open woodland, including butterflies. Most of this management has been in the transect recording period and so provides an opportunity to gauge the early effects. Other ride

Meadow brown

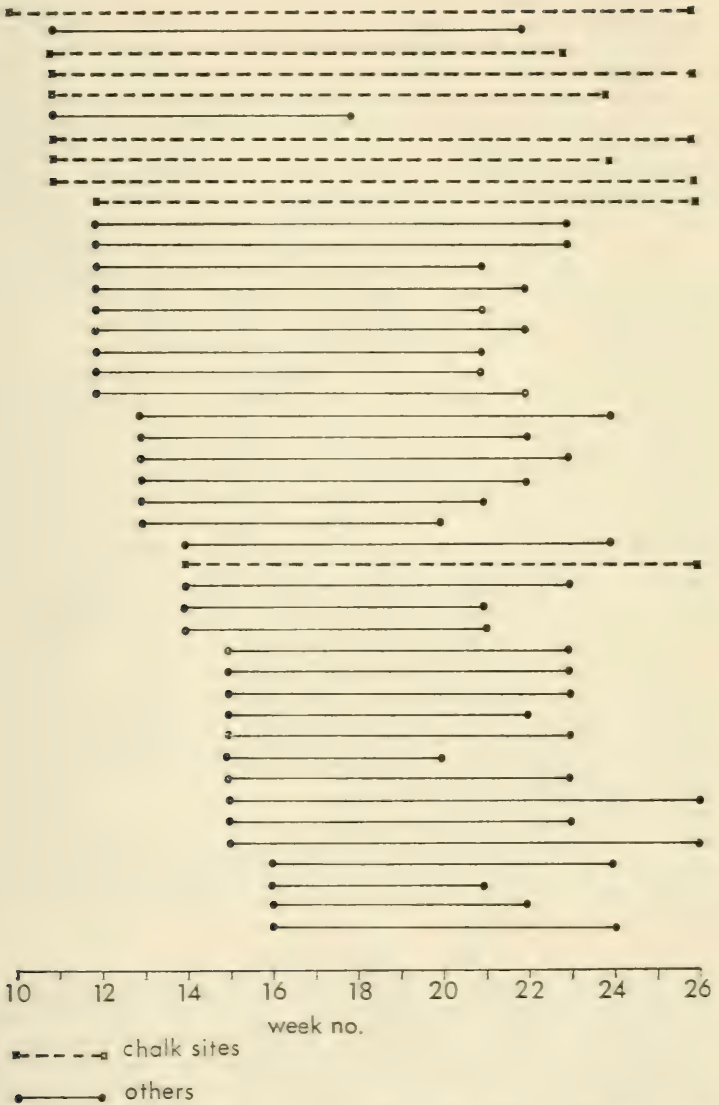


Fig. 5. Flight period of the meadow brown *Maniola jurtina* L. at all sites with adequate data 1978. Chalk sites shown by broken lines. Week 10 starts on 3 June. Week 26 on 23 Sept.

management consists of cutting the ride edge vegetation on a rotational basis every few years, but this is probably of minor importance compared with the widening of the rides.

The trends in index values for Monks Wood for the 1974-78 period can be compared with the collated index from the sites in the East Anglia, East Midland region (excluding Monks Wood). This has been done for just three species to provide an illustration (Fig. 7). It is clear that for the wall the Monks Wood trends are largely determined by what is happening in the region as a whole. The increase in numbers of walls at some sites in 1978 was not shown at Monks Wood and it is possible that the species is temporarily absent from the wood. The peacock shows fluctuations in Monks Wood which are not closely related to the regional picture. This is not unexpected, particularly for the summer indices, as the local abundance of flowers is so important. In 1978 the peacock had a very high summer index value in Monks Wood. This was probably the result of the large number of teasels *Dipsacus fullonum* L. in flower in the wood. The teasel is a biennial and seeded well on the bare ground of some rides during the 1976 drought. It is likely that this effect will be temporary.

The meadow brown seems to have increased in Monks Wood rather more than it has in the area generally. Visual comparison of trends gives only an indication of differences but a more formal comparison of the annual changes suggests that this is a small but real difference. We can move from this comparison with other sites to an inspection of data from the Monks Wood transect itself. Fig. 8 shows the index values for the meadow brown over the period of the six sections which have been subject to ride widening. There is no doubt that adults become more abundant in rides after widening. It seems that the numbers may rise to a peak two or three years after widening and then there is a decline, suggesting that the benefit for this species may be short lived. The evidence still falls short of a proof of a beneficial effect of the management on breeding populations, but it seems a reasonable assumption that this is the case.

Of the other species in the wood only one, the hedge brown *Pyronia tithonus* L. shows a similar increase to that of the meadow brown, while the ringlet and speckled wood have shown relative declines. The latter species are associated with the shadier rides of the wood and have probably been adversely affected by management.

The effect of the ride-widening must be said to be somewhat limited so far, the majority of species showing no obvious response in terms of the index value in the wood. A number do show redistribution within the rides however and it is likely that in the longer term the management will begin to show more benefits.

DISCUSSION

After three years it may be said that the Butterfly Monitoring Scheme is successfully established. Eventually it should be possible to quantify changes in butterfly abundance over a sufficiently long period to be able to investigate the effects of weather conditions and other factors on annual fluctuations, as Beirne (1955) and others have attempted previously with the qualitative data available to them.

The method is not however without its problems and these should not be forgotten in interpreting the results. The most serious of these problems are:

green-veined white

red admiral

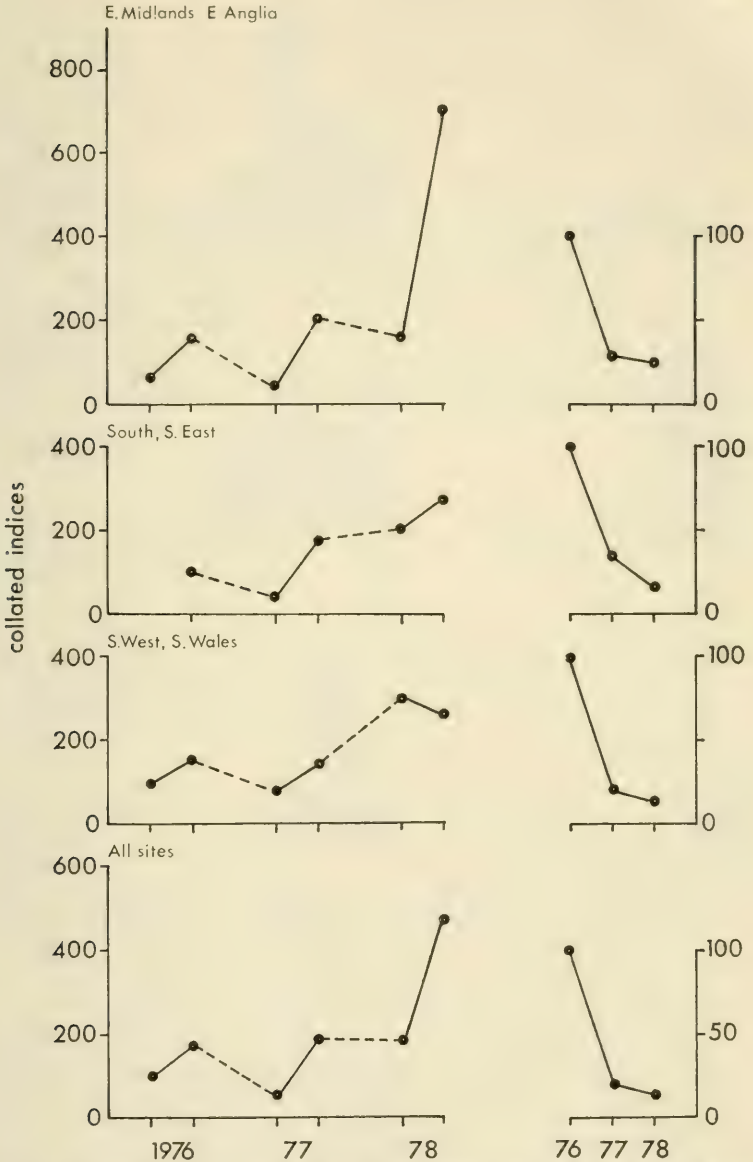


Fig. 6. Collated regional and 'all sites' index values for the green-veined white *Pieris napi* L. and red admiral *Vanessa atalanta* L. 1976-78. Insufficient data for the spring brood of *P. napi* in 1976 in S., S. East. Starting point an arbitrary 100 in 1976.

(1) There is undoubtedly an influence of weather on the flight of butterflies, above the minima adopted for recording. In most cases this means that the warmer and sunnier the weather the more butterflies will be recorded. There is also some evidence that at very high temperatures the flight of some species is reduced and so the counts depressed. It is believed that these effects are usually small compared with that due to real changes in abundance, but for some species they may be important. This problem does not affect the comparison between individual site and regional indices.

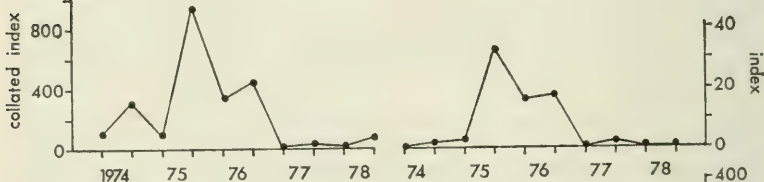
(2) The counts are of adults, but the real interest is in breeding areas. Adults of some species are nearly always found in close proximity to their breeding areas, others are not. In the latter species the index values will be greatly affected by the presence of nectar sources, and are a reflection of these as well as the general abundance of the species in the area.

(3) As a result of the transect counts we have good data on changes in butterfly abundance, but comparatively poor information on changes in habitats. Gross changes, such as those due to management or accidental fires, are known but detailed vegetational changes are not, as botanical monitoring is generally impossible because of the time and labour required.

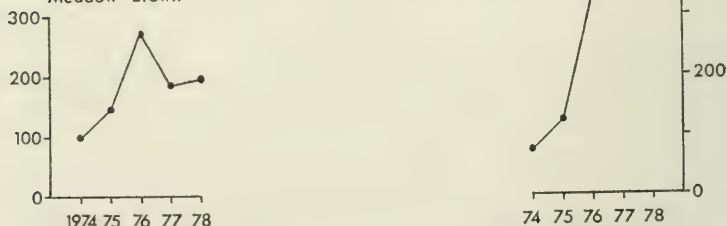
Peacock



Wall



Meadow brown



E. Midlands, E. Anglia

Monks Wood

Fig. 7. Collated E. Midlands, E. Anglia (excluding Monks Wood) index for three species 1974-78, compared with the Monks Wood index over the same period.

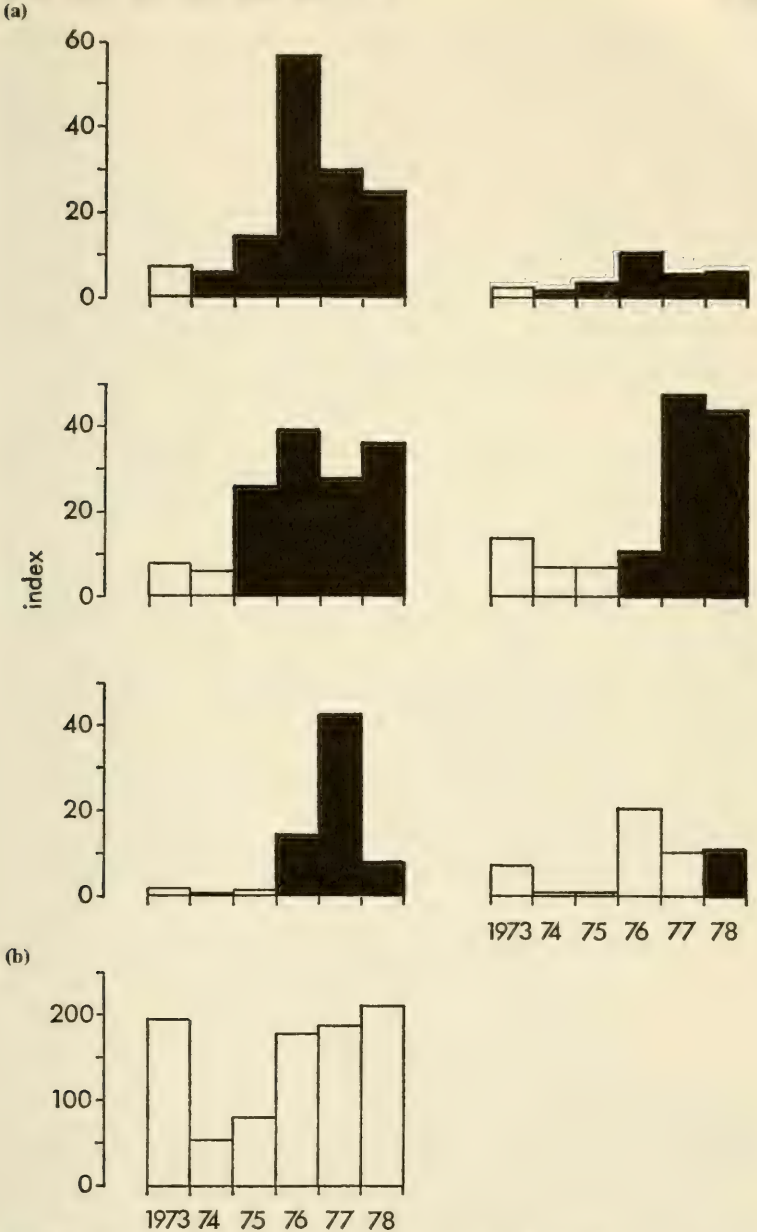


Fig. 8. Changes in index values: (a) In 6 rides in Monks Wood managed by ride widening. The columns are open before management and closed after management. (b) In unmanaged rides in the woods.

The local recorders and reserve managers, in the case of nature reserves, will therefore be particularly important in helping to interpret the effects of habitat changes on the index values.

The results from monitoring may help to indicate the causes of fluctuations by showing correlations with weather conditions or habitat changes and will also highlight problems for further investigation. An understanding of the processes involved in population changes can, however, only be obtained by intensive studies of individual species. Such studies must include not just the adults, but all stages of the life cycle, any one of which may be important in a particular case.

A major advantage of monitoring lies in the fact that we will know what is happening while it is happening and while it is possible to take action for the conservation of species. In addition there will be a data bank available, so that ideas resulting from research can be tested using information from a range of sites over a long period of time.

ACKNOWLEDGMENT

I would like to thank the Nature Conservancy Council, all of the recorders who have contributed to the scheme, and especially J. M. Welch and M. L. Hall who have been involved in all aspects of its organisation.

REFERENCES

- Bailey, R. S. (1967). An index of bird population changes on farmland. *Bird Study*, **14**: 195-209.
- Berne, B. P. (1955). Natural fluctuations in abundance of British Lepidoptera. *Entomologist Gaz.*, **6**: 21-25.
- Pollard, E., Elias, D. O., Skelton, M. J. and Thomas, J. A. (1975). A method of assessing the abundance of butterflies in Monks Wood National Nature Reserve in 1973. *Entomologist's Gaz.*, **26**: 79-88.
- Pollard, E. (1977). A method for assessing changes in the abundance of butterflies. *Biol. Conserv.*, **12**: 115-134.
- Pollard, E. (1979). The population ecology and change in range of the White Admiral butterfly *Ladoga camilla* L. in England. *Ecological Entomology*, **4**, 61-74.
- Thomas, J. A. (1974). Factors influencing the numbers and distribution of the brown hairstreak, *Thecla betulae* L., (Lepidoptera, Lycaenidae) and the black hairstreak, *Strimonidia pruni* L., (Lepidoptera, Lycaenidae) Ph.D. Thesis Leicester University.

THE BUTTERFLIES AND HAWK-MOTHS OF EASTERN SAUDI ARABIA

(with Plate VII and One Map [Plate VIII])

by A. R. PITTAWAY

(15 Beech Hall Road, Highams Park, London E4 9NJ)

Although described as desert or desert-steppe, the natural vegetation and topography of eastern Saudi Arabia is quite varied, ranging from shifting sand-dunes, fertile oases, rocky, barren plains, to true steppe.

Virtually all the rain (50 to 150 mm.) falls between November and April, during which period the windspeeds and cloud-cover are also at their greatest. These are also the coolest months of the year, day temperatures ranging from 17 to 27°C and at night, between 3 and 19°C. During the hottest months—June to early October, day temperatures rise to between 37 and 58°C, while at night they rarely drop below 30 degrees.

Thus, it is not surprising that most plant life away from the oases comes to life after the rains, but before the onset of searing temperatures, i.e. January to May. This is reflected in many of the butterflies' life-histories, described from observations made during 1977 and 1978.

PAPILIONIDAE

Papilio demoleus Linné.

RANGE: From Saudi Arabia and Mesopotamia across sub-tropical and tropical Asia to northern Australia.

Within Saudi Arabia, common in the oases of Safwa, Qatif, Tarut Island, Al Hassa and various wadis along the Tuwayq Hills, especially Wadi Hanifa to the west of Riyadh.

ADULT: 92-106 mm.

A strong flyer, sailing and soaring over *Citrus* groves, along tracks, as well as between date-palms, where it is greatly attracted to the flowers of root brassicas and *Lantana*.

This species, which varies from oasis to oasis, is on the wing from mid February to early December in a succession of overlapping broods. Scarce at the beginning of its flight period, numbers build up in April.

EARLY STAGES: *Citrus* species, especially Lemon and Mandarin, are the only foodplants. On these, the glossy yellow and domed eggs are laid singly on young leaves of a growing tip, never old leaves. Besides being very conspicuous, they are also locally numerous as many females will select the same bush for oviposition, with young saplings being preferred.

Newly hatched larvae resemble those of *P. machaon* L., i.e. black with a white saddle, and spiny. This colour scheme lasts into the fourth instar, as does the habit of resting and feeding exposed on top of a leaf.

With the next skin change green becomes the dominant colour dorsally, white ventrally, with a brown and white chequered anterior band over the 50 mm. body.

Now it feeds secretly, hiding away amongst twigs and leaves when at rest.

The 25-35 mm. pupa is formed amongst these twigs. However, if on a sapling, then on the main stem. Many are destroyed during the winter months due to the activities of parasites and bacterial disease. Even so, large numbers still survive.

A number of colour forms are evident—green and yellow, light brown and purple, and whitish brown with dark brown markings.

Papilio machaon Linné.

RANGE: Across the Palearctic and northern Nearctic in a multitude of subspecies.

In eastern Saudi Arabia confined to the Al Hassa Oasis, as well as on Tarut Island, where it was introduced in the winter of 1977/78.

Eller originally named this population ssp. *arabensis*, but gave no description or type locality. Examination of a number of individuals shows quite clearly that this Saudi population is but an isolated colony of *Papilio machaon syriacus* Verity.

However, Al Hassa examples do have broader and more curved tails than Mesopotamian specimens.

Occasionally, in summer, some individuals resemble subspecies *muetingi* Seyer from Iran will turn up in other areas.

P. machaon frequents cultivated date-palm areas, especially those bordering Lucerne fields, where it forms definite breeding colonies.

ADULT: 84-98 mm.

Found from late November to mid April in a number of overlapping broods, usually four. Commonest during January and February.

Flying quite fast along partially shaded tracks, or over cultivated fields, it frequently stops to sip nectar at the flowers of root brassicas and sweet basil (*Ocimum basilicum*).

Impregnated females have a more leisurely flight, stopping ever so often to investigate clumps of fennel (*Foeniculum vulgare*), or sun themselves during the coldest month.

Later on, when warmer weather sets in, most fly in the shade amongst date-palms.

EARLY STAGES: Fennel and *Haplophyllum tuberculatum* (Rutaceae) are the foodplants. As the former is an introduction, it is possible that this species once fed solely on the latter.

On these, the glossy yellow and domed eggs are laid, either all over small seedlings in fields, or on the lower and outer leaves of larger growths.

During midwinter, plants growing in full sunlight are preferred. However, come March, some sort of shade is sought for part of the day.

The larvae cannot be distinguished from those of *P. machaon gorganus* Fruhstorfer in all stages.

Those feeding on fennel generally eat the lower and older leaves, while on *Haplophyllum*, both leaves and flowers are avidly taken by all instars.

On the latter as many as nine larvae per plant have been found, ranging from newly emerged to fully grown individuals.

Pupae are formed away from the foodplants, amongst shrublets, on tree-trunks, or on the irrigation channels. These are identical to those of ssp. *gorganus* from central Europe, with both green and brown forms.

PIERIDAE

Pieris (= *Artogeia*) *rapae* (L.)

Recorded as a winter and spring migrant as far south as Riyadh along the Tuwayq Hills. Larval foodplant: — cultivated cabbage.

Euchloe belemia Esper.

RANGE: From north-west Africa and south-west Europe across North Africa, Saudi Arabia to Mesopotamia and Iran.

Found in the bush and grass strewn coastal sand-dunes, as well as the *Rhanterium* and camel-grass steppe areas on the eastern coast, from Abu Hadriyah to Al Mish'ab. Small numbers also occur in the Tarut Island and Qatif Oases.

ADULTS: 38-46 mm.

On the wing from mid January to mid March in two or three broods, this fast, strong and sig-zagging flyer stays close to the ground, often following definable courses repeatedly. It is greatly attracted by earth ridges supporting larger than normal numbers of annual Cruciferae. In very strong winds most seek shelter on the ground behind a grass tussock.

EARLY STAGES: The seed-pods of tall annual Cruciferae—*Sinapis*, *Brassica* and *Sisymbrium* are the commonest foodplants. In Qatif Oasis, the isolated population exists solely on the pods of cultivated root brassicas.

Young larvae are bluish green with a profusion of black bristles. Fully grown at between 45 and 50 mm., they are striped longitudinally purple, white and greenish yellow, with short, black bristles, and very thin.

They rest along the narrow seed-pods of their foodplant when not consuming them, with up to five per plant being common.

The 20-22 mm. pupae are similar to those of the European Orange Tip (*Anthocharis cardamines* L.), but more cylindrical and brownish grey. These are formed away from the foodplant, usually amongst *Rhanterium*.

Euchloe falloui Allard.

RANGE: North Africa across to Sudan, and central Arabia where it is found in small, isolated colonies along the Tuwayq Hills, frequenting open, flat, salt free, rocky desert-steppe, especially mini plateaus separated by wadis.

ADULT: 36-38 mm.

Very similar in behaviour to *E. belemia*, but not such a fast flyer. As many of each species resemble each other, genitalia comparisons should be undertaken.

Pontia glauconome Klug.

RANGE: From Somalia north to Lybia and east to Arabia.

In eastern Saudi Arabia, almost anywhere where rocky outcrops occur, i.e. the rocky plains and hills to the north, west and south of Riyadh, as well as around Dhahran, Khobar and the Al Hassa Oasis.

Favours rocky wadis and their surrounding gullies as well as sandy areas with perennial Cruciferae (*Zilla*).

ADULT: 43-46 mm.

Very fast, zig-zagging, low flying species which often settles at Cruciferae flowers bordering abandoned date plantations.

Common from early March to early December in a multitude of overlapping broods, which differ from area to area, depending on the rains. In some favourable localities, e.g. the Tuwayq Hill wadis, it often abounds in May and October.

(Overwinters as a maturing larva or pupa on its foodplants.)

EARLY STAGES: Although most often found on the shrubby *Ochradenus* species (Resedaceae), larvae also feed on *Reseda* (where it occurs), *Zilla*, *Diplotaxis harra* and *Moricandia sinaica*, (the latter only around Riyadh in the spring), taking leaves, flowers and seed-pods with equal relish.

It is on these plants that the pale creamy white, conical, ribbed eggs are laid singly, either on the flowerstalks (*Zilla*), or leaf surface (*Ochradenus*).

Full grown larvae (30-40 mm.) which are very similar to those of *Pontia daplidice* L., feed quite openly, with up to five or six individuals per plant being common.

The 16-20 mm. pupae are again very similar to those of *P. daplidice* and are formed head downwards at the base of a shoot, usually on the main stem at the approach of winter. Summer brood pupae may be found anywhere on the plant and be of a china-white colour.

Colias crocea (Geoffroy)

RANGE: Across southern and central Europe to North Africa, Iran and Saudi Arabia.

Common in the Tuwayq Hills; abundant in all major, cultivated, eastern oases—Al Hassa, Qatif, Tarut Island and Safwa, favouring the Lucerne (*Medicago sativa*) fields.

Small, isolated populations also exist around Manifa, north of Jubail, on beds of annual, winter legumes growing in hollows between coastal sand-dunes. These populations are also supplemented by migrants.

ADULT: 48-54 mm.

Occurs from December to early May, but at Manifa only during February and March.

Has a very characteristic to and fro flight over low vegetation, where it frequently settles at sweet basil (*Ocimum basilicum*) flowers in the oases. EARLY STAGES: *Medicago sativa*, *Sesbania* and various annual trefoils and vetches are this species' foodplants, whose larvae and pupae are identical to European examples.

Anaphaeis aurota Fabricius

RANGE: From subsaharan Africa across Saudi Arabia to Syria, India and Ceylon (Sri Lanka).

In this region a small, isolated population exists on Tarut Island. There is then a large break before it reappears in the easterly Tuwayq Hills, from Al Kharj to Buraydah, where it frequents abandoned date plantations in oases, or wadis. It is especially common in Wadi Hanifa to the west of Riyadh.

Although it may occur over a large area, *aurota* inhabits definite, large colonies whose fortunes wax and wane due to heavy predation.

ADULT: 53-58 mm.

A powerful flyer, dashing between date-palms, across clearings, or over the ground, where it frequently settles. Often stops to sip nectar at flowers.

Observed from mid November to mid April, with three peaks:— late November, mid to late January and late March.

EARLY STAGES: *Capparis* species, but only those in or near oases, are the foodplants on which the pale yellow, conical and heavily ribbed eggs are laid in groups of up to 30 on the leaf underside of growing shoots, with often more than four batches per shoot. After a few days they turn orange, then grey prior to emergence.

Larvae are greyish green when young, covered in dark bristles and highly gregarious.

Fully grown specimens (35 mm.) are mid grey with a broad, greenish yellow dorsal band and yellowish underside. Two very distinct features are the long, pale, ventral hairs, and small orange spots which cover the whole body. Once this size and colour, most are very inactive, spending much of their time sunbathing.

Pupae are approx. 17 mm. long and very like those of *Pieris brassicae* L., but basically grey, or green, with darker markings and a greenish dorsal band. The orange spots, so noticeable in the larvae, are even more conspicuous.

Formed at the base of a shoot in most cases.

Colotis liagore Klug

RANGE: From Mauretania through Arabia to Baluchistan. In eastern Saudi Arabia, only found in the Tuwayq Hills along the sides of deep, rocky wadis.

ADULTS: 32-36 mm.

Tends to fly up and down, or along, the cliff walls, keeping to a given route. Many frequently settle on the ground in the shade of some bush, where they are ambushed by others patrolling the same area.

Easily confused with a small *P. glauconome* Klug at a distance, as this species is on the wing during the brief March and April flight time of *liagore*.

EARLY STAGES: *Capparis* species growing on cliff faces—*C. cartilaginea*; never those species in plantations, are selected as foodplants.

Colotis fausta Olivier

RANGE: From Egypt through Arabia, Iraq, southern Iran to India and Ceylon (Sri Lanka).

Found in the same areas as *A. aurota*, i.e. Tarut Island and the Tuwayq Hills. Common to the west of Riyadh in Wadi Hanifa.

Occurs as ssp. *fausta*, closely resembling specimens from Mesopotamia and also found in similar habitats—the edges of cultivated fields, or abandoned date plantations, where *Capparis* has colonised.

ADULT: 48-50 mm.

A very fast flyer, and solitary, dashing very close to the ground, on which it frequently settles with wings closed Dorsally, it resembles a pinkish orange *C. crocea* Geoff.

Observed in Wadi Hanifa from mid November to mid May. On Tarut Island, only seen during January and February in very limited numbers.

EARLY STAGES: Feeds on *Capparis*, especially *spinosa*.

Catopsilla florella Fabricius

RANGE: From the Canary Islands across subsaharan Africa, through Egypt and Arabia to India and China.

Only found in the Tuwayq Hills west and north of Riyadh, frequenting wadis with abandoned date plantations and sand-bars.

ADULT: 65-75 mm.

A very fast and direct flyer, most often seen dashing along the edges of plantations. However, it is rare and may only be a migrant in this area, occurring in April, although in western Saudi Arabia (Jiddah) it flies from March to July.

EARLY STAGES: *Cassia italica*, a small shrub found in wadis, is the only foodplant in the eastern region.

The eggs, which are almost identical to those of *C. crocea* Geoff., are laid on the upper and lower surfaces of this plants leaves.

Full grown larvae (40-45 mm.) are dorsally leaf green with cross-lines of fine, dark, bristle bearing tubercles. A double lateral line of black and yellow is present. Head leaf green with fine, black spots. This colour scheme provides good camouflage amongst the flowerheads and leaves where they rest.

Eurema hecabe Boisduval

RANGE: Right across subsaharan Africa and tropical Asia to Japan in numerous subspecies.

In eastern Saudi Arabia, confined to the oases around Qatif and on Tarut Island as ssp. *senegalensis* Bdv., frequenting the edges of cultivated fields, especially those of Lucerne. However, in Qatif Oasis, where it is less common, individuals are often seen flying between date-palms on overgrown, abandoned plots.

ADULT: 40-44 mm.

A weak flyer, staying close to the ground where it often settles amongst the Lucerne.

It is also an avid visitor of nectariferous flowers, especially sweet basil, from which it feeds for lengthy periods.

The generations are identical in appearance, the species flying from December to mid May, with two peaks:— one during January and the other in late March.

EARLY STAGES: The sole foodplant of this species is *Sesbania sesban*, an introduced, small, upright tree similar to *Laburnum* in many respects, especially the flowers, but not the pinnate leaves.

Small, isolated saplings situated in sunlight dappled clearings, or field

borders, are selected on which to lay the yellow, conical and heavily ribbed single eggs, which turn orange prior to hatching.

Fully grown larvae (30-33 mm.) are very similar to those of *C. crocea* Geoff., (which can also be found on the same plant), but are thin, cylindrical and lack any trace of red along the yellow lateral line. Otherwise, they are dark green, including the head, and covered in fine, black bristles.

Most rest along a leaf midrib, on the upperside, where they are very well camouflaged.

The pupa (15 mm.) is, again, very similar to that of *C. crocea*, but more finely proportioned and pale green. Usually formed under a leaf if hatching soon; otherwise at the tree base.

DANAIDAE

Danaus chrysippus Linné.

RANGE: From the Canary Islands right across Africa, Arabia, tropical Asia to Australia.

Found all over the rocky central region of Saudi Arabia, as well as all large oases and most of the coastal area in the east, i.e. the Tuwayq Hills, Al Hassa, Khobar, Dhahran, Qatif, Tarut Island, Safwa and the Manifa sand-hills.

ADULT: 74-78 mm.

A slow, lazy flyer, abundant in well vegetated wadis around Riyadh where it flies all year round. However, in the east it is only on the wing from February until November, overwintering as a feeding larva or pupa.

EARLY STAGES: The large, broadly conical, pale yellowish white, ribbed ova are laid singly on the underside of a young leaf, with various Asclepiadaceae being selected for this—*Pergularia tomentosa* around Riyadh; *Calotropis procera* both there and in Dhahran; a plant resembling *Vincetoxicum* in the eastern oases, and *Leptadenia pyrotechnica* on the Manifa sand-hills.

On these black, yellow and white banded, tentacled larvae feed up rapidly before pupating beneath a leaf as a pale blue, gold speckled pupae.

NYMPHALIDAE

Melitaea perseae Kollar

RANGE: Lebanon, S. Turkey, Syria, Iraq, Iran and Saudi Arabia.

In the latter country only found in the Tuwayq Hills, where it is very common to the west and north of Riyadh as ssp. *sargon* Hemming, frequenting the rock strewn beds of dry wadis, especially those with sheltering cliffs. Occurs in definite colonies

ADULTS: 38-50 mm.

Flight very typical of the genus, being interrupted by frequent stops on the ground, or on *Anvillea garcini* to feed. Wing patterning and colour variable, as well as the first generation being darker and more heavily spotted.

On the wing from early March to mid April in two broods—early March and the first two weeks of April. Each brood only flies for a very short period.

EARLY STAGES: *Teucrium oliverianum* (desert germander) is the sole food-plant, being a perennial herb which is often abundant, carpeting some wadis with their salvia-like, purple flowers.

The larvae (see Plate VII) are sometimes very common on this plant, some areas being completely stripped of leaves, flowers, as well as seedpods. Fully grown at between 30 and 35 mm., the larvae are typical of the genus,

being white with dark cross stripes and bright orange dorsal cones. Like most *Melitaea* larvae, these will curl up and fall into the tangled mass of their foodplants base when disturbed.

Pupae (12-15 mm.) are also typically *Melitaea*—pearly white with small black and tan specks. These are formed at the foodplant's base, although many of the first generation hang fully exposed on the upper stems, where they form up in a week.

Junonia (= *Precis*) *orithya* (L.)

RANGE: Sub-Saharan Africa across Arabia to tropical Asia.

In eastern Saudi Arabia it is confined to cultivated oases in the Tuwayq Hills, as well as in the eastern coast region—Al Hassa, Khobar, Dammam, Qatif, Tarut Island and Safwa, where it shows a preference for field edges, fallow fields and the clear areas beneath date-palms.

ADULT: 43-50 mm.

A very conspicuous species and very common, either flying rapidly in the shade of trees, sunning on bare ground, or sipping nectar from *Vernonia* shrubs. Many are also attracted to overripe dates which have fallen on the ground.

J. orithya flies all year round, but is most common from April to November.

EARLY STAGES: *Convolvulus* species, especially *arvensis* plants at the edge of, or in, fields, are the foodplants on which the blue-green, domed and heavily ribbed eggs are laid singly.

Fully grown larvae (35-40 mm.) are black with fine white speckling and a mass of blackish spines. The black head has an orange ring behind it, a dorsal line of the same colour extending from there to the anal claspers.

Many sit fully exposed on the ground inbetween eating small holes in their foodplants leaves, with older ones being preferred.

The pupae (15 mm.) are pale greyish brown and similar to those of *Vanessa atalanta* L., both in shape and department. They are formed on the stalk of some nearby dead plant.

Vanessa cardui (L.)

RANGE: Throughout the subtropics and tropics, except South America, where it occurs as a sporadic migrant.

It is as a migrant that this species occurs all over eastern Saudi Arabia, but it is only resident in the Tuwayq wadis and large eastern oases, and from the *Rhanterium*/Camel-grass steppe north and northwestwards to Kuwait and Iraq.

ADULT: 54-56 mm.

Has a very characteristic and straight flight, but it often settles on the ground to sun with wings open. Many are attracted to flowers, especially the large *Vernonia* shrubs of the east coast oases, these blooming during the insects flight period—November to April in up to four broods, with February producing most adults.

EARLY STAGES. The spiny yellow and brown larvae are identical to European examples, but feed on *Urtica urens* around Riyadh; but on *Malva egyptia* and, especially, *Neurada procumbens* (Rosaceae) in the east coast steppes and sand-hills.

LYCAENIDAE

Lampides boeticus (L.)

RANGE: In the tropics and subtropics of the Old World.

In this region it is confined to the cultivated oases of Safwa, Qatif, Tarut

Island, Dammam, Khobar, Al Hassa and the Tuwayq Hills, being rare in the latter locality.

Frequents the fringes of cultivated fields, gardens, road reservations and islands, and rocky gorges fringing cultivated wadis.

ADULT: 30-34 mm.

At certain times of the year an abundant species, flitting around its foodplants on which it frequently settles, or even feeds from, especially in the case of *Sesbania sesban*.

Alternatively, to be seen dashing along some plantation edge, or city street, in search of flowers, or a place to deposit eggs.

Its flight time usually coincides with the flowering of its foodplants, but small numbers can be found throughout the year. Three main broods are evident: — one in December and the other two in March and April.

EARLY STAGES: The pillbox shaped, china white and heavily sculptured eggs are laid on the sepals or immature pods of the foodplants flowers, and are often extremely abundant. The most common foodplant is *Sesbania sesban*. However, as this plant does not occur in Al Hassa and the Tuwayq Hills, the pods of *Phaseolus* are taken in the former, those of *Astragalus* in the latter.

On hatching, the young larva immediately bores into the pod where it proceeds to feed on the immature seeds. Pupation also occurs within the pod.

Zizeeria karsandra Mre.

RANGE: From Africa and the southern Iberian Peninsula across the Middle East and tropical Asia to Australia.

In eastern Saudi Arabia, mainly confined to the cultivated oases of Jubail Safwa, Qatif, Tarut Island, Dammam, Khobar, Al Hassa and the Tuwayq Hills. A few isolated colonies exist along the coast to Kuwait where rain-water accumulations between coastal sand-dunes allow trefoils and vetches to grow during the winter months, e.g. Manifa and the island of Abu Ali.

ADULT: 18-22 mm.

Probably the commonest butterfly in the region. Abounding over Lucerne fields, it flies very close to the ground, often in groups which frequently settle on low vegetation. Where flowers occur, especially *Vernonia* and sweet basil, this species smothers them, often driving off competing bees. Amongst sand-dunes, population densities are much lower.

In the oases this species is continuously brooded throughout the year, but becomes uncommon during the cooler months of December, January and February. However, on the sand-dunes, where its foodplants are seasonal, only one or two broods occur during March and early April, but this is dependent on the rainfall.

EARLY STAGES: The 8 mm. larva is typically lycaenid; pale olive green with a number of faint, coral red bars and arrow marks dorsally. The small head is black.

It feeds quite openly on a shoots tip, preferring cultivated Lucerne (*Medicago sativa*). Prior to its introduction, various *Alhagi* species were probably taken in the easterly oases, and still are. It is also found on related, annual species such as *Lotus* and *Trigonella*.

Pupae, which are approx. 6 mm. long, are attached to the underside of a leaf or stem, and exhibit the same colouration as the larvae. In shape it resembles that of the common blue (*Polymmatius icarus* Rottemburg).

Tarucus rosaceus Austaut

RANGE: From North Africa across Arabia to Iraq and Iran.

In this region it is confined to oases, having been found at Jubail, Safwa, Qatif, Tarut Island, Khobar, Al Hassa, Salasil and various wadis criss-crossing the Tuwayq Hills. On no occasion was *T. theophrastus* Fab. found. ADULT: 22-26 mm.

A species which occurs in marked colonies. Each adopt a particular *Zizyphus* tree, around which they fly, frequently settling on the leaves and flowers. Many also rest on the dead twigs and shoots of herbaceous plants nearby, which is where most sleep.

Apart from the flowers of its foodplant, individuals have been observed sipping nectar from fennel (*F. vulgare*) and *Heliotropium*.

T. rosaceus flies throughout the year in a number of well defined broods, although it is commonest in October and during March and April.

EARLY STAGES: The larval foodplant is *Zizyphus*.

Agrodiaetus loewii Zeller

RANGE: Turkey, Syria, Lebanon, Jordan and Arabia.

In Saudi Arabia it is only found in the Tuwayq Hills and thence eastwards up to the Ad Dahna sand-dunes, inhabiting any kind of water course in the stony desert, so long as *Astragalus spinosus* is present. However, it does favour the same large, stony wadis that *M. persea* Kollar is found in.

ADULT: 34-38 mm.

A very fast flyer occurring at very low population densities. Often seen dashing in tight circles around *Astragalus* bushes, on whose flowers it settles.

It is on the wing from early March to mid April in two generations; these coinciding with the flowering of its foodplants: — *A. spinosus* and *A. sieberi*, especially the former.

Chilades galba Lederer

RANGE: From southern Turkey southwards through the Middle East, Afghanistan, Mesopotamia to southern Arabia.

In this region it occurs in the Tuwayq Hills along the edges of date plantations in sandy wadis.

ADULT: 22-24 mm.

Flies close to the ground under date-palms, or around *Prosopis* bushes. Many often settle for lengthy periods on shaded bare earth, or grass, during hot weather.

This species is very easily confused with a tailless *Chilades parrhasius* Feb., with which it flies from mid April to mid May.

EARLY STAGES: Most probably feeds on *Prosopis*, a known foodplant which is common in many localities.

Chilades parrhasius Fabricius

RANGE: From India and Arabia north to Afghanistan.

In this area confined to the wadis along the Tuwayq Hills, preferring the edges of date plantations, especially abandoned ones with a profusion of flowers.

ADULT: 22-24 mm.

Nearly always found amongst date-palms, sunning on, and feeding from, bush Compositae.

It is very easily overlooked, or confused with *Lampides boeticus* L. and *Chilades galba* Lederer, with which it flies from mid April to mid May.

HESPERIIDAE

Gegeus nostrodomus Fabricius

RANGE: Circum-Mediterranean, through Asia Minor, Arabia to Turkestan and India.

In eastern Saudi Arabia it occurs in the oases of Safwa, Qatif, Al Hassa and the Tuwayq Hills.

ADULT: 30-33 mm.

This rapid flying species, which is on the wing all year round, but as three or four well defined generations, is most often seen resting on the leaf of some broad-leaved shrub, or feeding from *Lantana*.

EARLY STAGES: As with most hesperids, the larvae feed on grasses.

Pelopidas thrax Hübner

RANGE: Africa, the eastern Mediterranean, Egypt, Arabia, Iran to India and Penang as two separate subspecies.

In eastern Saudi Arabia it occurs as ssp. *thrax* in the oases of Safwa, Qatif, Tarut Island, Al Hassa and the Tuwayq Hills.

ADULT: 40 mm.

Quite a common species, but only really noticed when at rest on a leaf, or feeding from *Jasminum* and *Lantana* blossom. Flies for most of the year.

EARLY STAGES: The larvae feed on most coarse grasses.

SPHINGIDAE

Acherontia styx styx Westwood

Rare in the large Al Hassa Oasis to the north and east of Hofuf, where it flies in February, May, July and September as four separate generations.

Larvae only found on *Withania somnifera* (L.) Dun. (Solanaceae), although it may also feed on the widely cultivated Aubergine.

Agrius convolvuli convolvuli (L.)

A common species, but confined to the neighbourhood of large towns and oases, having been found at Al Hassa, Khobar, Dammam, Qatif, Tarut Island and in the Tuwayq Hills.

Flies from April to November in up to four clearly defined broods, with the first yielding the largest individuals.

Larvae on *Convolvulus* in oases, especially those plants growing along the edges of cultivated fields. In towns, only on ornamental *Ipomoea* species growing over walls.

Daphnis nerii nerii (L.)

Common in all major east coast oases—Al Khobar, Qatif, Tarut Island and Al Hassa, flying from January to June, which is the flowering period of its foodplant. Three overlapping generations have been recorded.

Larvae on *Nerium oleander*, where they usually take the flowers and young shoots. The brown form is common.

Hyles lineata livornica (Esper.)

An abundant species, being especially common (breeding) along the east coast sea-dunes and in the patches of *Rhanterium*/Camel grass steppe to the north and west of Manifa. The largest individuals, however, were recorded from the fringes of Al Hassa Oasis.

Flies from November until April, with most occurring in January and February. Multi-brooded.

Larvae common on the seedheads of *Asphodelus fistulosa*, less commonly on Polygonaceae and tendrilled, annual Leguminosae.

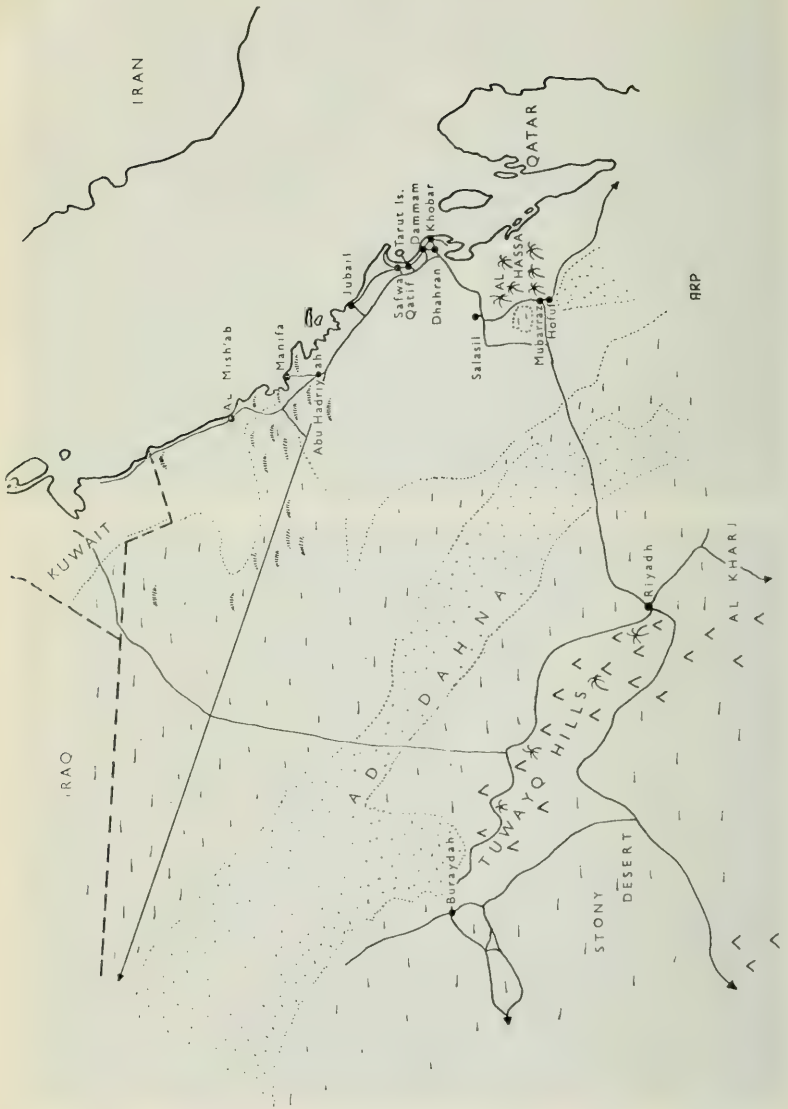
Hippotion celerio celerio (L.)

A common oases species, having been found at Al Hassa, Qatif and Tarut Island from November until June in up to four distinct generations.

Larvae only on *Vitis*.



Plate VII
Melitaea perseca Koll. Larva on foodplant, and pupa.



Macroglossum stellatarum stellatarum (L.)

An infrequent summer migrant to the east coast from Iran.

REFERENCES

- Higgins, L. G. and Riley, N. D. (1970). A field guide to the Butterflies of Britain and Europe. Collins.
- Larsen, T. B. (1974). The Butterflies of the Lebanon. Beirut.
- Lipscombe Vincett, B. A. (1977). Wild flowers of central Saudi Arabia. Tipostile S. R.L., Milan.
- Migahid, A. M. and Hammouda, M. A. (1974). Flora of Saudi Arabia. Riyadh University Publication.
- The Journal of Oman Studies, Special Report (1975). The Scientific Results of the Oman Flora and Fauna Survey 1975. Ministry of Information and Culture, Sultanate of Oman.

OBITUARIES

DR. HENRY BERNARD DAVIS KETTLEWELL

Bernard Kettlewell was born on 24th February, 1907 at Howden, East Yorks., the son of a member of the corn exchange. He went to school at Old College, Windermere and Charterhouse, and then studied for medicine at Gonville and Caius College, Cambridge and Barts Hospital.

The Cambridge University Natural History Society at that time had about 200 members and subdivided into several disciplines. In the entomological section, the zoology students mingled amicably with the amateur lepidopterists (students of medicine, the sciences or the arts), and among the latter Bernard's charm and energy made him a natural leader. There was, of course, another older oracle among the bug-hunters, namely Harold Worsley Wood, brother of a don and living in retirement in De Freville Avenue, Chesterton. Probably due to Wood's influence, Bernard joined the "South London" in 1928. Contact with Dr. E. A. Cockyne, then still practising as a doctor in London, and other leading lepidopterists of the day was a natural consequence.

Most of the undergraduates owned bicycles; these put Wicken Fen within range, and those, who wished, could obtain an exeat from their tutor and spend a night bug-hunting in the Fen under arrangements of keeper Barnes. Bernard's fast car enabled him and a few friends to range even further afield, to find vernal larvae of the black hairstreak, *Fixsenia pruni* (L.) at Warboys Wood, or the vernal flier *Carterocephalus palaemon* (Pallas), the chequered skipper at Bedford Purlieus on the Great North Road north of Stilton. During his 1928 vacations with R. P. Demuth he took *Coscinia cribraria* (L.) at Bournemouth and bred from it in 1931; in the summer of 1930 he joined the writer in lodgings at Cox's Staithe, Barton Turf, Norfolk, to obtain other local rarities. These pursuits in no wise impeded the acquiring of an M.A. and an M.B.

During the next few years he disappeared from East Anglia acquiring in London his medical qualifications (B.Chir., M.R.C.S., L.R.C.P.) and becoming engaged, in Birmingham, where his parents now resided, to Hazel Wiltshire. The marriage took place in 1936 when he joined a medical practice at Cranleigh, Surrey; he lived there at "Homefield", The Common.

Throughout this period he continued field entomology and breeding and began to publish results and observations of increasing interest. A series of articles in the Entomologist's Record, Vols. 51-64 (1939-52) dealt particularly with the natural history and breeding of the less well-known

British lepidoptera. Two important papers with colour-plates appeared in our Society's (the South London) Proceedings: A survey of the insect *Panaxia dominula* (L.) (1942-3: 1-49) and Temperature experiments on the pupa of *Heliiothis peltigera* Schiff. . . . with the manifestation of the Mendelian law at a given temperature only" (1943: 69-81). In the latter he introduced his concept of the pupal "passiphase" and "actiphase"; temperature changes during the former had no effect on subsequent imaginal pigmentation, but during the latter were responsible for degree of pigmentation laid down. As contacts with his Cambridge friends declined, those with Dr. Cockayne and E. B. Ford led to this increasing interest in the genetics of British lepidoptera.

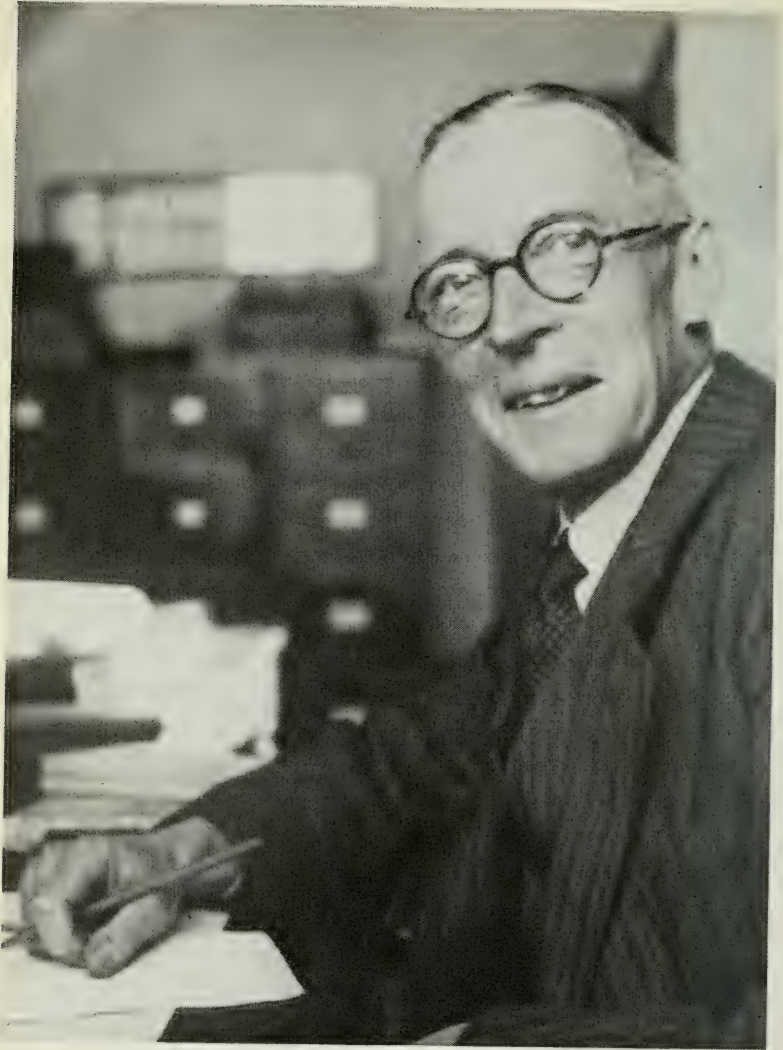
The inauguration of the National Health Service in 1946, however, was a shock for Bernard, and he ceased to be a general practitioner, becoming, for a while, an anaesthetist in the Emergency Medical Service; then, the idea of a radically new life lured him and his family abroad. He accordingly presented his lepidoptera collection to the British Museum of Natural History in 1947 and departed for South Africa, where he travelled and collected widely. These collections also eventually came to the British Museum. Persuaded by E. B. Ford he returned after a few years to cloudier skies and genetics at Oxford, giving up all thought of continuing in medicine; in 1952 he was awarded a Nuffield Research Fellowship there, and thus his greatest period began; his penetrating intelligence enabled him to fit naturally into the highest academic circles, despite what a friend described as his "rugged individualism".

His experiments with birds and melanic moths soon enabled him to unveil the causes of "industrial melanism", which he showed to be due not to the chemical effects of breathing polluted air or eating polluted food, but to natural selection mainly by bird predators in a visually polluted environment. A flood of articles followed, mainly in *Heredity* and other specialist papers; they are listed in his principal book ("The evolution of melanism", Oxford 1973) but this was still to be written, for his first book, a popular work, appeared in 1963 ("Your book of butterflies and moths", Faber) to be followed by a joint work with Julian Huxley: "Charles Darwin and his world" (Thames and Hudson, 1965).

In connection with the Darwin centenary he visited Brazil in 1958 there photographing and collecting the rich and colourful moths of the rain forest close to Rio de Janeiro, an episode in which the writer had the good fortune to accompany him, at least in his activities in the Corcovado rain forests. "Life", the American picture magazine, printed a big feature on 3rd November, 1958: "Darwin's insects jewels of his jungle paradise", mainly remarkable for its illustrations, of which the colour photos were Bernard's own work, while the paintings were by Walter Linsenmaier; no less remarkable however was one black and white photograph of Bernard himself at his light-trap, veiled by a kite-net, stripped to the waist and covered with moths. Another account of this collecting at the Corcovado hotel, was penned and illustrated by the humorist Ludwig Bemelmans; here he figures as "the professor" and is again portrayed, more decently clad but equally surrounded with moths, in his eyrie, in a striking water-colour drawing; this appeared in an article "The best way to see Rio" in "Holiday", December 1958. "Discovery" also printed an illustrated account of his expedition, giving more space to its scientific significance, and the British Museum again received the collection.



DR. H. B. D. KETTLEWELL



CAPT. N. D. RILEY, C.B.E.

His British collection had meanwhile become merged with those of Cockayne and Rothschild; as the "R.C.K." collection it proved to be a Mecca for students of the variations of British moths; later still this became part of the "National collection" at South Kensington as David Carter reported in our last number (11 (1/):19-23).

Soon after this he visited the Shetlands repeatedly to study the case of *Paradiarsia glareosa* (Esper) whose melanic form *edda* (Staudinger) in Unst shows reduced flight activity, is concentrated in the north end of the Shetlands, and appears to be less subject to predation by gulls than the typical form (see *Heredity* 16(4):415-434 (1961). Typically he toiled single-handed to produce his great work, "The Evolution of Melanism" (1973), a labour that lasted longer than expected and left him exhausted. He retired from his main appointment in 1976, becoming a senior officer in the University Zoology Department and an Emeritus Fellow of Wolfson College. His usual ebullience faded as ill-health and suffering made his retirement less fruitful than hoped; our Society made him an Honorary Member in February 1977, an act of appreciation which consoled him but could not arrest the decline. The end came in May 1979 at the age of 72.

During his Oxford life he had resided at the Old Vicarage, Steeple Barton, and he introduced into its garden a rare strain of the scarlet tiger moth (*P. dominula*) which multiplied and survived him there. Perhaps the local naturalists' trust will be able to ensure its continuance there. In any case his memorial remains, in his collections and written work. But his enthusiasm and encouragement will be sadly missed by many.

E.P.W.

N. D. RILEY, C.B.E.

Norman Denbigh Riley was born at Tooting, London, on the 26th September, 1890 and was educated at Harlington School, Balham (1898-1904) and at Dulwich College (1904-1909). From an early age he showed an intense interest in Natural History, and on leaving Dulwich took up the position of Demonstrator in entomology at Imperial College of Science in 1911. Later that year he joined the staff of the British Museum (Natural History) at South Kensington, London as an Assistant in charge of the Rhopalocera (Butterflies) in the Department of Zoology. The Department of Entomology housing all the Insecta did not come into being until two years later in 1913.

During the First World War, Riley reached the rank of Captain, serving in the Army Service Corps and The Queens Regiment from 1914-1919 and was mentioned in dispatches. On his return to civilian life he resumed his work on the butterflies at the Natural History Museum. His administrative ability became evident and he took over the Keepership of the Department of Entomology in 1932, the post which he so ably held for twenty-two years a record—until his retirement in 1955. Though he retired two decades ago he still continued to visit the Museum almost daily to work on the collections and to give freely the benefit of his vast experience to those who requested it.

During the long period as head of the Department containing the largest insect collection in the world he organized the dispersal, for safety reasons, of the major parts of this vast collection during World War II and their re-assembly afterwards. He was made a C.B.E. in 1952.

He was the senior member of the South London Entomological and Natural History Society (now the British E. & N.H.S.) having joined in

1908. He was President in 1923 and 1924 and was elected a Special Life Member in 1959. He was elected a Fellow of the Royal Entomological Society of London in 1912 and served as an Officer of that Society on many occasions. He was a Council member in 1921-23, 1930,, 1933-35 and 1953, Hon. Treasurer 1939-40, Hon. Secretary 1926-29, 1941-50, Vice-President 1929, 1949 and 1953, President in 1951 and 1952, and was elected an Honorary Fellow in 1957. He was also a Fellow or member of many other learned bodies concerned with Natural Science, Entomology, Conservation and Nomenclature. He was elected a Fellow of the Zoological Society of London in 1919 and was its Vice-President in 1958 and 1959. He was President and Vice-President of the Lepidopterist's Society and an Honorary member of the Entomological Society of France. He served as a Commissioner on the International Commission on Zoological Nomenclature and was one of the editors of the International Code drawn up by that body. He was also both Secretary and then Treasurer of the Society for the Promotion of Nature Reserves for many years. He was the Royal Entomological Society's representative on the Council of the National Trust and was also Chairman of the Entomological Section of the International Union of Biological Sciences and of the Permanent Committee of the International Congresses of Entomology. The above list is not exhaustive but just some of the more important posts he held with such distinction.

Throughout an exceedingly busy life he found time to edit *The Entomologist*—the first journal to be devoted entirely to entomology—for nearly forty years. During his editorship a steady stream of taxonomic papers, notes, observations, obituaries and reviews issued from his fluent pen. He published numerous scientific papers devoted almost exclusively to the Rhopalocera of the World in other journals as well and was the author of several books on this subject. Amongst these are the *Field Guide to the Butterflies of the West Indies* and as a co-author with L. G. Higgins of the extremely popular *Field Guide to the Butterflies of Britain and Europe*, published by Collins in 1970 which is already in its second edition and has appeared in eight different European language editions. A bibliography of all the above is appended.

He married Edith Vaughan in 1920 by whom he had a son and daughter and who all survive him.

N. D. Riley: Bibliography 1912-1976

- 1912. Book Reviews. *Entomologist*, **45**: 212, 308.
- 1913. Book Reviews. *Entomologist*, **46**: 70, 339.
- 1914. Book Reviews. *Entomologist*, **47**: 48.
- 1919. Some new Rhopalocera from Brazil. *Entomologist*, **52**: 181-200.
- 1920. A note on Dutch *Chrysophanus dispar* Haw. *Entomologist*, **53**: 10.
- 1920. A note on some African Rhopalocera. *Entomologist*, **53**: 73-75.
- 1920. A new *Arhopala* (Lep.: Lycaenidae) from Ceylon. *Entomologist*, **53**: 97.
(Reprinted in *Spolia Zeylanica*, **12**: 210-211.)
- 1920. Book Reviews. *Entomologist*, **53**: 167, 288.
- 1921. Book Reviews. *Entomologist*, **54**: 56, 152.
- 1921. Some undescribed Rhopalocera in the British Museum (Natural History). *Entomologist*, **54**: 180-184.
- 1921. A new form of *Tajuria* from Ceylon. *Entomologist*, **54**: 206.
- 1921. Notes on the Rhopalocera of the Dollman Collection. *Trans. ent. Soc. Lond.*, **1921**: 234-259.
- 1921. with Godfrey, E. J. Some undescribed Rhopalocera from Siam. *J. nat. Hist. Soc. Siam*, **4**: 167-190.
- 1921. Some undescribed Rhopalocera from Mesopotamia and N.W. Persia. *Ann. Mag. nat. Hist.* (9), **8**: 580-600.

1922. Notes on the generic names of Indian Theclinae and Amblypodiinae. *J. Bombay nat. Hist. Soc.*, **28**: 465-473.
1922. The genus "*Amblypodia*" auctorum (de Niceville, Moore, Swinhoe, etc.), nec. Horstfield (Lep. Rhop.). *Entomologist*, **55**: 25-29, 51-53.
1922. Book Reviews. *Entomologist*, **55**: 139, 140, 167, 261, 284.
1922. *Vanessa io* ab. *belisaria*. *Entomologist*, **55**: 136.
[May 1921 took over editorship of *The Entomologist*]
1922. Obituary. H. Fruhstorfer. *Entomologist*, **55**: 144.
1922. *Colias croceus* Fourc. (*edusa* Fab.). *Entomologist*, **55**: 211.
1922. Obituary. H. H. C. J. Druce. *Entomologist*, **55**: 215.
1922. Editorial comments. *Entomologist*, **55**: 236, 237, 256, 278.
1922. Some undescribed Rhopalocera in the British Museum (Natural History) II. *Entomologist*, **55**: 250-252.
1922. A new *Arhopala* (Lep., Lycaenidae) from Ceylon. *Spolia Zeylanica*, **12**: 210-211.
1923. Editorial comments. *Entomologist*, **56**: 12, 44, 67, 114, 262, 235, 259.
1923. Preservation of rare species. *Entomologist*, **56**: 43.
1923. New Rhopalocera from Borneo. *Entomologist*, **56**: 35-38.
1923. An [alleged] male *Colias croceus* var. *helice*. *Entomologist*, **56**: 64.
1923. Phenology, or the science of appearances. *Entomologist*, **56**: 68.
1923. Book Reviews. *Entomologist*, **56**: 72, 119, 145, 146, 192, 218, 241, 242, 264, 265, 282.
1923. The Zoological Record. *Entomologist*, **56**: 111.
1923. Hybridisation in nature. *Entomologist*, **56**: 115.
1923. Head transplantation in insects. *Entomologist*, **56**: 143-144.
1923. A new dissecting microscope. *Entomologist*, **56**: 281.
1923. The Rhopalocera of the Mount Everest 1921 Expedition. *Trans. ent. Soc. Lond.* **1922**: 461-483.
1923. Two undescribed Rhopalocera from Ceylon. *Spolia Zeylanica*, **12**: 323-326.
1924. Editorial comments. *Entomologist*, **57**: 207, 211, 232, 234, 235, 237, 281.
1924. Editorial with R. A[dkin] and W. G. S [heldon]. *Entomologist*, **57**: 1.
1924. Obituary. Colonel Swinhoe. *Entomologist*, **57**: 23.
1924. *Colias crocea* form *helice* "♂". *Entomologist*, **57**: 66.
1924. A useless name. *Entomologist*, **57**: 67.
1924. Book Reviews. *Entomologist*, **57**: 71, 214, 215, 239, 264.
1924. A new Lycaenid butterfly from Costa Rica. *Entomologist*, **57**: 88.
1924. *Eromene ocellus* Haw. in Dorset. *Entomologist*, **57**: 90.
1924. Obituary. Charles Oberthur. *Entomologist*, **57**: 191.
1924. A note on the genus *Pyrhopygopsis* Godman and Salvin (Lep. Hesperidae). *Entomologist*, **57**: 245-249.
1924. Presidential address. *Proc. S. Lond. ent. nat. Hist. Soc.* **1924**: 74-90.
1924. with E. Step and W. E. China. Insects. In *Animals of all countries*. Hutchinson. London. pp. 1757-2034.
1925. An inquiry. *Entomologist*, **58**: 39.
1925. Editorial comments. *Entomologist*, **58**: 39, 64, 225.
1925. Biological abstracts. *Entomologist*, **58**: 42.
1925. British National Committee on Entomological Nomenclature. *Entomologist*, **58**: 43.
1925. Book Reviews. *Entomologist*, **58**: 43, 45, 69, 171, 172, 229, 302.
1925. *Spilosoma lubricipeda* in February. *Entomologist*, **58**: 63.
1925. Obituary. Arthur Cant. *Entomologist*, **58**: 72.
1925. with E. J. Godfrey. New Rhopalocera from Siam and Hainan. *Entomologist*, **58**: 140-143.
1925. Jersey Lepidoptera. *Entomologist*, **58**: 149-151.
1925. British Association for the Advancement of Science. *Entomologist*, **58**: 171.
1925. Obituary. Dr. A. G. Butler. *Entomologist*, **58**: 175.
1925. Third International Congress of Entomology. *Entomologist*, **58**: 220-224.

1925. Editorial. *Entomologist*, **58**: 257.
1925. A new Moroccan subspecies of *Cigaritis zohra* (Lep., Lycaenidae). *Entomologist*, **58**: 270.
1925. Obituary. Prof. H. Maxwell Lefroy. *Entomologist*, **58**: 279.
1925. List of butterflies collected in Arabia by Captain R. E. Cheesman. *Ann. Mag. nat. Hist* (9), **15**: 151.
1925. Presidential address. *Proc. S. Lond. ent. nat. Hist. Soc.* **1925**: 63-81.
1925. A revision of the genus *Artitropa* (Lep. Hesperiiidae). *Trans. ent. Soc. Lond.* **1925**: 281-288.
1925. Notes on the genus *Ceratruchia* (Lep. Hesperiiidae). *Ann. Ma. nat. Hist.* (9), **16**: 405-416.
1925. The species usually referred to the genus *Cigaritis* (Lep. Lyaenidae). *Novit. zool.*, **32**: 70-95.
1925. with A. G. Gabriel. Catalogue of the type specimens of the Lepidoptera Rhopalocera in the British Museum Pt. 1. Satyridae, Pt. 2. Danaidae. British Museum (Nat. Hist.). London.
1926. Editorial comments. *Entomologist*, **59**: 11, 239, 254.
1926. Book Reviews. *Entomologist*, **59**: 23, 93, 117, 147, 200, 255.
1926. Obituary. E. A. Butler. *Entomologist*, **59**: 24.
1926. Nomenclature. *Entomologist*, **59**: 41.
1926. Dates of publication of early British Museum Catalogues. *Entomologist*, **59**: 167.
1926. Obituary. Thomas Salvage. *Entomologist*, **59**: 176.
1926. Postcards of Insects. *Entomologist*, **59**: 187.
1926. Obituary. J. C. Moulton. *Entomologist*, **59**: 232.
1926. *Colaenis* and *Dione* (Lep. Nymphalidae): a revisional note on the species. *Entomologist*, **59**: 240-245.
1926. A gift of *Heodes dispar* to the National Collection. *Entomologist*, **59**: 254.
1926. Obituary. Rev. F. D. Morice. *Entomologist*, **59**: 328.
1926. Descriptions of three new Rhopalocera. *Entomologist's mon. Mag.*, **62**: 277-279.
1926. List of Hesperiiidae, in the Tring Museum collected on the ivory Coast by G. Mebu. *Novit. zool.*, **33**: 49-52.
1926. On the identity of certain Hesperiiidae described by Latreille. *Trans. ent. Soc. Lond.*, **1926**: 231-241.
1927. Obituary notices. *Entomologist*, **60**: 24.
1927. *Polygonia c-album* in Dorset. *Entomologist*, **60**: 30.
1927. The Natural History Museum. *Entomologist*, **60**: 45.
1927. Book Reviews. *Entomologist*, **60**: 48, 70, 94, 118, 138, 139, 236, 263, 286.
1927. A new form of *Talicada nyseus* Guerin (Lep. Lycaenidae). *Entomologist*, **60**: 59.
1927. Obituary. Oliver Janson. *Entomologist*, **60**: 72.
1927. *Brenthia dia* in the Forest of Dean. *Entomologist*, **60**: 133-134.
1927. The Oberthür Collection. *Entomologist*, **60**: 136-138.
1927. The Froggatt Collection of Australian Insects. *Entomologist*, **60**: 165.
1927. Exit Huebner's "Tentamen". *Entomologist*, **60**: 260.
1927. A new European Lycaenid, *Cupido arcilacis*. *Entomologist*, **60**: 269-276.
1927. Interesting British Butterflies from the Ingall Collection. *Nat. Hist. Mag.*, **1**: 44-45.
1927. The Rhopalocera of the third Mount Everest Expedition. *Trans. ent. Soc. Lond.*, **1927**: 119-129.
1927. The Oberthür Collection of butterflies and moths. *Nat. Hist. Mag.*, **1**: 83-90.
1928. Book Reviews. *Entomologist*, **61**: 20, 93, 115, 144, 165, 191, 215.
1928. *Cupido carswelli* Stempffer = *C. arcilacis* Riley. *Entomologist*, **61**: 38, 91.
1928. *Sphinx convolvuli* at Nairn. *Entomologist*, **61**: 41.
1928. Obituary. John Hartley Durrant. *Entomologist*, **61**: 48, 73-75.
1928. A List of the Hesperiiidae collected in the island of Sao Thomé by T. A. Barns. *Entomologist*, **61**: 64-65.

1928. Obituary. Gervaise Frederick Mathew. *Entomologist*, **61**: 119.
1928. Two new local races of *Euchlaë*. *Entomologist*, **61**: 136.
1928. Editorial comments. *Entomologist*, **61**: 161, 259.
1928. obituary. Edward Bonney Nevinson. *Entomologist*, **61**: 168.
1928. Obituary. Arthur George Malin Gillott. *Entomologist*, **61**: 168.
1928. Description of two new Lycaenidae in the British Museum. *Entomologist*, **61**: 187.
1928. A swarm of *Melitaea aurinia* larvae. *Entomologist*, **61**: 210.
1928. *Pachys betularia* var. *doubledayaria* in Ireland. *Entomologist*, **61**: 212.
1928. Notes on the *Iolaus*, *Argiolaus* and related genera, with descriptions of new species and a new genus. (Lep. Lycaenidae). *Novit. zool.* **34**: 374-394.
1928. with E. B. Poulton. The Rhopalocera of the "St. George" Expedition from French Oceania. *Trans. ent. Soc. Lond.*, **1928**: 453-468.
1929. An Entomological Dinner. *Entomologist*, **62**: 36.
1929. The fourth International Congress of Entomology, Ithaca 1928. *Entomologist*, **62**: 37.
1929. The Kenrick Collection of Lepidoptera. *Entomologist*, **62**: 42.
1929. Editorial comments. *Entomologist*, **62**: 45, 256, 258, 259, 280.
1929. Book Reviews. *Entomologist*, **62**: 115, 142, 189, 190, 214, 215, 234, 261.
1929. *Cupido carswelli*. *Entomologist*, **62**: 137, 285.
1929. The re-introduction into Britain of *Chrysophanus dispar*. *Entomologist* **62**: 169.
1929. Obituary. Gilbert Henry Raynor. *Entomologist*, **62**: 239.
1929. Wicken Fen. *Entomologist*, **62**: 242.
1929. The Comma butterfly in England. *Nature*, **124**: 653.
1929. Revisional notes on the genus *Heliophorus* (Lycanidae) with descriptions of new forms. *J. Bombay nat. Hist. Soc.*, **129**: 384-402.
1929. Three new species of Hesperidae from Matto Grosso. *Bull. Hill Mus., Witley*, **3**: 134-138.
1929. The re-establishment of the large copper butterfly in England. *Nat. Hist. Mag.*, **2**: 113-118.
[The coloured plate is acknowledged to the Ent. Soc. but have no ref. to an Ent. Soc. Text.]
1929. (with Eltringham, H., Poulton, E. B., Talbot, T. G., and others.) African Rhopalocera descriptions and notes. *Trans. ent. Soc. Lond.*, **1929**: 475-505.
1930. Book Reviews. *Entomologist*, **63**: 20, 44, 70, 214, 286.
1930. Editorial comments. *Entomologist*, **63**: 58, 112, 137, 256, 257, 283.
1930. Annual Dinner of the Entomological Department of the B.M. (N.H.). *Entomologist*, **63**: 61.
1930. Sale of the late E. B. Nevinson's Collection of Lepidoptera. *Entomologist*, **63**: 69.
1930. Obituary. James Cosmo Melvill. *Entomologist*, **63**: 96.
1930. Entomological Society of London. New Meeting Room. *Entomologist*, **63**: 102.
1930. *Philyctaenia fulvialis* Hb. *Entomologist*, **63**: 137.
1930. Obituary. James Waterson. *Entomologist*, **63**: 143.
1930. with E. B. Poulton. Obituary. Edwin G. R. Waters. *Entomologist* **63**: 167.
1930. *Vanessa antiopa* in N. London. *Entomologist*, **63**: 203.
1930. *Papilio aphrodite* sp. nov. *Entomologist*, **63**: 211.
1930. *Mylothris andeonidi* sp. nov. *Bull. Soc. lép. Genève*, **6**: 107-108.
1930. Revisional notes on the genus *Epameras* (Lep. Lycaenidae). *Novit. zool.*, **36**: 146.
1931. *Sphinx convolvuli*. *Entomologist*, **64**: 17.
1931. A new Ithomiine (Lepidoptera, Rhopalocera). *Entomologist*, **64**: 35.
1931. Book Reviews. *Entomologist*, **64**: 42, 148, 163, 189, 260, 284.
1931. Buckler's Larvae. *Entomologist*, **64**: 103.
1931. Editorial comments. *Entomologist*, **64**: 118, 161, 214.
1931. Immigration of *Phryxus livornica* Esp. *Entomologist*, **64**: 163.

1931. Two new *Charaxes* from southern Arabia. *Entomologist*, **64**: 279.
1931. The Comma butterfly in England. *Nature*, Oct. 31, 1931.
1931. The present state of the National Collection of Insects. *Entomologist*, **64**: 241-242. [Attributed to E. E. Austen. Written by N. D. Riley.]
1931. Butterflies in Appendix II. Bertram Thomas. *Geogr. J.*, **78**: 209-242.
1931. Revisional notes on the genera *Abisara* and *Saribia* (Lep. Riodinidae), with descriptions of new species and subspecies. *Novit. zool.*, **37**: 181-188.
1931. Descriptions of new Siamese Rhopalocera. *J. Siam Soc. N.H. Suppl.*, **8**: 249-254.
1931. Arthropoda. In: The Standard Natural History, pp. 189-191, 194-291, 320-345.
1923. Book Notices, etc. *Entomologist*, **65**: 23, 45, 93, 117, 188, 214, 239, 288.
1932. Obituary. Richard South. *Entomologist*, **65**: 97-100.
1932. Editorial comments. *Entomologist*, **65**: 114, 186, 188, 200, 211, 262, 286.
1932. The Dizzard Valley, N. Cornwall. *Entomologist*, **65**: 129.
1932. Swanzy Collection. *Entomologist*, **65**: 136.
1932. Fifth International Congress of Entomology. *Entomologist*, **65**: 137, 167.
1932. Obituary. James John Joicey. *Entomologist*, **65**: 142-144.
1932. A new Satyrid butterfly from the Orange Free State. *Entomologist*, **65**: 148.
1932. *Colias croceus* in West Sussex. *Entomologist*, **65**: 203.
1932. New African and Arabian butterflies. *Ann. Mag. nat. Hist.* (10), **10**: 137-152.
1933. Book Reviews. *Entomologist*, **66**: 22, 143, 190, 238, 239, 288.
1933. Further immigration records. *Entomologist*, **66**: 87.
1933. Editorial comments. *Entomologist*, **66**: 139, 225, 259.
1933. List of British Ephemeroptera [a correction]. *Entomologist*, **66**: 142.
1933. Immigrant Lepidoptera. *Entomologist*, **66**: 167.
1933. Centenary celebration of the Royal Entomological Society of London. *Entomologist*, **66**: 186.
1933. *Colias croceus* and *C. hyale*. *Entomologist*, **66**: 203.
1933. Obituary. E. J. Godfrey. *Entomologist*, **66**: 216.
1934. Book Reviews. *Entomologist* **67**: 20, 70, 71, 93, 141, 142, 286.
1934. Obituary. C. G. Nurse. *Entomologist*, **67**: 23-24.
1934. Second-brood *Apatura iris*. *Entomologist*, **67**: 40.
1934. Editorial comment. *Entomologist*, **67**: 43, 210.
1934. A new palearctic Lycaenid butterfly. *Entomologist*, **67**: 85.
1934. *Plusia gamma* eaten by a yellow-hammer. *Entomologist*, **67**: 91.
1934. *Polygonia c-album*: miscellaneous records in 1933. *Entomologist*, **67**: 116.
1934. A new American Hesperid. *Entomologist*, **67**: 185.
1934. Obituary. William Frederick Johnson. *Entomologist*, **67**: 240.
1935. Book Reviews. *Entomologist*, **68**: 21, 45, 168, 266, 290.
1935. The Dobree Collection of European Noctuae. *Entomologist*, **68**: 51.
1935. Hibernating *Vanessa atalanta*. *Entomologist*, **68**: 67.
1935. An Oxford Congress. *Entomologist*, **68**: 68.
1935. Records of *Polygonia c-album* in 1934. *Entomologist*, **68**: 69, 90.
1935. Yellow *Pieris napi*. *Entomologist*, **88**: 78.
1953. Entomological Club. *Entomologist*, **68**: 96.
1935. An unusual pairing. *Entomologist*, **68**: 286.
1936. *Vanessa cardui* at sea. *Entomologist*, **69**: 43.
1936. *Pontia daplidice* in Essex. *Entomologist*, **69**: 55.
1936. Liberation of *Nymphalis antiopa* in England. *Entomologist*, **69**: 67-68.
1936. Abnormal pairings. *Entomologist*, **69**: 70.
1936. Book Reviews. *Entomologist*, **69**: 72, 84, 86, 96.
1936. Editorial comments. *Entomologist*, **69**: 124, 186.
1936. Records of *Polygonia c-album* in 1935. *Entomologist*, **69**: 139.
1936. An old record of *Vanessa antiopa*. *Entomologist*, **69**: 143.
1936. *Apatura iris* in Surrey. *Entomologist*, **69**: 174.

1936. A Handbook of British Caddis Flies. *Entomologist* **69**: 193.
1936. Some varieties of British Lepidoptera. *Entomologist* **69**: 221.
1936. *Nephopteryx similella* Zinck. *Entomologist* **69**: 230.
1936. *Eurythene sophus audeoudi* sspn. In Audeoud. Description de six espèces ou sous-espèces nouvelle. *Bull. Soc. Léop. Genève*, **7**: 184.
1937. Book Notices and Reviews. *Entomologist*, **70**: 47, 142, 166, 191, 238, 260.
1937. *Polygonia c-album* in 1936. *Entomologist*, **70**: 116.
1937. Editorial comments. *Entomologist*, **70**: 164, 227.
1937. Obituary. Lord Rothschild, F.R.S. *Entomologist*, **70**: 216-220.
1937. *Nymphalis io* in Scotland. *Entomologist*, **70**: 285.
1938. Mayflies. *Entomologist*, **71**: 5.
1938. Editorial comments. *Entomologist*, **71**: 12, 67, 141, 231, 262.
1938. Book Notices and Reviews. *Entomologist*, **71**: 22, 46, 71, 144, 192, 214, 215.
1983. Misuse of cyanide. *Entomologist*, **71**: 286.
1938. Descriptions of new or little know S. African butterflies. *Trans. R. ent. Soc. Lond.*, **87**: 233-245.
1938. with Corbet, A. S. A revision of the Malayan species of *Jamides* Hübner (Lep. Lycaenidae). *Trans. R. ent. Soc. Lond.*, **87**: 147-159.
- 1939 *Lycaena thersamon* and *Pyrgus malvoides* ab. *semiconfluens* in Switzerland. *Entomologist*, **72**: 8.
1939. Book Notices and Reviews. *Entomologist*, **72**: 102, 126, 199, 223, 269, 270, 295.
1939. A new species of *Armandia* (Lep. Papilionidae). *Entomologist*, **72**: 207-208.
1939. *Polygonia c-album* in Kent. *Entomologist*, **72**: 219.
1939. Editorial comments. *Entomologist*, **72**: 265.
1939. When is a name a subspecific name? *Ent. News*, **50**: 31-33.
1939. Notes on oriental Theclinae (Lep. Lycaenidae). *Novit. zool.* **41**: 355-361.
1940. Book Notices and Reviews. *Entomologist*, **73**: 70, 94, 168, 192.
1941. Yellow Pieridae urgently wanted. *Entomologist*, **73**: 80.
1940. Obituary. G. L. Bates. *Entomologist*, **73**: 95-96.
1940. Editorial comments. *Entomologist*, **73**: 109, 239.
1940. Notes on oriental Theclinae: a correction. *Entomologist*, **73**: 162.
1940. The Insect House at the Zoo. *Entomologist*, **73**: 163.
1940. Obituary. Dr. F. W. Edwards, F.R.S. *Nature*, **146**: 739.
1941. Book Notices and Reviews. *Entomologist*, **74**: 21, 46, 167, 190.
1941. Red Locust control. *Entomologist*, **74**: 86.
1941. Butterfly books destroyed by fire. *Entomologist*, **74**: 94.
1941. Misidentified genotypes. *Entomologist*, **74**: 196-197.
1941. *Scythropia crataegella* L. parasitized by *Angitia exareolata* Ratzeburg. *Entomologist*, **74**: 212.
1941. Editorial comments. *Entomologist*, **74**: 170, 210, 220, 243.
1942. *Colias croceus* in 1941. *Entomologist*, **75**: 18, 74.
1942. Editorial comments. *Entomologist*, **75**: 18.
1942. Obituary. Dr. H. Eltringham. *Entomologist*, **75**: 24, 25-27.
1942. Reviews and Book Notices. *Entomologist*, **75**: 71, 187.
1942. New Lycaenidae from the Malay Peninsula. *Entomologist*, **75**: 88-89.
1942. Nature Reserves Investigation Committee. *Entomologist*, **75**: 227.
1942. Misidentified genotypes. *Ent. News*, **1942**: 45. Reprinted from *Entomologist*, **74**: 196.
1943. Editorial comments. *Entomologist*, **76**: 106, 108.
1943. *Colias croceus* at Wimbledon. *Entomologist*, **76**: 181.
1943. *Colias croceus* in W. Sussex. *Entomologist*, **76**: 208.
1943. Flight period of *Lampra fimbriata*. *Entomologist*, **76**: 213.
1943. Reviews and Book Notices. *Entomologist*, **76**: 215, 262.
1943. A new African Lycaenid butterfly. *Entomologist*, **76**: 225.
1943. An occurrence of *Nasutitermes costalis* Holmgren in England (Isoptera). *Proc. R. ent. Soc. Lond.* (A), **18**: 95.

1944. Obituary. William George Sheldon. *Entomologist*, **77**: 17-19.
1944. Two new South African Lycaenidae. *Entomologist*, **77**: 28.
1944. Obituary. Frank E. Lutz. *Entomologist*, **77**: 48.
1944. Editorial comments. *Entomologist*, **77**: 62, 96.
1944. Book Reviews. *Entomologist*, **77**: 64, 80.
1944. *Pontia daplidice* in Gloucestershire. *Entomologist*, **77**: 140.
1944. Some British moths. 32 pp. 16 col. pl. King Penguin Books, London and New York.
1944. *Spolia mentawiensia*: Rhopalocera Lycaenidae and Riodinidae. *Trans. R. ent. Soc. Lond.*, **94**: 249-271.
1945. Editorial comments. *Entomologist*, **78**: 38, 125, 136, 141, 143, 144, 158, 159, 165, 173, 175, 190.
1945. *Celerio livornica* in 1945. *Entomologist*, **78**: 94-125.
1945. Early dates for Lepidoptera in 1945. *Entomologist*, **78**: 108.
1945. *Colias hyale* records. *Entomologist*, **78**: 141-142.
1946. Book Reviews. *Entomologist*, **79**: 24.
1946. Editorial comments. *Entomologist*, **79**: 41, 140, 163, 164, 166, 174, 193, 210, 212, 272, 289.
1946. *Argynnis lathonia* in Cornwall. *Entomologist*, **79**: 139.
1946. Norfolk Broads. *Entomologist*, **79**: 162.
1946. *Zygaena purpuralis* Brunnich and *Z. pimpinellae* Guhn. *Entomologist*, **79**: 166.
1946. *Colias croceus* in 1946. *Entomologist*, **79**: 174.
1947. Editorial comment. *Entomologist*, **80**: 22, 24, 71, 127, 269.
1947. Obituary. F. W. Frohawk. *Entomologist*, **80**: 25-27.
1947. Preservation of *Melitaea cinxia*. *Entomologist*, **80**: 66.
1947. The Cockayne-Kettlewell Collection of British Lepidoptera. *Entomologist*, **80**: 147.
1947. *Colias australis* Verity in Britain. *Entomologist*, **80**: 147.
1947. International Union of Biological Sciences. *Entomologist*, **80**: 246.
1947. *Rhodometra sacraria* some other records. *Entomologist*, **80**: 271.
1947. *Colias croceus* records. *Entomologist*, **80**: 287.
1947. *Colias hyale* records. *Entomologist*, **80**: 291.
1948. Records of *Colias croceus* and *C. hyale*. *Entomologist*, **81**: 20.
1948. Further observations on *Colias croceus* in 1947. *Entomologist*, **81**: 41.
1948. Further reports of *Rhodometra sacraria*. *Entomologist*, **81**: 45.
1948. *Nymphalis antiopa* in February. *Entomologist*, **81**: 71.
1948. Reviews and Book Notices. *Entomologist*, **81**: 72.
1948. Editorial comment. *Entomologist*, **81**: 100, 117, 146, 147, 152, 171, 172.
1948. *Ourapteryx sambucaria* in December. *Entomologist*, **81**: 101.
1948. The Rothschild-Cockayne-Kettlewell Collection of British Lepidoptera. *Entomologist*, **81**: 145.
1948. Transplanting of local insects. *Entomologist*, **81**: 147, 269.
1948. *Aplasta ononaria* colonies. *Entomologist*, **81**: 148.
1948. VIII International Entomological Congress. *Entomologist*, **81**: 148
1948. *Nymphalis polychloros* records. *Entomologist*, **81**: 150.
1948. *Vanessa huntera* in S. Wales. *Entomologist*, **81**: 167.
1948. Further records of *Colias hyale*. *Entomologist*, **81**: 167.
1948. *Nymphalis antiopa* taken in cop. *Entomologist*, **81**: 272.
1948. Obituary. Dr. A. S. Corbet. *Nature*, **161**: 1003.
1949. Otto Bang-Haas. *Entomologist*, **82**: 22.
1949. Editorial comments. *Entomologist*, **82**: 43, 69, 116, 189, 235, 260, 261, 268.
1949. Book Reviews. *Entomologist*, **82**: 191.
1949. Huntingdonshire Fauna and Flora Society. *Entomologist*, **82**: 204.
1949. Obituary. William Fassnidge. *Entomologist*, **82**: 216.
1949. Letter to the editor [on meeting of International Commission of Zoological Nomenclature in Paris, July 1948]. *Lepid. News*, **3**: 67.
1950. The Rothschild-Cockayne-Kettlewell Collection. *Entomologist*, **83**: 19-20.
1950. Editorial comments. *Entomologist*, **83**: 63, 72, 119, 214.

1950. Wicken Fen Fund. *Entomologist*, **83**: 115.
1950. Book Reviews. *Entomologist*, **83**: 216.
1951. Editorial comments. *Entomologist*, **84**: 46, 92, 119, 144, 225.
1951. Yet another insecticide: Isopestox. *Entomologist*, **84**: 96.
1951. The protection of British insects: An appeal. *Entomologist*, **84**: 97-98.
1951. Need collectors be hooligans? *Entomologist*, **84**: 155.
1951. A "marked" *Vanessa cardui*. *Entomologist*, **84**: 161.
1951. Zoological Nomenclature: Notice of proposed suspension of the Rules. *Entomologist*, **84**: 164.
1951. Book Reviews. *Entomologist*, **84**: 190.
1951. The Monnarch Butterfly. *Science*, **114**: 75-76.
1951. Obituary. H. J. Turner. *Nature*, **167**: 176.
1952. Editorial comment. *Entomologist*, **85**: 23, 45, 72, 77, 96, 118, 171, 204, 213, 221, 233.
1952. Obituary. Lieut. Colonel Charles Donovan. *Entomologist*, **85**: 120.
1952. Obituary. Claude Morley. *Entomologist*, **85**: 121.
1952. Obituary. George Talbot. *Entomologist*, **85**: 191-192.
1952. Book Reviews. *Entomologist*, **85**: 215, 240.
1952. The President's remarks. *Proc. R. ent. Soc. Lond.*, **16** (C): 84-89.
1953. Obituary. G. D. Hale Carpenter. *Entomologist*, **86**: 155-156.
1953. Obituary. K. G. Blair. *Nature*, **171**: 152.
1953. The President's remarks. *Proc. R. ent. Soc. Lond.*, **17** (C): 71-74.
1953. The Presidential address. *Proc. R. ent. Soc. Lond.*, **17** (C): 75-79.
1954. A new species of *Thestor* (Lepidoptera: Lycaenidae) from S. Africa. *Entomologist*, **87**: 97-102.
1954. Book Notices. *Entomologist*, **87**: 170.
1954. Meathop Moss, Westmorland. *Entomologist*, **87**: 202.
1954. *Diataraxia essoni* Hampson. *Entomologist*, **87**: 222.
1954. The lectotype of *Colias australis* Verity (Lep., Pieridae). *Entomologist's Rec. J. Var.*, **66**: 55.
1954. Obituary. G. F. Herbert Smith. *S.P.N.R. Handbook*, **1953**: 4-6.
1955. New Nature Reserves. *Entomologist*, **88**: 21, 81, 165, 261.
1955. *Lasiocampa quercus* ab. *olivaceo-fasciata*: a correction. *Entomologist*, **88**: 23.
1955. International Commission for Zoological Nomenclature. *Entomologist*, **88**: 45.
1955. Book Reviews. *Entomologist*, **88**: 95.
1955. Editorial comments. *Entomologist*, **88**: 116, 213, 263.
1955. The moth that saved the life of Queen Victoria. *Entomologist*, **88**: 140.
1955. Karl Jordan and the International Congresses of Entomology. *Trans. R. ent. Soc. Lond.*, **1955**: 15-24.
1955. Editor. *S.P.N.R. Handbook*, 1954.
1956. Book Reviews. *Entomologist*, **89**: 79.
1956. *Zygaena purpuralis* in the Isle of Rhum. *Entomologist*, **89**: 154.
1956. Editorial comment. *Entomologist*, **89**: 160.
1956. Tenth International Congress of Entomology. *Entomologist*, **89**: 257.
1956. Migrant *Acherontia atropos* in September. *Entomologist*, **89**: 301.
1956. Index of taxonomic specialists in Entomology. U.N.E.S.C.O. Series No. 6. 37 pp.
1956. Obituary. William Harry Evans. *Lepid. News*, **10**: 193-199.
1956. Editor. *S.P.N.R. Handbook*, 1955.
1957. (with H. B. Williams). Obituary. E. A. Cockayne. *Entomologist*, **90**: 78-80.
1957. Editorial comments. *Entomologist*, **90**: 105, 162, 189, 254, 259.
1957. New Nature Reserves. *Entomologist*, **90**: 136. ...
1957. Damage to the Hungarian Natural History Museum, Budapest. *Entomologist*, **90**: 164.
1957. Obituary. Brigadier W. H. Evans. *Nature*, **179**: 127.
1957. Editor *S.P.N.R. Handbook*, 1956, 1957.

1957. The 5th General Assembly of the International Union for the Protection of Nature. *S.P.N.R. Handbook*, 1956: 2-7.

(to be continued in our next issue)

PROCEEDINGS

Thursday, 11th January, 1979

The President, Mr. G. PRIOR, in the chair.

The President announced with great regret the death of Mr. Cecil Haxby, a member since 1958, and a frequent exhibitor formerly. He also welcomed a visitor from Europe, Dr. Gerhardt Tarmann, of Innsbruck, Austria.

EXHIBITS

Rev. D. AGASSIZ — Two further introduced species of Nymphuline moths (Lep. Pyralidae) from aquatic nurseries at Enfield: (i) *Oligostigma polydectalis* Walker, a single specimen taken on 26th October, 1978; probably imported from Singapore, although most specimens in the British Museum are from Australia; and (ii) an unidentified *Nymphula* species closely related to *N. enixalis* Swin. This species has been present throughout this year and has become very numerous.

Dr. A. A. ALLEN — (i) Three spp. of Pyralidae, all obtained in the Brunswick Square area of Central London: (a) *Pyrausta aurata* (Scopoli) found with many others, flying in sunshine around mint growing in St. George's gardens; in Britain more often regarded as a chalk downland species; (b) an example of *Plodia interunctella* (Hübner) captured 18.ix.1975 in a chemical laboratory at the Royal Free Hospital School of Medicine; and (c) a moth thought to be an *Ephestia*, whose determination was discussed later, bred from a larva found in a slight web on top of a russet apple 21.xi.1975. The apple was stored at room temperature during the winter and the larva pupated in the spring without feeding. (ii) two British spp. of the Ichneumonid sub-family Alomyinae (Hym.) namely *Alomya debellator* F. and *A. semiflava* Stephens, all ♂♂. *A. debellator* was captured by Mr. L. Packer on 10.vi.1975 at Parks, Oxford, while the exhibitor captured the other species, in the company of others, on 26.viii.1978 at Arundel, Sussex, by sweeping. Both spp. are common, at least in the south but apparently the hosts are unknown. The hind-wing venational character which mainly distinguishes the two species was also illustrated. (iii) A dried example of the flower of *Atropa belladonna* L. (Solanaceae), deadly nightshade, taken 9.vii.1978 on chalk downs near Gomshall, Surrey.

Col. A. M. EMMET — Eight adults of *Epinotia fraternana* (Haworth) (Lep. Tortricidae) reared from larvae on *Abies grandis* and taken at Chalkney Wood, Essex. A small piece of branch shewing larval feeding was exhibited on 28.ix.70. The larvae and subsequent pupae were kept indoors in a room with moderate central heating and 22 imagines emerged between 21.xi.78 and 5.i.79, apparently without diapause. There were no parasites. *Epinotia subsequana* (Haworth) was less rare on the same tree.

MEMBERSHIP

The following names were read for the first time: Messrs. D. G. Brotheridge and G. M. Hollins. The following, their names having been read for the second time, were duly declared elected members: Messrs. T. A. Wickett, B.Sc., F.R.A.S., and P. H. Sterling; Miss Celia Haddon, M.A., and Miss Helen Wilk; and the Dundee Museum and Art Galleries. The obligation book was signed by Mr. Shephard and Master Geoffrey Burton.

Mr. W. G. Tremewan in an illustrated talk then discussed the life-histories of seven British species of Burnet moths, viz., *Zygaena exulans* (Hohenwarth), *Z. loti* (D. & S.), *Z. viciae* (D. & S.), *Z. Filipendulae* (L.), *Z. trifolii* (Esper), *Z. loniceræ* (Scheven) and *Z. purpuralis* (Brunnich). Transparencies depicted the biotopes of the species and the adults, cocoons, larvae and hostplants, in Britain. The numerous and interested audience put many questions to the lecturer at the conclusion of his talk, and much further information was given during a fairly long question-time.

COMMENTS ON EXHIBITS

S. N. Jacobs thought that the moth exhibited by Dr. Allen which he thought an *Ephestia* sp., was in fact *Cryptoblabes gnidiella* (Mill.) and Col. A. M. Emmet concurred. The usual foodplant reported for it was pomegranate. Regarding the flower of *A. belladonna*, S. N. Jacobs said this species was common in the heart of Bromley, Kent, and had been for many years; J. M. Chalmers-Hunt said it was very common on chalk downs at Eynsford and he had also seen it on the Dartford marshes, also in Kent. G. Prior said he had seen it by the roadside at Rickmansworth. Col. A. M. Emmet said that *P. aurata* was often reported as a pest on mint.

25th January, 1979

Inclement weather and trouble on the railways prevented most members from attending this meeting, which was to have been the Annual General Meeting. After telephonic consultation with officers of the Society, the President proposed that the Annual General Meeting be adjourned until 8th February. This was agreed by the members present, *nem. com.*

EXHIBITS

S. N. A. JACOBS — a greetings card reproducing the coloured illustration of a double blue hyacinth and *Nigella* (Love in the mist) by Nicolas Robert (1614-1685) estimated about 1660, embellished by a "Blue Spotted Brimstone" (*Papilio eclipis*) and a larva feeding on the Hyacinth leaves. This fraudulent insect is mentioned by Col. Cowan in his article in the *Entomologist's Record* 90:302.

P. VERDON — A large, and as yet unidentified, hymenopterous parasite reared from a cocoon of *Mimas tilae* (L.).

E. S. BRADFORD — Specimens of microlepidoptera he was presenting to the Society's collection, including *Niditinea piercella* (Bent.), from a Tawny Owl nest at East Blean, Kent; *Eudonia angustea* (Curtis) from Moss at Faversham, Kent and *Yponomeuta vigintipunctata* (Retz.) from *Sedum telephium* (Orpine) at Boreham Wood, Herts.

COMMUNICATIONS AND COMMENTS ON EXHIBITS

Rev. Agassiz pointed out that Orpine, the foodplant of *vigintipunctata*, was a scarce plant, but the moth was in his experience commoner than the foodplant. Possibly the moth utilised an alternative foodplant, such as a small *Sedum*. Mr. Stubbs mentioned a Hoverfly which mined the leaves of Orpine in Norway, but appeared to be associated with Pennywort in the South West of England. Mr. Bradford agreed that alternative natural foodplants were probable, and mentioned the diverse nature of foodplants of some Lepidoptera. He instanced *Teleiodes paripunctella* (Thunb.), a Gelechiid normally associated with Oak that had been bred by Mr. R. Heckford from *Myrica gale* L. in Scotland. Mr. Evans pointed out how little was known about the natural foodplants of many of our insects, including some of the more common macrolepidoptera.

A general discussion ensued on foodplants, the merits of recording distribution of lepidoptera, and the techniques for labelling specimens in a collection. The evening concluded with Mr. Prior showing a comprehensive set of slides of the larvae of British Eupithecinae, including some of the rarer species. He outlined some aspects of their life history, and answered questions on various aspects of "Pugs".

Thursday 8th February 1979

107th ANNUAL GENERAL MEETING

(with which was combined the Ordinary Meeting)

The President, Mr. G. PRIOR in the chair.

The President announced to those present that the Annual General Meeting held on 25th January, had been adjourned until the present session, due to inability of most officers to be present at the earlier occasion.

He also announced with regret the death, at the age of 91, of B. C. S. Warren, a resident at Folkestone and an international authority on the Rhopalocera, though not a member of the Society.

EXHIBITS

E. S. BRADFORD — an example of *Oncocera obductella* (Z.), taken 1976 at Blean, Kent, three specimens of *Leucoptera laburnella* Staint. bred from a stunted laburnum tree infested with its larvae, and three examples of *Hedya nubiferana* (Haworth), one typical and two melanic; the latter were from Rothamsted trap at Horrogate, Yorks.

A. J. HALSTEAD — the comb of a bees' nest found in the open air at Wisley Gardens. In early September 1978 a small cluster of *Apis mellifera* (L.) was noticed at 15ft. above ground on a branch of *Pinus radiata* and was kept under observation until mid November when the last bee died of exposure. When first noticed they were clustered on a piece of comb 6in. x 5in. which suggested they had already been there some time. Normally bee swarms only remain in the open for a few days before moving on to a more suitable nesting site. From a previous observation he concluded that such open-air nests can be constructed with a viable queen present, but in this instance it appears the nest had lost its queen.

J. HEATH — Maps prepared by the Biological Records Centre of: the distribution in Britain of *Plemyria rubiginata* (D. & S.), *Lycia lapponaria scotica* (Harr.), *Psodos coracina* (Esp.), *Serraca punctinalis* (Scop.), *Pseudopanthera macularia* (L.), and *Scopula marginepunctata* (Goepe) (= *conjugata* Borkh.).

MEMBERSHIP

The following, their names have been duly read a second time, were declared elected members: D. J. Brotheridge, G. N. Hollins.

The Obligation Book was signed by I. F. G. McLean.

ANNOUNCEMENTS

The Secretary announced that the Department of the Environment proposed to add to Schedule 1 of the act protecting British Lepidoptera *Thetidia smaragdaria* (Fabr.) (the Essex Emerald Moth).

COMMUNICATIONS

Col. M. Emmet said that a further volume on the Moths and Butterflies of Great Britain and Ireland would appear later this year and would be accompanied by a supplement regarding addenda and corrigenda on those species included in Vol. 1. He invited those with new Vice County records for Lepidoptera to send them to him for inclusion.

MATTERS ARISING OUT OF THE MINUTES OF THE PREVIOUS A.G.M.

Mr. J. Heath stated that he had consulted a Kodak engineer regarding the proposal to make slide copies of old style slides and hoped that this could be arranged in due course.

The Secretary then read the Council's Report. J. M. Chalmers-Hunt seconded its adoption which was passed. The Treasurer read his report which was seconded by Rev. Agassiz and adopted. The Editor then read his report which Mr. S. N. Jacobs seconded and it was adopted. In the absence of Dr. Allen the Secretary read his report whose adoption was seconded by R. Fairclough, and passed. The Curator then read his report which Col. A. M. Emmet seconded; the Librarian's report was likewise passed; and Col. Emmet then read his report on the Prof. Hering Memorial Fund which Rev. D. Agassiz seconded, and these two were also passed.

The President invited proposals or questions from the floor under By-law 25(b) without evoking any suggestion or proposal from members present. He then declared the following elected for 1979: President, the Rev. D. J. L. Agassiz, M.A.; Vice-Presidents: G. Prior, F.L.S., F.R.E.S. and R. Fairclough, F.R.E.S., F.R.H.S.; Treasurer: Col. D. H. Sterling, F.B.C.S.; Secretary, E. H. Wild, L.Inst.Biol.; Editor: E. P. Wiltshire, C.B.E., B.A., F.R.E.S.; Curator, E. S. Bradford; Librarian, G. Prior; Lanternist, S. A. Knill-Jones, A.R.C.M. Ordinary members of Council: Mrs. M. F. Murphy, B.Sc.; C. G. Roche, F.C.A., F.R.E.S.; B. J. Jackson; A. E. Stubbs, M.Sc., F.R.E.S.; A. A. Allen, B.Sc., Ph.D.; T. J. Daley; J. Muggleton; W. Parker.

The President then read his report and his address. He then inducted the new President to the chair. The latter proposed a vote of thanks to his predecessor for all his work on the Society's behalf and expressed the hope that his address would be published in the Society's Proceedings. Motions thanking the Treasurer and other officers for their work were also passed.

COUNCIL'S REPORT

Your Council is pleased to report 1978 as a year of excellent progress. Membership reached 731 in December. Eight of our members died and will be mentioned later by the President.

A revised "economy" membership list was produced with the help of The Rev. D. Agassiz. This was necessitated by heavy expenditure on other publications. Four parts of our Proceedings were published which have earned our Editor hearty congratulations. Also, thanks largely to the drive of Mr. Agassiz, we were able to publish the bound collection of illustrated papers on Micro-lepidoptera from past Proceedings in time for distribution at the Exhibition, with the financial assistance of several of our members. The New Field Guide, a greatly amplified revision of Ford's Guide, is now in the hands of our printers. Council wish to thank Mr. Tubbs, Col. Emmet the Editor, and his team of specialists, for the efforts they have made to produce this, and all the benefactors and typists who gave assistance.

The Annual Dinner, once again well organised by Dr. MacNulty, was held at Imperial College, and the 66 members and guests who attended enjoyed a delightful evening. In the hope of increasing attendance next year Council solicits the aid of Ordinary Members to offer hospitality to Country Members for the night of the Dinner, so that many who come to the Exhibition will be able to attend both functions.

The Annual Exhibition at Chelsea Old Town Hall was most successful, in spite of the poorness of the season. There were over 100 exhibits and

some 300 signed the attendance book. The very high quality of the exhibits maintained our usual tradition. The refreshments, organised by Mrs. Murphy, with the help of a dedicated team of volunteers, including our two youngest members, was appreciated by all and our thanks are due to them and to Mr. Ken Evans who was in charge of the Exhibition. We also thank Mr. Ventom for selling our Christmas cards, this year's beautiful design by Mr. Dyke being very well received, Mr. Wilson, who devoted so much effort to photographing the exhibits, and to many others behind the scenes including our team of reporters.

The Society owes so much to our Treasurer, Mr. Bretherton, who has asked to be relieved of his Office this year. He has guided our finances through this difficult time of inflation, has imposed a wise watch on Council's spending and has done so much for the Society in many other ways for which we are deeply grateful. We wish Col. Sterling, our new Treasurer every success.

Dr. Allen, our librarian, has had to resign because of pressure of other work but Mr. Prior has volunteered to take over from him for which we are most grateful.

Mr. Else again produced an interesting and varied programme of 21 indoor meetings which have been well attended and much enjoyed. A new venture this year was a joint meeting with the Royal Entomological Society of London who entertained us at Queen's Gate in an atmosphere redolent of spiced wine and good Fellowship. We hope to reciprocate this year and to make a regular fixture of what was a most enjoyable event.

Fourteen Field meetings, seven of which were two day fixtures, were organised by Mr. Wild. These were attended, in most cases, by many more members than usual, and produced some interesting records.

Council has devoted some time this year to making its views known on the proposed Amendments to the Parliamentary Bill on Plant and Animal Conservation and has taken what action was possible. It is also trying to establish a happier *modus vivendi* with the Forestry Commission by seeking active cooperation and simplified access procedure to their woodlands.

HON. SEC.

TREASURER'S REPORT, 1978

The Accounts for 1978 have been prepared and audited under difficult conditions, and I warmly thank our auditors, Mr. Messenger and Mr. Stoughton-Harris, for completing their approval in time. I also thank Mr. Wakely for his care of the subscriptions work as Assistant Treasurer.

The Publications Account, which always covers our largest expenditure, this time includes the cost of publishing the "Illustrated Papers on Microlepidoptera"; which was £981, with about £50 postage, but against this we had income from sales of it of £1,570. This remarkable result was largely due to efficient organisation by our President elect, the Rev. David Agassiz. I also thank three members for interest-free loans of £600, which they generously contributed to bridge the time gap between cost and receipts. In the event, this was short, and they have now been repaid. Printing the Proceedings for 1978 cost more than last year, and our ordinary sales, at £454, were much below the abnormal figure of 1977; but the combined result is another welcome reduction in the charge to the Income and Expenditure Account, to £893.

The Income and Expenditure Account shows a surplus of £470; but without the saving from the "Illustrated Papers", mentioned above, there

would have been a small deficit. Our ordinary administrative expenditure was almost unchanged; but the Special Funds have taken more interest as a result of the large transfers to Reserve which were made last year. On the income side, interest from investments, bank deposit, our new holding of £1,000 in Post Office Savings Investment Account is well up at £1,102, and Christmas Cards, Ties, and the Annual Dinner show useful surpluses, though rather smaller than in 1977. But there is the very disturbing feature that, despite an increase in membership, income from subscriptions is, at £1,763, actually £64 less than last year. This was mainly because the arrears have become larger. In spite of much use of ink and postage by the Assistant Treasurer; some 90 members had failed to pay their subscriptions, due on 1st January, by the end of 1978, and many had not paid even for 1977. In the face of this fact, I cannot describe the year's results as more than moderately satisfactory.

On the assets side of the Balance Sheet, there was a small addition to the Midland Bank shares held for the Hering Memorial Fund, and the cash position was built up in preparation for financing the new "Field Guide to the Smaller British Lepidoptera", which is now with the printers. On the liabilities side, the Housing and Reserve Funds spent nothing and increased their balances by receipt of interest; and the Library and Hering Memorial Funds also spent less than their income. The General Fund, with the addition of the surplus on Income and Expenditure Account, now stands at £4,863.

I have been Treasurer for ten years, and it is time that both the Society and I should have a change. Colonel Sterling is well equipped by experience; he will bring a fresh mind to the work; I hope he can simplify it; and I wish him every success.

EDITOR'S REPORT

The 1978 Proceedings were again printed in two double parts appearing in April and November, the latter double part being a month later than planned due to a printer's break-down. At the request of some members and the Council, the title-page was reintroduced; not counting this, 138 pages of text were printed, a total of ten more than 1977. Of the seven art plates, five were of lepidoptera, and two were obituary portraits. The index is in press and will shortly be distributed.

A French colleague once remarked that entomology was a *dialogue des sourds* (a conversation between the deaf); there is a degree of metaphorical truth in that remark, particularly due to the specialisation and ever deepening and widening of contemporary knowledge. Our Proceedings endeavour to strike and, I hope, do achieve, a balance between the interests of the main body, with whom touch should not be lost, and the discoveries of the advance guards. The Rhopalocera figured most prominently in 1978 and may well do so again in 1979. Once again our Proceedings (Indoor Meeting) and Field Meeting reports occupied about one-third of our text space and, as last year, contained many important and interesting observations of species of various orders.

The assistance, before or after printing, of Dr. Southwood and Messrs. Howard, Tweedie and Uffen in checking our manuscripts and proofs, is gratefully acknowledged.

CURATOR'S REPORT

My report this year is one of steady progress in the Society's affairs.

The Torstenius collection of Scandinavian lepidoptera is at present being accommodated in a ten-drawer Hill unit, earmarked for that purpose some

British Entomological and Natural History Society Statement of Accounts

BALANCE SHEET — 31st DECEMBER 1978

LIABILITIES

1977	1978		1977		1978	
£	£	p	£	p	£	p
	LIABILITIES					
	Special Funds:					
	<i>Housing</i>					
1554 19	1694	19	260 27		260 27	
	Balance at 1st January					
140 00	add: Interest transferred from					
	180	00	712 10		712 10	
	Income and Expenditure Account					
			1398 21		1398 21	
335 37	364	32	541 58		541 58	
	Library					
	Balance at 1st January					
59 50	68	75	646 49		646 49	
	add: Entrance fees and interest					
30 55	5	00	1153 71		1153 71	
	deduct: Expenditure in the year					
			708 90		708 90	
			260 00		260 00	
			428 07		428 07	
	<i>Herring Memorial Research Fund</i>					
2257 25	2275	92	291 97		291 97	
	Balance at 1st January					
198 67	223	08	646 48		646 48	
	add: Interest transferred					
180 00	103	00	303 81		303 81	
	deduct: Expenditure in the year					
			2396 00		2396 00	
	<i>Reserve</i>					
1292 77	2108	77	8923 31		8923 31	
	Balance at 1st January					
116 00	220	00	379 09		379 09	
	add: Interest transferred					
700 00						
	Legacy and donations transferred					
			2328 77		2328 77	
	<i>Sundry Debtors</i>					
136 00	85	25				
677 34	1821	16				
4393 34	526	12				
	Subscriptions paid in advance					
	Sundry creditors					
	<i>General Fund</i>					
	us.					
	The value of the Society's library, collections, stocks of publications, Christmas cards and ties is not included.					
	<i>Cash at Bank</i>					
	Sundry Debtors					
	Post Office Savings Investment Account					
	Deposit Account					
	Current Account (Ledger Balance)					
	The value of the Society's library, collections, stocks of publications, Christmas cards and ties is not included.					
	£13797 10					
	£13797 10					

R. F. BRETHERTON, Hon. Treasurer.

British Entomological and Natural History Society

Statement of Accounts

PUBLICATIONS ACCOUNT

EXPENDITURE

1977	£	p
1508	46	
165	05	
59	41	
<u>4172</u>	<u>92</u>	

To Printing and blocks for Proceedings and Index for 1978
 Producing "Illustrated Papers on Microlepidoptera"
 New list of members and addresses
 Postage, etc. (share)
 Repayment of loans (provision)
 Shortfall on provision for 1977

1978	£	p
1619	33	
981	42	
67	18	
218	36	
600	00	
30	11	
<u>£3516</u>	<u>40</u>	

1977	£	p
677	70	
1055	22	
<u>£1732</u>	<u>92</u>	

INCOME

1978	£	p
453	57	
1569	80	
600	00	
893	03	
<u>£3516</u>	<u>40</u>	

By Sales of Proceedings, etc.
 Sales of "Illustrated Papers"
 Interest-free loans
 Grant from Income and Expenditure Account

INCOME AND EXPENDITURE ACCOUNT

445	25	To	Rent	475	00
32	60		Insurance	58	86
197	87		Officers' expenses (mainly postage)	168	13
162	51		Stationery	98	37
42	85		Subscriptions to other Societies	35	75
35	50		Indoor meetings, lectures and exhibition (net)	30	55
8	12		Cabinets and Collections (net)	10	76
11	99		Bank charges and miscellaneous	31	01
1055	22		Publications Account: charge	893	03
484	67		Interest transferred to Special Funds	663	08
700	00		Legacy and donations: transfer to Reserve Fund	—	—
<u>3216</u>	<u>58</u>			2464	54
483	64		Excess of Income over Expenditure	469	78
				<u>£2934</u>	<u>32</u>

1827	17	By	Subscriptions	1777	10
786	77		Interest on investments	19	28
82	46		Investment	20	10
44	35		Sale of Christmas cards: profit	—	—
57	66		Annual Dinner: surplus	29	74
27	00		Sale of Ties: profit	—	—
174	61		Sale of cabinets and equipment	—	—
700	00		Legacy and donations	2934	32
<u>1700</u>	<u>22</u>			<u>£2934</u>	<u>32</u>

Interest on Bank deposit and Post Office Investment
 Sale of Christmas cards: profit
 Annual Dinner: surplus
 Sale of Ties: profit
 Sale of cabinets and equipment
 Legacy and donations

We certify that the Balance Sheet and General Income and Expenditure Account are in accordance with the books and vouchers presented to
 J. L. MESSENGER
 A. G. STOUGHTON-JARRIS, F.C.A.,
 Chartered Accountant.

time ago. It is hoped to make available one, or possibly two more Hill units for this collection in due course as it may require that amount of drawer space to house it when complete. The collection comprises several thousand specimens. The task of arranging it is being undertaken by Mr. C. B. Ashby. Several drawers, already laid out, were displayed at the Annual Exhibition at Chelsea Town Hall on 28th October, 1978. We have to thank Mr. Ashby for the display which was visually interesting and informative.

While on this subject I would like to bring to the attention of members that Mr. Torstenius desires specimens of various races or sub-species of British lepidoptera. The Society's collections contain few of those species required, so I appeal to members to make available from their own collections specimens that can be presented to Mr. Torstenius, and to contact either Mr. C. B. Ashby or myself on his requirements.

Good headway is being made with the new Diptera cabinet considering the large number of specimens involved. The transference of the *Massees collectio* of Coleoptera is well on its way to completion.

The use of the duplicate collections over the past year has depleted the stocks somewhat. It is hoped to provide more specimens this year, including the microlepidoptera. The Rhopalocera are one group rarely available as duplicates. In fact the Society would be pleased to receive donations of butterflies, especially geographical races or sub-species. Those from the more remote regions of the British Isles being particularly welcome. Duplicate Coleoptera are available. Those members wishing to know more about them please contact Mr. R. D. Weal.

I would like here to enquire of a box of 35mm colour transparencies depicting larvae of the British Lepidoptera, that are, I believe on loan. Would the member who is at present in possession of them return them as soon as possible.

The few items of equipment surplus to the Society's needs were sold by Mr. M. Ventom at the Annual Exhibition.

Donations were made to the Society's collections during the year and the thanks of the Society are due to the following for their contributions: Mr. E. Gower-Scopes (Coleoptera), Mr. B. F. Skinner (Lepidoptera), Col. A. M. Emmet (Lepidoptera), Mr. R. D. Weal (Coleoptera), Mr. M. Chalmers-Hunt (Lepidoptera), Mr. E. S. Bradford (Lepidoptera).

Once again I wish to thank Mr. R. D. Weal, Mr. C. B. Ashby, Mr. W. Parker, Mr. P. J. Chandler, Mr. B. F. Skinner and other members for their valuable assistance during the year; also to Mr. L. Christie for his continued help in the collating and packaging of the Society's proceedings.

LIBRARIAN'S REPORT

During the past year the library has undergone extensive revision. The numerous unsorted Journals have mostly been helved in chronological order, thereby enabling members to obtain a desired reference quickly and efficiently, instead of searching laboriously through piles of disarranged literature. All of the more widely-read Journals are readily accessible, together with a representative selection of less familiar publications.

With the acquisition of more shelving space, all of the Journals taken by the Society will be available on meeting-nights—an ambition also derived from gradual loose case binding of the Journals—of which the appearance and shelf-life will accordingly be improved. The generosity of Mr. G. Prior is very much appreciated in this context.

A lot of work remains to be done, chiefly on the books at present far too many are disorganized — often by virtue of their large size. This feature merely emphasizes the urgent need for spacious shelves in the limited room available.

More generally, too many books are still retained by their borrowers for a period in excess of that allowed under the Society's By-Laws: the present period of two months (for a maximum of three books) is deemed to be of sufficient duration. It is essential that books are returned before they become overdue; it is up to the member concerned to act in a responsible manner.

As the year has advanced, the pressure of work has increased to such a degree that I am compelled to resign my tenure of office. I would like to thank Council for their support during this critical period of redevelopment within the library.

I conclude my report by listing the publications generously donated to the library in 1978. They include: —

'*Records of my life work in Entomology*' — C. R. Sacken: from E. W. Classey; '*1977 Records of Fareham group of Entomologist: Lepidoptera*' — Appleton, Carpenter, et al: from E. W. Classey; '*Butterflies on my mind*' — Dulcie Gray; '*Abberations of British Butterflies*' Russwurm: from E. W. Classey; '*Gardens of Buckingham Palace*' — P. Coats: donated by the author; '*Life on 40 acres*' — Barry Moore: from E. W. Classey; '*British Tortricoid Moths*' — Bradley, Tremewan and Smith: from Miss Wakely; '*The British Butterflies*' — R. Dennis: donated by the author; '*Endodontoid Land Snails from Pacific Islands*'; '*Moth Hunter's Gossip*' — P. B. M. Allen: from T. Daley; '*A guide to the Butterflies of Central & S. Africa*' — Piney & Hoe; '*British butterflies and their transformations*'— Humphreys & Westwood: from Rear-Admiral A. D. Torlesse; '*British moths & their transformations*', Vols. I & II (1854) and '*European butterflies & moths*' — W. F. Kirby: both from Rear-Admiral A. D. Torlesse; '*The Life of Henry Doubleday*' — Robert Mays.

Grateful thanks are extended to donators of Journals throughout the past year, particularly to Mr. S. N. A. Jacobs.

REPORT ON THE PROFESSOR HERING MEMORIAL RESEARCH FUND FOR 1977-1978

Two applications were received and a sum of £50 was granted to each applicant. They were as follows: —

(1) Dr. I. A. Watkinson, for travel incurred in connection with field work and the study of collections for his work on the genus *Phyllonorycter* for "The Moths and Butterflies of Great Britain and Ireland", Vol. 2.

(2) The Ray Society, to help defray the high cost of publication of Volume 2 of "British Tortricoid Moths". Grants are not normally made for this purpose but an exception was made in this instance because of the importance of this work in the study of Microlepidoptera.

The sum of £100, unexpended in 1977-1978, has been added to the funds available for grants in the current year.

A. M. EMMET, *Hon. Sec.*

Thursday 22nd February 1979

The President, Rev. D. AGASSIZ, in the chair.

EXHIBITS

Dr. A. A. ALLEN — (i) A male of *Tromatobia oculatoria* (F.) (Hym., Ichneumonidae) bred 11.viii.1978 from a cocoon found on heather 30.vii.78, on moorland near Dawlish, Devon. The species was most interesting because it is a parasite of spiders' nests; the larva of *T. oculatoria* feeds on the spiders' eggs. The pale ochre cocoon of the exhibit was inextricably bound to the spider's nest at which the larva had fed. Other closely related species of this subfamily (the Pimplinae) have a similar life-history, and the literature affords instances of more than one parasite cocoon being found in a single spider's nest.

Col. A. M. EMMET — Two adults of *Coleophora machinella* (Bradley) taken flying amongst sneezewort (*Achillea ptarmica*) on Ditchling Common, Sussex, on 28.vii.1977. Larval cases of this species used to be found feeding on sea-wormwood (*Artemisia maritima*) on the Essex salt-marshes from about 1885-1903, but it was subsequently lost sight of until Dr. J. Langmaid rediscovered it in Hampshire in 1977; there too its foodplant was sneezewort.

Dr. I. WATKINSON — An unidentified nematode, 2-3in. long, found in a seed-tray, in Kent.

E. WILD — Three specimens of the Gelechiid *Argolamprotes micella* (D. & S.) (determined by Rev. D. Agassiz) taken at m.v. light in S. Devon on 30.vii.78. This species was first noticed in Britain in the mid-sixties and has not been taken outside Devon. Spuler gives raspberry as the foodplant. Also a striking melanic form of *Olethreutes lacunana* (D. & S.) (Tortricidae) taken at m.v. light at Dungeness 30.vi.73, determined by J. D. Bradley; not represented in the B.M. collection.

MEMBERSHIP

The following, their names having been read for the second time, were declared elected members: Messrs. M. S. Harvey, P. E. D. Hirst, F.R.B.A., and D. Corke, Ph.D.

ANNOUNCEMENTS

A. STUBBS made a statement regarding the Dept. of Environment's recommendation that the Essex emerald moth (*Euchloris smaragdaria* (F.)) should be added to the listed moth or butterflies which it would be illegal to collect. The stands of its foodplant in Essex had been reduced by sea-wall repairs in recent years. Only one site where the moth survived was now known. A survey of all known localities had been made and there appeared no doubt that the moth was already for the above reasons on the verge of extinction in Britain.

COMMUNICATIONS

Dr. A. A. ALLEN reported that *Phragmatobia fuliginosa* (L.) larvae had been found at Littlehampton under dead bark of a log on the beach covered with snow.

Dr. E. POLLARD then gave an illustrated talk on "Monitoring the abundance of butterflies". An article covering much of this subject appears elsewhere in this part.

After this various members exchanged accounts of their experiences breeding progeny of recently immigrated *Mythimna* subg. *Pseudaletia unipuncta* (Haw.), the American Wainscott. A. BRETHERTON stated he had found the larvae strongly lucifuge. Experiments in trying to over-winter such larvae in natural out-door conditions in Surrey had shown, after the prolonged and severe cold spell of recent weeks that this was impossible in the county, though adult moths were only killed after more than ten days of such weather.

8th March 1979

The President, the Rev. D. AGASSIZ, in the chair.

The President announced with great regret the deaths of two members: — Douglas Ollevant, of Farnborough, Hants., who joined the Society in 1969, and P. Lemesurier, of Kincaig, Inverness-shire, a member since 1960, both deaths having occurred last year.

EXHIBITS

The Rev. D. AGASSIZ — The carcass of a pigeon, found in a church tower and infested with the larvae probably of *Endrosis sarcitrella* (L.) Lep., Oecophoridae) and perhaps other larvae.

Dr. A. A. ALLEN — Three females and one male *Zemiotes albiditarsus* (Curtis) (Hym., Braconidae), illustrating the variation within the species, not only of the leg-colour but also of wing-venation. Until recently two closely related species had been thought to exist:— *albiditarsus*, with a radial cross-vein on the hind-wing and with off-white or white tarsi, and *deceptor* (Wesmael), having no radial cross-vein and possessing testaceous-coloured hind tarsi. The first set of characters were present in one ♀, captured 12.vi.1976 at Salfords, Surrey, while the latter set of characters occurred in two females, one caught by day at Salfords 15.vi.1977, while the other provided an opportunity to include a reared specimen; it was bred from a larva of *Anarta myrtilli* (L.) (Lep., Noctuidae) swept from heather on 11.viii.1978 on moorland near Dawlish, Devon; the last cocoon was spun 16.viii and the parasite emerged from its cocoon, spun in that of the host, 5.ix.1978. Finally a male, one of several examples taken 9.ix.78 at m.v. light, Kingspark Wood, Plaistow, Sussex. This form displayed the white hind tarsi but lacked the radial cross-vein. Before obtaining the revision in the Check List of British Insects, R.E.S. Handbook of Hymenoptera the exhibitor had encountered some difficulty in placing this species.

Col. A. M. EMMET — *Phyllonrycter viminetorum* (Stainton) reared from a mine in osier (*Salix viminalis*) collected at Kingsford Bridge Marsh Nature Reserve, near Colchester, Essex, on 30th October 1978. The moth emerged indoors on the 19th January 1979. The species, much rarer now than it was in the last century, has seldom been recorded in recent years.

A. J. HALSTEAD — A second-year larva of *Zeuzera pyrina* (L.) the leopard moth collected August 1978 from the upper part of the trunk of *Sorbus mitchellii*. The trunk diameter at this point was about 5 cm. The tree was growing at the Royal Horticultural Society's Garden at Wisley, near Woking, Surrey.

ANNOUNCEMENTS

The President read out a list of lepidopterous desideranda by Dr. Stig Torstenius of Stockholm in exchange for the fine collection donated to the Society. It was hoped members could supply most of these from their private collections. Among species named were *Lithophane leautieri hesperica* (Boursin) and *Aleucis distinctata* (H.-S.).

COMMUNICATIONS

Dr. A. A. ALLEN reported having found larvae of *Parascotia fuliginaria* (L.) on bracket-fungi on dead pine at Hankley Common, Surrey on 23rd February, the length of the larvae being only 6 mm.; he had also beaten on 25th February at Salfords, Surrey, larvae of *Campaea margaritata* (L.) from wild privet.

C. F. RIVERS reported having obtained larvae of *Acherontia atropos* (L.) in Canary Is. which produced adults, of which females were eggless on emergence from their pupae, whereas males were sexually developed and

mated immediately; six spermatophores had been found inside the bursa of a female whose ovaries were still hardly more advanced than in the larval state. S. KNILL-JONES reported having had a pairing of this moth in September. R. BRETHERTON, however, pointed out that immigrants in autumn of other moths included females impregnated and fertile.

C. F. RIVERS then gave an illustrated talk of which the following is an abstract:—

Insect diseases and population control

“Insects are subject to infection with fungi, bacteria, rickettsia and viruses and diseases play some part in regulating populations. In some colonies of mosquitos virus infections are at a very low level with as few as one diseased in every thousand collected, whilst amongst the sawflies virus epidemics wipe out all the larvae. Wintermoths, *Opheroptera*, are sublethally infected with Microsporida which affects the fecundity of the species. An infestation of *O. brumata* in Caithness collapsed because of a natural infection with Baculovirus (Nuclear polyhedrosis) and an expensive chemical control was called off. It is important that field entomologists should be able to recognise when diseases are present in the population of potential pests so that they are able to make realistic projections of the likely pest problem. Much useful information has been gathered by the Unit of Invertebrate Virology's study of a virus epidemic in *Gilpinia hercyniaca* in Mid Wales. Birds and mice were found to be actively assisting the spread of the disease which brought a potentially serious pest under control within four years. Pathogens are passed out in faeces, in meconium and by regurgitation before the insect dies and foliage gets contaminated heavily by dead larvae. Infection occurs as a result of ingesting pathogens with food or, in the case of some fungi, invasion through the skin of the insect. Diseases may be passed from adult to progeny on the surface of the eggs and in a few instances passage within the egg has been demonstrated. To avoid the problems of diseases amongst insects in captivity it is essential to surface sterilize the eggs with 1% sodium hypochlorite for eight minutes or immersion in 10% formaldehyde for 40 minutes. Careful rinsing, ventilating and drying of the eggs must follow this treatment. Wooden and netting cages and plastic boxes used to house insects can be sterilized by immersion in a 10% solution of Sodium hypochlorite for at least an hour. The exclusion of sickly insects and careful breeding with vigorous individuals is the only hope of obtaining disease free culture of insects which do not respond to egg surface sterilization.

The observation that virus diseases very effectively control some insect pests has led to the development of their use as pesticides and the speaker talked about his work with *Neodiprion sertifer* in Scotland starting in 1958 and with *Euproctis chrysorrhoea* on Canvey Island. Thorough safety testing is carried out with any virus which is a candidate for use in the field and the Pesticide Safety Committee screens all applications to work with viruses in Britain. At present the viruses are applied like chemical insecticides but they lend themselves to more sophisticated methods of application, such as spot application and the release of virus carrying adults”.

The talk provoked an animated discussion during which P. J. BAKER stated that a good substance to disinfect breeding cages with was Johnson's Baby Bottle Sterilizer which has a solution of sodium hypochlorite — a drop of Murphy's rose black spot fungicide should be added to the bath.

22nd March 1979

The President, the Rev. D. AGASSIZ, in the chair.

EXHIBITS

D. AGASSIZ — The first British specimen of *Coleophora hydrolapathella* (Hering) (Lep., Coleophoridae), taken at Hickling, Norfolk 7th July 1974, but only identified today. The species was added to the British list by T. Peet from a series taken in July 1975 from the same locality.

Dr. A. A. ALLEN — A male specimen of *Amblyjoppa proteus* (Christ.) (Hym., Ichneumonidae) having been bred from the pupa formed by a mature larva of the elephant hawkmoth, *Deilephila elpenor* (L.), by K. Merrifield on 13.vi. 1961, subsequently passed to the exhibitor. The species is a well-known parasite for this host, but the present specimen was of interest because the hind-wing venation differed, the mediella of the right hind wing being forked near the wing-markin, while this was normal in the left hind wing. Secondly, a female example of *Ichneumon bucculentus* Wesm., (Hym., Ichneumonidae) found 23.ii.1979 by uprooting a small dead pine stump on Hankley Common, Surrey. The females of this genus spend the winter hibernating and are sometimes encountered in rotten wood, or under loose bark. The species is considered uncommon.

J. MUGGLETON — Two examples of the *simulatrix* form of *Adalia bipunctata* (L.) (Col., Coccinellidae), one from Yorkshire, the other from Somerset. These appear to be the first examples of this form recorded from the British Isles. The Yorkshire example was sent to Mr. R. D. Pope by Dr. W. A. Ely, and the Somerset example was sent to the exhibitor by R. W. Rowe. The colour pattern of both the elytra and pronotum is identical to that of *Adalia decempunctata* (L.) and the legs and under-side are mostly yellow-brown as in *A. 10-punctata*, so that the occurrence of this form in the British Isles seems capable of causing confusion in identifications. It is therefore important to know how common the form is in the British Isles and the exhibitor would be grateful if coleopterists would watch out for it. The form can be distinguished from *A. 10-punctata* by the underside characters given in Pope's R.E.S. handbook. The *simulatrix* forms of *bipunctata* are common in parts of Central Asia, the Near East and on some of the Mediterranean islands.

P. A. SOKOLOFF — A freshly emerged living specimen of *Spargania luctuata* (D. & S.), the white-banded carpet, from a brood collected at Ham Street, Kent, late June 1978. Despite identical treatment, about 20% of the pupae emerged within three weeks of pupation, the remainder overwintering as pupae. Also freshly emerged specimens of *Phyllonorcter schreiberella* (F.) bred from elm leaves, West Wickham, Kent.

MEMBERSHIP

The following were declared elected their names having been read the second time: — Messrs. M. Edwards, M. S. Parsons, J. Bingham, P. D. Hume, B.Sc., Ph.D., Dip.E.E., C.Eng., R. A. Fry, M.I.E.E., P. J. Holloway, R. H. Dunn, M. V. Albertini.

ANNOUNCEMENTS

The President read a letter from S. N. A. Jacobs to the effect that he was forbidden to drive by his doctor and would be unable in future to attend meetings. P. A. Sokoloff reported that he had recently seen Mr. Jacobs and found him cheerful but resigned to future immobility. The President wondered whether some member living near by might not be able to provide a lift, sometimes.

COMMUNICATIONS

After making an announcement regarding circulation of cards, notices and proceedings to members, R. F. BRETHERTON reported that he had recently suspected *Lithophane leautieri hesperica* Boursin of breeding in his part of Surrey on *Chamaecyparis lawsoniana* a hitherto doubtful foodplant for this moth, and had now succeeded in breeding from ova laid last autumn by this species larvae on this foodplant past the critical first instar stage; the larvae had taken readily to the tree, first eating the male flower buds as reported by Haggett for the larva but on *Cupressus macrocarpa*. They were now growing normally and eating only the buds.

Dr. B. MACNULTY then gave an illustrated talk on West African Coleoptera, giving the names of the majority of the Longicornes illustrated, and information regarding the habits of some. A number of questions were evoked by this interesting talk, and thanks were expressed in the usual way.

Thursday, 28th April, 1979

The President, Rev. D. J. L. AGASSIZ, in the chair.

EXHIBITS

Dr. A. A. ALLEN — Three examples of *Dyspetes arrogator* Heinrich (Hym., Ichneumoninae) taken at m.v. light, Plaistow, West Sussex, 9.x.76 and 9.ix.78; there are many records of the species having been taken by day. Also two larvae of *Parascotia fuliginaria* (L.) (Lep., Noctuidae) from five such larvae found on fungi on a rotten pine log, Hankley Common, 2.ii.79. Though small when taken three had spun cocoons by 25.iv.

G. PRIOR — Larvae of *Euplagia quadripunctaria* (Poda), the Jersey tiger moth, reared from some given to him by a member at the Annual Exhibition on 28th October, 1978.

R. TUBBS drew attention to a reissue of Sepp's plates by the firm Michael Joseph with text by Dr. S. McNeil, under the title "Butterflies and Moths by Christian and Jan Christian Sepp". This originally appeared in parts in 1762 in Holland.

ARISING FROM THE MINUTES OF THE PREVIOUS MEETING

The President supplemented his remarks on his exhibit of *Coleophora hydrolapathella* Hering (Lep., Coleophoridae) by saying he had received from T. Peet a further specimen of this taken in 1974 but had failed to identify it. He also reported having received a cheerful letter from S. N. Jacobs.

MEMBERSHIP

The obligation book was signed by M. S. Parsons and R. A. Fry.

ANNOUNCEMENTS

The President reported the Society had received, as a donation, the NCC Survey of Esher and Oxshott Commons.

G. PRIOR said the library had now been reorganised on usual library lines. Borrowed books, having been signed for, would have to be brought back after two months but might then be re-registered to the same borrower unless requested by another member. Overdue borrowers were being requested by letter to return books. He suggested that where periodicals were loose in a binder, the whole binder should be borrowed, not isolated numbers.

R. SMILES then gave an illustrated talk entitled "*Charaxes* the artful butterfly; reflections on collecting in Kenya".

COMMUNICATIONS

Dr. A. A. ALLEN — Two females of the uncommon species *Hoplismenus bidentatus* Gmelin (Hym., Ichneumonidae) were found hibernating together 11.iv.79 under bark of a pine-log on Haldon Moors, Devon. Species of the Ichneumoninae parasite Vanessa and Satyrid butterflies. In addition he reported that he found *Stenichneumon culpator* Schrank, all females, extremely common in a few of the rotten logs. Also three larvae of *Euplagia quadripunctaria* (Poda) (Jersey tiger) were taken 11.iv, 12.iv and 18.iv.79, all at night, low on old bramble on Dawlish cliffs, Devon. They readily ate bramble in captivity. He reported having found other larvae at Dawlish, including *Callimorpha dominula* (L.) (common), and reported other creatures observed in the same area.

R. BRETHERTON said the spring had been a good one for *Archiearis* species, particularly *parthenias* (L.).

E. P. WILTSHIRE reported having also observed both orange underwing species in East Berkshire recently.

A discussion of *S. culpator* and its reported host-specificity on Plusiinae the ensued, in view of the large numbers found in Devon by Dr. Allen. R. BRETHERTON mentioned that *Autographa gamma* (L.) had been reported as far less numerous in Devon the previous year than usual.

Thursday, 10th May, 1979

The President, Rev. D. J. L. AGASSIZ, in the chair.

The President announced with regret the death of a member, F. C. Brown, a resident of Surrey.

EXHIBITS

The President — (i) specimens of *Thera* (Lep., Geometridae) received from Ole Karsholt in Denmark: *T. obeliscata* Hübn., *T. variata* D. & S. and *T. albonigrata* Gornik, with British specimens of *Thera* for comparison; (ii) Danish specimens of *Nematopopogon panzerella* (F.) agreeing with Fabricius' type together with British specimens which we have regarded as that species but which Dr. Schmidt Nielsen states should be called *N. schwarziellus* Zeller. In a later comment Col. Emmet stated that whereas earlier British books gave the wrong name for the British *Nematopogon* form exhibited, the new list by Dr. Bradley had the name right.

Dr. A. A. ALLEN — (i) (on behalf of Mr. Donald Quicke, the captor), a male example of *Poecilostictus cothurnatus* (Grav.) (Hym., Ichneumonidae) taken in 1977 in the Gwernol valley, Wales, being the second known record of the species in Britain, the first having been bred from a pupa of *Bupalus piniaria* (L.) of Delamere, Cheshire. The species is well-known on the Continent; (ii) specimens of Ichneumoninae discovered by the exhibitor in rotten pine stumps on a moorland at Dawlish, Devon, in mid-April 1979. Females of this species spend the winter in such habitats. The species were: (a) *Stenichneumon culpator* (Schrank), a typical dark form caught on 11.iv.1979 and the much less common form in which the tibiae together with tergites 2 and 3 were red, taken 13.iv.79. The species is a common parasite on Plusiinae and large numbers were taken on the moors. (b) (c) two closely related species, *Ichneumon suspiciosus* Wesmael and *I. septentrionalis atrifemur* Perkins, both captured 13.iv.79. Of these the second is less common and is liable to be confused with the first unless care is taken in identifying (see Perkins 1960).

Col. A. M. EMMET — *Coleophora adjectella* H.-S. 1861, a species now recognised as British. The first British specimen appears to have been one reared from a case-bearing larva found mining leaves of *Prunus spinosa* at Danbury, Essex, in October 1900 by W. C. Boyd during a shooting party.

It was identified as *Coleophora milvipennis* Zeller by Barrett and presented under that name as a species new to Britain (Ent. monthly mag. 38: 79-80). That species is found in Britain on *Betula* and, on the Continent, also on *Alnus*, *Corylus*, *Carpinus* and *Myrica*. Study of a recent paper by O. Karsholt and E. S. Nielsen (Remarks on microlepidoptera new to the Danish fauna, with a review of the *Coleophora milvipennis* group. Ent. Meddr. 46:1-16, Copenhagen 1978) showed that the *Prunus*-feeding member of the group was a distinct species, viz. *adjectella*. A series of eight moths was reared in July 1968 from *Prunus*-feeding larvae taken at Benfleet, Essex on the 20th October, 1967 and misidentified as *C. badiipennella* (Dup.) which was feeding commonly on the adjacent elms. These were submitted to Dr. J. D. Bradley who determined them as *C. adjectella* after dissection of the genitalia. Larval cases of *C. adjectella* have also been noted at a third locality in south-east Essex and at Newtown, I.o.Wight. The specimens from Benfleet together with examples of the four other members of the group (*C. limosipennella* (Dup.), *C. badiipennella* (Dup.), *C. alnifolia* Barasch and *C. milvipennis*) were exhibited; the larval cases of all except *badiipennella* were also shown.

A. HALSTEAD — a leaf-mining weevil on hardy cyclamen: *Orthochaetes setiger* (Beck) (Col., Curculionidae) is a small brown weevil whose larvae feed as leaf-miners in the foliage of many wild plants particularly in the Compositae family, such as *Taraxacum*, *Lactuca*, *Hieracium*, *Centaurea*, and *Sonchus* spp. Other plants recorded as hosts are *Ajuga*, *Myosotis*, and *Plantago* spp. Leaf-mining on *Cyclamen hederifolium* was noted on plants growing at the Royal Horticultural Society's Garden at Wisley, Surrey in 1975. Adults were reared the following year and identified by the British Museum (Nat. Hist.). The weevil appears to overwinter as adults in the soil and become active in March when the first signs of mining appear on the leaves of *C. hederifolium*. The mine is initially linear but later broadens into a blotch. The larvae go into the soil to pupate in late April-May and adults emerge after about three weeks. By that time the foliage of *C. hederifolium* is dying down, so presumably the weevils seek out one of their other host plants.

G. PRIOR — a living example of *Eupithecia insigniata* (Hübner) hatched from larvae found last year on hawthorn, as already reported, and confirming the identity of the larvae exhibited on 13th July, 1978.

MEMBERSHIP

Their names having been read for the second time, the following were duly declared members: M. Beresford, M. Gandy, Dr. J. A. Gibson, J. W. Muir, and R. K. Press.

ANNOUNCEMENTS

R. BRETHERTON announced that two numbers of the Proceedings of 1942/43, 1944/45 containing plates of *Phyllonorycter* spp. had run out of stock or nearly so and the Society was prepared to buy back from members holding these numbers and no longer needing them in order to supply continued demands.

C. G. DE WORMS reported that finally the cold spell had been succeeded by a breath of spring weather and *Anthocharis cardamines* (L.), the orange tip butterfly, had been observed by J. Greenwood at Petersfield; *Odontotrypa carmelita* (Esper) and *Polyphoca ridens* (F.) had also been seen, about a fortnight after their usual date.

G. PRIOR, as librarian, asked for a duplicate set of the Society's Proceedings going back as far as possible, particularly pre-1919 or war-time copies.

N. M. COLLINS then gave a highly competent illustrated lecture on the Royal Geographical Society's Expedition to the Mount Mulu National Park, Sarawak. This contains a great diversity of forest types and also of wild life belonging to many orders, but the largest mammals are absent. Orchids were not collected. Nomad tribesmen living a hunting-life were still found in the forest.

24th May, 1979

The President, the Rev. D. J. L. AGASSIZ, in the chair.

The President announced with great regret the death of an Hon. Life member of the Society, Dr. H. B. D. Kettlewell, over fifty years a member and distinguished as a geneticist and writer.

EXHIBITS

D. J. L. AGASSIZ — three live adults of *Eupithecia extensaria* (Freyer) (Lep., Geometridae) from West Norfolk, together with foodplant.

Dr. A. A. ALLEN — A female of *Temelucha arenosa* (Szép.) (Hym., Ichneumonidae) taken 25.viii.1978 on Brownsea I., Dorset.

M. R. BROWN — larvae of *Ptilophora plumigera* (D. & S.) (Lep., Notodontidae) from ova from a female taken to light at Wye, Kent, in mid-November 1978 (courtesy J. Platts).

Col. A. M. EMMET — A first-year cone of *Pinus sylvestris* collected in St. Leonard's Forest, Sussex, on the 24th November, 1978 from which a specimen of *Cydia conicolana* (Heylaerts) (Lep., Tortricidae) emerged on 16th May, 1979. Before the emergence of the moth there was no outward sign that the cone was tenanted. By a remarkable coincidence the whole process of the moth's emergence was observed, and the pupa-case was exhibited protruding from the cone.

R. F. BRETHERTON — Live larvae of *Lithophane leautieri hesperica* Boursin (Lep., Noctuidae) feeding on *Chamaecyparis lawsoniana*, from Surrey.

G. PRIOR — a larva of *Eupithecia irriguata* (Hübner) (Lep., Geometridae) on oak, larvae of *Orthosia gothica* (L.) (Noctuidae) and of *Spargania luctuata* (D. & S.) (Geometridae), the latter on willow-herb.

ANNOUNCEMENTS

The President exhibited copies of N.C.C. Information sheets on national nature reserves in different parts of Britain, which he had received.

MEMBERSHIP

G. Ebert, M. Gandy, Dr. J. A. Gibson, the Hon. Lindsay Bethune, and M. S. Punnell, their names having been read for a second time, were duly declared elected members.

The obligation-book was signed by M. Gandy and M. S. Punnell.

COMMUNICATIONS

Col. A. M. EMMET announced that the proofs of the revised edition of Ford had been done astonishingly well and only those of the indices were now awaited.

Dr. C. G. M. DE WORMS mentioned that the season had opened up, and he had heard reports of the holly blue, *Celastrina argiolus* (L.), orange-tip, *Anthocharis cardamines* (L.) and poplar hawk moth, *Amorpha populi* (L.), having been seen quite plentifully. M. S. CHALMERS-HUNT reported that *Pyrgus malvae* (L.), the grizzled skipper, had been seen at Plaistow, Sussex, on 20th May. A. HARMAN reported that *Vanessa atalanta* (L.), the red admiral, had been seen on 22nd May at Sandwich, Kent.

C. SAMSON then gave an illustrated account of a solo trip to Ecuador and of the natural history of that land. He had walked, collected, and photographed, camping alone in a variety of habitats and gave particular attention to the butterflies; however, he also showed photographs of the condor, which, he found, was scarce, and limited to a few high mountain habitats, also of lizards, Odonata, etc. The damp climate had corroded his flash-apparatus within two weeks of his arrival. He carried two cameras however so that when one broke down a reserve model was available. An appreciative audience asked many questions at the end of the talk.

14th June, 1979

The President, Rev. D. J. L. AGASSIZ, in the chair.

The President announced with great regret the death of Mr. N. D. Riley, the distinguished lepidopterist, and member of the Society since 1908.

EXHIBITS

R. FAIRCLOUGH—Larvae of *Ectropis crepuscularia* (D. & S.) (Lep., Geometridae) from a cross between Devon and melanic Forest of Dean moths. These were sent by Mr. M. Leech of Ross-on-Wye. A live *Acleris cristana* (D. & S.) f. *ruficristana* Johnson. Manley in his "Guide to this species (Ent. Gaz. 24, 1973) said that the whereabouts of the holotype was unknown, and that he had been able to trace only one specimen. This specimen, together with one other emerged from an Essex x Surrey/Sussex pairing. Also exhibited were some moths caught 23rd January, 1979 at Ula Belait at 200 ft. in primary rain forest by Lt. Col. M. G. Allen and sent papered to the exhibitor.

Col. A. M. EMMET—Thirteen specimens of *Parornix alpicola* (Wocke) reared between the 6th and 17th of May, 1979 from larvae collected at Eriboll, West Sutherland on the 31st of July, 1978. Sprays of the foodplant, mountain avens (*Dryas octopetala*) containing larval mines and a cocoon spun on the under surface of a leaf were also shown and described.

The history of *P. alpicola* in Britain is linked with that of *P. leucostola* Pelham-Clinton. Between the 5th and 8th of June, 1963 Mr. Pelham-Clinton captured seven adults of a whitish species of *Parornix* at the Invernaver Nature Reserve, on the Sutherland coast. Since leading European authorities supported his view that they belonged to a species new to science, Mr. Pelham-Clinton described them as such under the name *leucostola*.

Early the following August, Mr. Pelham-Clinton and Dr. J. D. Bradley visited the reserve to search for larvae on the suspected foodplant, mountain avens. Numerous mines were found at Invernaver and later at Eriboll, some 20 miles further west. In the following May, several *P. leucostola* were reared from Invernaver but none from Eriboll. In addition, two *P. alpicola*, a species new to the British list, were reared, one from each locality; these emerged earlier than *P. leucostola*. The genitalia of the two species were compared, continental specimens of *P. alpicola* being included. No difference could be observed, except that the valva of male *P. alpicola* appeared to be slightly more slender. The question whether they constituted a single species therefore arose, but in view of the very different appearance of the imagines and the apparent earlier emergence period of *P. alpicola* they were kept as separate species and are so treated in the Kloet & Hincks check list.

In a quest for further evidence, in 1978 Mr. Pelham-Clinton conducted the exhibitor to the two localities and tenanted mines were collected in

both places. No moths emerged from Invernaver, but the thirteen *P. alpicola* exhibited probably represent 100% of the larvae taken at Eriboll; Mr. Pelham-Clinton also reared at least one *P. alpicola* from Eriboll. No *P. leucostola* was reared from either locality, though in 1963-1964 it was the more common species at Invernaver. On present evidence, therefore, *P. leucostola* is confined to Invernaver whereas *P. alpicola* occurs in both localities. Some unknown factor seems to have inhibited the emergence of *P. leucostola* but not of *P. alpicola*. Support is therefore given to the view that the species are distinct.

Dr. A. A. ALLEN — Three species of the genus *Apanteles* (Hym., Braconidae): *A. endemus* Nixon, *A. limbatus* Marshall and *A. formosus* (Wesmael), all of which were bred from larvae of *Abraxas grossulariata* L. (Lep., Geometridae) taken on blackthorn at Littlehampton, Sussex, spring 1979. *A. endemus* (♀) was bred 29.v.1979 from a host collected 12.v.1979, the parasite larva emerging on 17.v. This appeared to be the first record of *endemus* having been bred in England; the species was hitherto recorded from St. Andrews, Scotland and from a single French specimen (Nixon, 1965). The cocoon was remarkable for the large number of pure white loose threads attached to the main structure. The possibility could be entertained that the south coast insect represents the northern extremity of the French record. *A. limbatus* (a gregarious species) was bred 4.vi.1979 (nine specimens) from a larva collected 12.v.1979. Twelve parasite larvae emerged from the host on 24.v.1979, from one cocoon a species of *Mesochorus* was also reared; two failed to hatch. In the exhibitors experience, *limbatus* is a common parasite of *grossulariata*, at least on the Sussex coast. *A. formosus* (♀) was bred 17.v.1979 from a host larva collected 20.iv.1979. The host was killed 8.v, on which date the parasite larva spun its unique, stalked, pale ochre cocoon. This species is known to be bivoltine, the second generation attacking the larvae of *Lycia hirtaria* (Clerck).

The exhibit formed a compact little group comprising the three known species of *Apanteles* known to attack, almost exclusively, *A. grossulariata*. It was of interest that all three were obtained in the same year, from larvae collected in the same locality. About 75 larvae were collected of *grossulariata*: several gave *limbatus*, but only one each provided *endemus* and *formosus* (the last named has an alternative overwintering host, *Ourapteryx sambucaria* (L.)).

Also exhibited were five species of Lymantriidae larvae, these being *Euproctis similis* (Fues.) collected v.1979 at Littlehampton, Sussex; *E. chrysorrhoea* (L.) collected as first instar larvae on Birch 13.v.1979, Reigate Heath, Surrey; *Leucoma salicis* (L.) taken 2.vi.1979 at Camber, Sussex, and *Lymantria monacha* (L.) beaten from oak 31.v.1979 Brownsea I., Dorset. Larvae of *salicis* and *chrysorrhoea* were abundant at Camber; several young poplars and hawthorn/sea buckthorn hedges were almost entirely defoliated as a result of the depredations of these larvae.

G. R. ELSE — five fully grown larvae of *Selenia lunularia* (Hubn. ("lunar thorn")). These resulted from pairings obtained from moths reared second generation pupae received from Mr. A. Liebert. He collected the original parent or parents at his home in Crowcombe Heathfield, near Taunton, Somerset.

L. D. M. PACKER — a female specimen of *Exetastes maurus* (Desvignes) (Hym., Ichneumonidae) captured at Welling in the London Borough of Bexley on 29.viii.1976, along with another female and male of the same species. These three specimens constitute the 13th, 14th and 15th known

to science. The species was originally described from a specimen caught in France. Several specimens in the British Museum were caught at Barnehurst only a few miles from Welling. The host is unknown but the three caught in Welling were flying with others around pollarded poplars and aspens.

P. JEWESS — *Hypocallia citrinalis* (Scop.) (Lep., Oecophoridae) one pupa and some larvae feeding on *Polygala vulgaris* from Trottscliffe Down, Kent, 10.vi.1979.

P. A. SOKOLOFF — a freshly emerged specimen of *Scythris fletcherella* Meyrick (Lep., Scythridae), reared from a larva collected on *Helianthemum nummularium* L. (rockrose), Badgers Mount, Kent.

REV. D. J. L. AGASSIZ — A short series of *Eucosma pauperana* (Dup.) from Cambridgeshire bred 17th-29th April, and Plastozote boxes, illustrating some of their uses in collecting and storing large numbers of specimens.

ANNOUNCEMENTS

Mr. PRIOR told the meeting that Dr. Pike was returning to Malaya, and had offered the Society Library some 18 vols. of *The Entomologist*, 11 vols. of *The Entomologist's Gazette* and 10 vols. of the Proceedings.

COMMUNICATIONS

Mr. R. F. BRETHERTON reported a remarkable capture of *Notodonta torva* (Hübner) by Mr. M. Hadley at Eastbourne, Sussex, only the second authenticated capture for this country. He also remarked on the scarcity and lateness of migrant lepidoptera, *Authographa gamma* (L.) and *Agrotis ipsilon* (Hufn.) appearing only recently. A number of members confirmed the appearance of *gamma* and *ipsilon*, and Mr. Baker reported *Nomophila noctuella* (D. & S.) and *Orthonama obstipata* (F.) from Reading, Bucks. Dr. ALLEN reported that an inconsiderate larva of *Cosmia trapezina* (L.) had consumed a Braconid parasite emerging from a specimen of *Campaea margaritata* (L.). Dr. LONSDALE described a visit to a wood in Sussex recently on a still day, when frass could be heard falling from oak trees in considerable profusion.

Mr. A. HARMAN then gave a talk on the Ulu Temburong expedition to Brunei 1978. Exhibits associated with the talk included a large, dried pitcher, samples of python dung containing remnants of deer, and swiftlet nests (famed for birds-nest soup). The talk itself was illustrated with tape-recordings of jungle sounds, slides and film, and was much enjoyed by the audience.

28th June 1979

The President, REV. D. J. L. AGASSIZ in the chair

EXHIBITS

Dr. A. A. ALLEN — One male example of *Rhyssa persuasoria* (L.) (Hym.: Ichneumonidae) captured alighting on a rhododendron bush in bright sunshine 1.vi.1979, Brownsea Island, Dorset. This species is frequently illustrated in general entomological text books by virtue of its large size. It is an ectoparasite of the wood wasp, its long ovipositor enabling an egg to be laid near the host larvae as it feeds concealed in the wood. The main feature of the parasite (which does not seem particularly common) is the marked imbalance of the adult sex-ratios: the male is very much less common than the female, few records existing for the former sex. Other hymenoptera exhibit uneven sex ratios, the males generally being less common. The exhibitor has, however, noted amongst the species *Mesochorus* (both captured and bred) that males are encountered more commonly than the females.

D. W. YENDALL — a specimen of *Panorpa germanica* (L.) which he had captured, and fed on squashed sawflies.

Dr. I. McCLENAGHAN — a specimen of *Aglais urticae* (L.) with right forewing about half normal length, but with wing pigments of same intensity as normal. 15 others from the same broods (ex. Writtle, Essex) were normal.

K. SAMUELS — a selection of Lepidoptera taken last year in Spain, including *Macroglossum stellatarium* (L.), *Pyrgus cirsii* (Ramb.), *Pontia daplidice* (L.), *Iphiclides podalirius feisthamelii* (Dup.) and *Pseudotergumia fidia* (L.). Also an interesting example of a halved gynandromorph of *Pieris napi* (L.) bred *ab ovo*. Left side female, right male.

P. A. SOKOLOFF — *Dichomeris marginella* (Fab.) (Lep.: Gelechiidae) bred from an infested shoot of an ornamental juniper. Despite intensive spraying of the bush with insecticide by the owner (not the exhibitor), the larval webs had been thick enough to withstand the onslaught. Also a freshly emerged *Evergestis extimalis* (Scop.) (Lep.: Pyralidae). This moth had been reared from larvae collected Dartford Marshes, Kent, September 1978. The larvae do not pupate until spring, and had been over-wintered outside. Due to an oversight, the container had filled with water, which subsequently froze solid, and the larvae had to be thawed from a block of ice. Despite this treatment, the majority of the larvae survived and produced moths.

Membership: The following members were declared elected: Messrs. G. G. Nobes, A. R. James and C. N. Selby.

Communications: Dr. DE WORMS commented on the profusion of large white butterflies in the South of England. Observations made on the coast suggest that there may have been an immigration of this butterfly. Col. EMMET reported that on the 23rd June he had captured a worn *Eucosma pauperana* (Dup.) at Fleam Dyke, Cambs. This moth is normally on the wing from mid-April to mid-May. Other members commented on the lateness of the season, Mr. WILD having taken *Aethalura punctulata* (D. & S.) on 27th June, and Mr. EVANS recently having collected ova of *Hamearis lucina* (L.).

Mr. K. G. PRESTON-MAFHAM then gave a talk entitled "The Use of Photography in Insect Behaviour". This was copiously illustrated with slides of high quality, and showed many orders of insect indulging in courtship, mating, oviposition, emergence, predation and feeding. The wide-ranging and interesting talk attracted many questions from the audience.

FIELD MEETINGS

WESTBERE MARSHES, CANTERBURY — 15th July 1978
(JOINT MEETING WITH THE KENT FIELD CLUB)

Leader — T. W. HARMAN

This all day and much of the night meeting was somewhat disappointing because of the weather which, although quite sunny by day, led to a clear night combining with a half moon to provide a temperature down to 10°C and even lower at ground level. This was a pity since there was an excellent turnout of members with varied interests and many more records of this interesting area could have been obtained in good conditions. No less than 17 members attended plus several interested friends at intervals. By night some 10 traps were run throughout the reedbeds, in some cases there were more entomologists round the trap than moths inside!

Species recorded included:—

Pepidoptera:— *Anthophila fabriciana* (L.), *Argyresthia albistria* (Haw.), *Batia lunaris* (Haw.), *Brachmia gerronella* (Zell.), *Mompha ochraceella* (Curt.), *Blastodacna hellerella* (Dup.), *Aphelia paleana* (Hubn.), *Clepsis spectrana* (Treits.), *Clepsis consimilana* (Hubn.), *Cydia aurana* (Fab.), *Diluta angustoriana* (Haw.), *Chilo phragmitella* (Hubn.), *Olethreutes lacunana* (D. & S.), *Crambus perella perlella* (Scop.), *Schoenobius gigantella* (D. & S.), *Eudonia mercurella* (L.), *Cataclysta lemnata* (L.), *Eurrhyncha hortulata* (L.), *Pleuroptya ruralis* (Scop.), *Endotricha flammealis* (D. & S.), *Eucosma cana* (Haw.), *Rotruda binaevella binaevella* (Hubn.), *Platyptilia pallidactyla* (Haw.), *Hepialus lupulinus* (L.), *Philudoria potatoria* (L.), *Habrosyne pyritoides* (Hufn.), *Timandra griseata griseata* (Pet.), *Idaea dimidiata* (Hufn.), *Epirrhoe alternata alternata* (Mull.), *Camptogramma bilineata bilineata* (L.), *Cosmorhoe ocellata* (L.), *Eulithis pyraliata* (D. & S.), *Colostygia pectinataria* (Knoch.), *Oncopeltus sambucaria* (L.), *Biston betularia* (L.), *Alcis repandata repandata* (L.), *Cabera exanthemata* (Scop.), *Mimastis tiliaria* (L.), *Laothoe populi* (L.), *Phalera bucephala* (L.), *Cerura vinula* (L.), *Thumatha senex* (Hubn.), *Spilosoma lubricipeda* (L.), *Spilosoma luteum* (Hufn.), *Agrotis clavis* (Hufn.), *A. exclamatoris* (L.), *Axylyia putris* (L.), *Ochropleura plecta* (L.), *Melanchnra persicaria* (L.), *Lacanobia oleracea* (L.), *Hadena compta* (D. & S.), *Mythimna ferrago* (Fab.), *M. straminea* (Treits.), *M. impura impura* (Hubn.), *M. pallens* (L.), *M. obsoleta* (Hub.), *Dypterygia scabriuscula* (L.), *Acrionicta psi* (L.), *Apamea monoglypha* (Hufn.), *A. lithoxyloa* (D. & S.), *A. ophiogramma* (Esp.), *Oligia strigilis* (L.), *Coenobia rufa* (Haw.), *Hoplodrina alsines* (Brahm.), *Caradrina morpheus* (Hufn.), *Chilodes maritimus* (Tausch.), *Diachrysis chrysitis* (L.), *Autographa pulchrina* (Haw.), *Aprostola triplasia* (L.), *Hypena proboscidalis* (L.), *Macrochilo cribrumalis* (Hubn.).

Hymenoptera seen included:— *Cephus nigrinus* (Thom.), *Chrysis ignita* (L.) Sp. comp., *C. viridula* (L.), *Trypoxylon figulus* (L.), *Pemphredon lugubris* (Fab.), *Oxybelus uniglumis* (L.), *Crossocerus wesmaeli* (V. d. L.), *C. quadrimaculatus* (Fab.), *Ectemnius cavifrons* (Thom.), *E. lapidarius* (Panz.), *Lindenius albilabris* (Fab.), *Colletes similis* (Schenck), *Andrena minutula* (Kirby), *Melitta leporina* (Panz.), *Anthophora quadrimaculata* (Panz.), *Nomada rufipes* (Fab.), *Megachile willughbiella* (Kirby), *Bombus terrestris* (L.), *B. lucorum* (L.), *B. lapidarius* (L.), *B. pratorum* (L.), *B. agrorum* (Fab.), *Psithyrus vestalis* (Geoff. in Fourc.).

Diptera seen included:— *Beris vallata* (Forst.), *Odontomyia viridula* (F.), *Dioctria baumhaueri* (Meig.), *Chilomyia illustrata* (Harris).

Plants recorded by two members of Kent Field Club included:— *Ranunculus acris*, *R. sceleratus*, *R. repens*, *R. fluitans*, *Equistum fluviatile*, *Rorippa islandica*, *Cerastium holosteoides*, *Hypericum tetrapterum*, *Trifolium repens*, *Filipendula ulmaria*, *Potentilla anserina*, *Lotus corniculatus*, *Lathyrus pratensis*, *Lythrum salicaria*, *Epilobium hirsutum*, *Conium maculatum*, *Polygonum amphibium*, *Angelica sylvestris*, *Heracleum sphondylium*, *H. mantegazzianum*, *Sium latifolium*, *Oenanthe fistulosa*, *Apium nodiflorum*, *Mentha aquatica*, *Rumex crispus*, *R. hydrolopathum*, *R. conglomeratus*, *Scrophularia aquatica*, *Myosotis scorpioides*, *M. caespitosa*, *Veronica beccabunga*, *V. catenata*, *Solanum dulcamara*, *Utricularia vulgaris*, *Galium palustre*, *Stachys palustris*, *Typha latifolia*, *Matricaria matricarioides*, *Cirsium vulgare*, *C. palustre*, *Achillea millefolium*, *Eupatorium cannabinum*, *Valeriana officinalis*, *Dipsacus fullonum*, *Pulicaria dysenterica*, *Picris echinoides*, *Sonchus arvensis*, *Iris pseudacorus*, *Alisma plantago aquatica*, *Phragmites communis*.

DENNY BOG, NEW FOREST — 29th/30th July, 1978

Leader — COL. D. H. STERLING

In a year not noted for good collecting weather, this meeting fortunately had about ideal conditions. The day was hot and sunny, but clouds and a little thundery rain came up at dusk, keeping the temperature up to 17°C for night collecting. Eight persons attended.

Morning collecting around the bog adjoining Shatterford car park

produced plenty of insects but nothing outstanding, although members were pleased to note the commonness of *Plebejus argus* (L.) (silver-studded blue) and *Idaea muricata* (Hufn.) (purple-bordered gold). Beetles found included *Micrelus ericae* (Gyll.), *Propylea 14-punctata* (L.), *Rhagonycha fulva* (Scop.).

During lunch a member's car was dive-bombed by the water-beetle *Acilius sulcatus* (L.), the shining cellulose presumably being mistaken for water.

Afternoon collecting took place on the marshy ground adjoining the heath. Over 500 nests of the ant *Lasius flavus* (F.) were noted in an area of about two acres. On the higher heathy ground *Lasius niger* (L.) was found moving about freely on the web of a Linyphid spider without producing any reaction from it, although any other slight vibration caused the spider to rush out of its tunnel. The bird *Sylvia undata* (Dartford warbler) was noted. Other insects included *Pholidoptera griseoptera* (Degear) (the dark bush-cricket), *Dolichonabis limbatus* (Dahl.) (the marsh damsel-bug) and the hoverflies *Eristalis tenax* (L.) and *Syrphus balteatus* (Deg.). Lepidoptera taken included *Idaea sylvestraria* (Hübner) (dotted border wave) and *Gnophos obscuratus* (D. & S.) (annulet).

Evening and night collecting in Parkhill enclosure was very productive. *Catocala promissa* (D. & S.) (light crimson underwing) males were just out and in perfect condition. Of the five seen, four were captured. Other species of interest were: — *Apoda avellana* (L.) (festoon), *Heterogenea asella* (D. & S.) (triangle), *Ptycholomoides aeriferanus* (H.-S.), *Lozotaenioides formosanus* (Gey.), *Epagoge grotiana* (F.), *Idaea straminata* (plain wave), *Boarmia roboraria* (D. & S.) (great oak beauty), *Meganola strigula* (D. & S.) (small black arches), *Apamea scolopacina* (Esp.) (slender brindle), and *Eustrotia uncula* (Clerck) (silver hook). Beetles included *Necrodes littoralis* (L.), *Melanotus rufipes* (Herbst.), *Aphodius rufipes* (L.), *Serica brunnea* (L.), *Limonium minutus* (L.), *Gyrinus substiatus* (Steph.), *Carabus violaceus* (L.), and *Chrysolina graminis* (L.). Other insects included the ubiquitous *Vespa crabo* (L.), *Ectobius lapponicus* (L.) (dusky cockroach), the shield-bug *Pentatoma rufipes* (L.) and the water-bug *Callicorixa praeusta* (Fieber).

In all, 190 different species of lepidoptera, 16 of coleoptera, 3 ants and 9 order were recorded. A full list was sent to the Deputy Surveyor, New Forest, but is too long for reproduction here.

TROTTCISCLIFFE, KENT — 12th August 1978

Leader — K. G. W. EVANS

Despite the promise of inclement weather, 12 members attended this joint meeting with The Croydon Natural History and Scientific Society. With the kind permission of the Kent County Council, Trossley offers the entomologist a fine collecting area over a wide expanse of chalk downland surmounted by a considerable tract of deciduous woodland. Early rain precluded much of the hoped for field work but a few specimens of The Straw Belle, *Aspitates gilvaria* D. & S. were kicked up and much time was devoted to renewing old friendships and exchanging helpful information. Despite the bad conditions many insects were identified and in the evening ten lights were established as well as quantities of sugar. While the latter proved a wasted effort, the lights attracted a good volume of insects but little that was not expected.

With the weather failing to improve most of the party had quit the site by 1.00 a.m. although the leader stayed until dawn. Final identifications included:—

LEPIDOPTERA:— *Zygaena filipendulae* (L.), *Monopis rusticella* (Hüb.), *Caloptilia syringella* (Fab.), *Phyllonorycter lantanella* (Schrank), *Argyresthia albistria* (Haw.), *A. brockeella* (Hüb.), *Yponomeuta padella* (L.), *Y. plumbella* (D. & S.), *Y. cagnagella* (Hüb.), *Ypsolopha scabrella* (L.), *Y. sequella* (Clerck), *Y. parenthesesella* (L.), *Y. dentella* (Fab.), *Paraswammerdamia lutarea* (Haw.), *Elachista biatomella* (Staint.), *Carcina quercana* (Fab.), *Agonopterix liturosa* (Haw.), *Depressaria pastinacella* (Dupon.), *Platyedra subcinerea* (Haw.), (Larvae in seeds of Musk Mallow) *Blastobasis decolorella* (Wollaston), *B. linea* (Walsingham), *Cydia pomonella* (L.), *C. splendana* (Hüb.), *Spilonota ocellana* (D. & S.), *Gypsonoma sociana* (Haw.), *Epiblema costipunctana* (Haw.), *Epinotia ramella* (L.), *E. solandriana* (L.), *Epiblema uddmanniana* (L.), *Ancylys comptana* (Frölich), *A. unculana* (Haw.), *Pandemis heparana* (D. & S.), *P. corylana* (Feb.), *Archips xylosteanus* (L.), *Clepsis consimilana* (Hüb.), *Acleris aspersionis* (Hüb.), *A. latifasciana* (Haw.), *Croesia forsskaeana* (L.), *Cochylis hybridella* (Hüb.), *Aethes beatricella* (Walsingham), *Crambus perlella* (Scop.), *Agriphila tristella* (D. & S.), *A. straminella* (D. & S.), *A. inquinatella* (D. & S.), *A. geniculea* (Haw.), *Scoparia cembrella* (L.), *S. ambigualis* (Treits.), *Catoptria pinella* (L.), *Pyrausta purpuralis* (L.), *P. aurata* (Scop.), *P. nigrata* (Scop.), *Ostrinia nubilalis* (Hüb.), *Anania verbascalis* (D. & S.), *Pleuropyta ruralis* (Scop.), *Eurrhyncha coronata* (Hufn.), *Endotrich flammealis* (D. & S.), *Acrobasis consociella* (Hüb.), *Oncocera semirubella* (Scop.), *Stenoptilia bipunctidactyla* (Scop.), *S. pterodactyla* (L.), *Pterophorus baliodactylus* (Zeller), *Pieris rapae* (L.), *Aricia agestis* (D. & S.), *Agriades coridon* (Podá), *Pyronia tithonus* (L.), *Maniola jurtina* (L.), *Coenonympha pamphilus* (L.), *Falcaria lacertinaria* (L.), *Drepana binaria* (Hufn.), *Philudora potatoria* (L.), *Habrosyne pyritoides* (Hufn.), *Hemitea aestivaria* (Hüb.), *Idaea biselata* (Hufn.), *I. aversata* (L.), *I. seriata* (Schrank), *Epirrhoe rivata* (Hüb.), *E. galiata* (D. & S.), *Scotopteryx chenopodiata* (L.), *S. bipunctaria cretata* (Prout), *Xanthorhoe spadicearia* (D. & S.), *X. flucata* (L.), *Ecliptopera silaceata* (D. & S.), *Cosmorhoe ocellata* (L.), *Camptogramma bilineata* (L.), *Pelurga comitata* (L.), *Eulithis populata* (L.), *Hydriomena furcata* (Thub.), *Chloroclysta citrata* (L.), *Horisme vitalbata* (D. & S.), *H. tersata* (D. & S.), *Philereme transversata* (Hufn.), *Melanthia procellata* (D. & S.), *Chloroclysta v-ata* (Haw.), *Eupithecia icterata* (de Vill.), *E. inturbata* (Hüb.), *E. succenturiata* (L.), *Lomasipilis marginata* (L.), *Acasis viretata* (Hüb.), *Abraxas grossulariata* (L.), *Opisthagraptis luteolata* (Hüb.), *Crocalis elinguaris* (L.), *Selenia tetralunaria* (Hufn.), *S. dentaria* (Fab.), *Biston betularia* (L.), *Peribatodes rhomboidaria* (D. & S.), *Aspitates gilvaria* (D. & S.), *Ptilodon capucina* (L.), *Ptilodontella cucullina* (D. & S.), *Pheosia gnoma* (Fab.), *Pterostoma palpina* (Clerck), *Euproctis similis* (Fuessly), *Eilema complana* (L.), *E. deplana* (Esp.), *Euxoa nigricans* (L.), *Agrotis exclamationis* (L.), *A. puta* (Hüb.), *Noctua pronuba* (L.), *N. comes* (Hüb.), *N. janthina* (D. & S.), *N. fimbriata* (Schreber), *Ochroptera plecta* (L.), *Xestia triangulum* (Hufn.), *X. xanthographa* (D. & S.), *X. baja* (D. & S.), *Mythimna conigera* (D. & S.), *M. ferrago* (Feb.), *M. pallens* (L.), *Amphipyra tragopoginis* (Clerck), *Thalpothila matura* (Hufn.), *Cosmia trapezina* (L.), *Mesapamea secalis* (L.), *Apamea monoglypha* (Hufn.), *A. scolopacina* (Esper), *Oligia lacruncula* (D. & S.), *O. strigilis* (L.), *Mesoligia furuncula* (D. & S.), *Hoplodrina blanda* (D. & S.), *H. ambigua* (D. & S.), *H. alsines* (Brahm.), *Caradrina clavipalpis* (Scop.), *Colocasia coryli* (L.), *Diachrysa chrysitis* (L.), *Autographa gamma* (L.), *Rivula sericealis* (Scop.), *Hypena proboscidalis* (L.), *Polypogon tarsipennalis* (Treits.), *Calistege mi* (Clarck), (larva), *Tyria jacobaeae* (L.), (larvae).

DIPTERA:— *Phytomyza sphondylii* (Goureau), *P. conyzae* (Hendel), *P. autumnalis* (Griffiths), *Amauromyza labiatarum* (Hendel), *Liriomyza strigata* (Meigen), *Taxomyia taxi* (Inchbald), *Dasyneura crataegi* (Winnertz), *D. urticae* (Perris), *D. plicatrix* (Loew., H.), *D. rosarum* (Hardy), *Craneiobia corni* (Giraud), *Jaapiella veronicae* (Vallot), *Phlyctidobia solmsi* (Kieffer), *Lasioptera rubi* (Heeger).

HYMENOPTERA:— *Blennocampa pusilla* (Klug), *Diptolepis rosae* (L.), *B. lapidarius* (L.), *B. pratorum* (L.), *B. terrestris* (L.), *B. hortorum* (L.), *B. ruderarius* (Mull.), *Vespula sylvestris* (Scop.), *Halictus tumulorum* (L.), *Lasioglossum laevigatus* (Kirby), *L. fulvicornis* (Kirby), *L. morio* (Fab.), *Andrena bicolor* (Fab.), *Chelostoma campanularum* (Kirby).

HOMOPTERA:— *Trichohermes walkeri* (Förster).

DICTYOPTERA:— *Ectobius pallidus* (Olivier) (taken at treacle).

ACARI:— *Phytoptus macrochelus* Nal., *P. thomasi* Nal., *P. thomasi* spp. *origani* Nal., *P. sanguisorbae* Can., *P. viburni* Nal.

Large brown adder was also observed.

EPPING FOREST, ESSEX — 29th October 1978

Leader — A. M. EMMET

The year 1978 marks the centenary of the Epping Forest Act, which conserved the Forest for the nation. The occasion was marked in May by a symposium at which papers were read on its flora, fauna and history. In preparing a list of the Lepidoptera of Epping Forest for the symposium, the author found that many common species of microlepidoptera, though doubtless present, had never been recorded. One of the purposes of the field meeting was to fill these gaps.

An exceptionally bright and warm day for late October attracted an attendance of at least 28 members and their families. The sunshine brought comma and peacock butterflies on the wing and there was a distant sighting of a female brimstone or one of the whites. After assembling and having coffee at the Epping Forest Conservation Centre, the party moved off to the relatively open ground of Whitehouse Plain, where a total of 79 species of microlepidoptera were identified; to these a further six may be added which were observed in adjacent areas during a reconnaissance earlier in the month. Out of these, 36 had not been recorded previously and these additions bring the number of Lepidoptera found in Epping Forest to over 1,000.

Potentially the most interesting record was of *Stigmella carpinella* (Heinemann), but this requires confirmation. This hornbeam-feeding species was added to the British list as recently as 1976 and was recorded in Hainault Forest, Essex in 1977. Two or three mines only were found, one of which was still tenanted. It is hard to distinguish the mine from that of *S. floslactella* (Haworth), a very common species but not recorded from Epping since its principal foodplant, hazel, is absent. It also feeds on hornbeam, but is always abundant where it is found, like the other nepticulid on the same foodplants, *S. microtheriella* (Haworth), which is plentiful at Epping. Hence, somewhat paradoxically, the scarcity of these mines at Epping makes it probable that they belong to the rarer species.

Another very local species was *Tischeria angusticollella* (Duponchel), whose mines were found on wild rose. Vacated mines of *Stigmella distinguenda* (Heinemann) were noted on birch and of *Etainia sphendamni* (Hering) in the keys of field maple. The Faircloughs worked the blackthorn thickets for *Acleris cristana* ([Denis & Schiffermüller]) and obtained over 20 specimens covering a range of forms, none rare but some very beautiful. These were retained for breeding.

A complete list of the species observed has been sent to the Epping Forest Conservation Centre as an appendix to the list already lodged there.

CURRENT LITERATURE

BOOK REVIEWS

A recorder's log-book or label-list of British Butterflies and Moths, by J. D. Bradley and D. S. Fisher. Curwen Books, 1979. Price £2.00

This pocket-sized paperback check-list is a novel production: the first column on each page consists of the names of the species and subspecies, the second column being left blank for the user to insert further data against those forms he may observe. If used in recording for the Biological Records Centre, the latter, after registering the records, will return the log-book to the owner. Previously, recorders used cards for this purpose. If they wish to continue to use it for the same purpose it would see that their entries should be in pencil!

By and large, the list is the Kloet and Hincks 1972 check-list omitting most of the synonyms. The very first species on the list appears now as *Micropterix thunbergella* Fabr. (with *thunbergella* auctorum as a synonym). The two authors have chosen to omit the parentheses round the names of all authors; these were inserted in the 1972 check-list in accordance with correct zoological nomenclature rules but in the work under review their omission conforms with the rather general practice of lepidopterists, which our present editorial policy has endeavoured to correct. The omission of the "h" in the specific name quoted above raises the vexed question of whether one should adhere to the original and earliest spelling of a name even when it may be an obvious error (elsewhere in the list the authors insert an "h" when printing Thunberg's name!)

In another place, the generic name *Helicoverpa* Hardwick 1965 is retained for the scarce bordered straw, although Hardwick 1970 and Todd 1978 reincluded *Helicoverpa* (and other generic names) in *Heliothis*, apparently sinking it to subgeneric status or even synonym!

The difficulty of bringing the nomenclature of a long list "up to date" as the publishers claim has been done, is demonstrated by the above random examples, and the question of which check-list our readers should follow is once more raised. On the whole we think most will like to use this list, and for recording and registering questions of nomenclature are, at the most, a problem for the staff of the Records Centre.

E.P.W.

A Dipterist's Handbook. Edited by Alan Stubbs and Peter Chandler. The Amateur Entomologist, 15, ix + 255 pp., many figs. 1978. Price £6.00

This is an excellent book, following the high standard set by the Amateur Entomological Society with their handbooks on the Lepidoptera, Coleoptera and Hymenoptera. The editors are two of this country's most energetic Dipterists, with a wide experience of fieldwork and an appreciation of the endless diversity and versatility of the Diptera. They have enlisted the help of a large number of fellow-Dipterists to contribute sections on their specialities—indeed, the list of contributors reads almost like a check list of British Dipterists.

The key-notes of the book are enthusiasm and comprehensiveness. There can be few Dipterists browsing through this book during winter evenings who will not be fired with the desire to get into the field again. During the summer months it will prove an invaluable *vade mecum* for tyro and pundit alike, since it contains detailed results and summaries alongside

suggestions for further lines of enquiry. One of the attractive features of the book is that several contributors have given complete synopses of their subjects, though for reasons of economy these have had to be presented in cursive rather than tabular form and are more difficult to use. It is always invidious to single out examples of particular excellence, but it seems to me that the sections on associations with fungi, the higher plants and dung are outstandingly useful contributions. The key to families of Diptera larvae, containing a wealth of illustrations, fills a longstanding lacuna in the literature and it is worth buying the book for this alone. I welcomed too the deft touches of humour provided by one well-known contributor.

The book has been produced at high speed, and this is reflected in a 4-page errata slip accompanying it. Needless to say, this includes nowhere near the full number of misprints, but all slips of this kind can be corrected in a second printing and hardly detract from the quality of the work itself.

In short, a fine book: a must for all Dipterists and indeed for most entomological fieldworkers.

A. C. PONT

OUR CONTEMPORARIES

Environmental entomology, Ent. Soc. Amercia, 7 (1), 1978

There are thirty-six articles in this fascicle of Vol. 7 of this magazine, and we select two as of general interest: — T. C. BAKER and R. T. CARDE: *Disruption of Gypsy moth male sex pheromone behaviour by high frequency sound.*

Males of the day-flying moth *Lymantria dispar* (L.) while flying up-wind towards a pheromone source respond to high frequency (> 15 KHz) sounds by deviating sharply from the established flight-course and flying away rapidly. Pheromone-stimulated males fanning their wings while walking on the substrate, "freeze" momentarily in response to high frequency sound. The puncturing of both tympana eliminates auditory behaviour, whereas perforation of only one tympanum causes highly direction flight course deviations towards the perforated (silent) side. The retention of ultrasonic sensitivity in this essentially day-flying species may be explained by the selective advantage from bat predation gained by individuals near dusk. (Females of this species had less well developed tympanic organs than males.) Response to ♀ pheromone in these males is wing-fanning before flight. These observations were made in a wind-tunnel. "Freezing" (a cessation of activity) lasted ten seconds. The two tympanic membranes of *L. dispar* are located in a smooth sclerotized channel on the postero-lateral margin of the metathorax. They are directed obliquely posteriorly towards hair-covered counter-tympanic hoods on the first abdominal somite which cover all but the extreme lateral edges of the scaleless channels. A sensillum similar to that described for *Agrotis ipsion* (L.) appears to be attached to each membrane in the centre and to extend internally into the tympanic air-sac. In the experiments the membranes were ruptured with a pin after retracting the hoods, and this is claimed to have inhibited response to high frequency signals. However, the same sound did have some effect on females despite their less sensitive ears. But lower-key sounds had no effect on these flying males.

S. GOTHILF, M. KEHAT, M. JACKSON, & R. GALUN: *Screening pheromone analogues by E.A.G. technique for biological activity on males of Earias insulana, Heliothis armigera, and Spodoptera littoralis.*

These species are well known pests in the Mediterranean and Middle East and the purpose of the experiments was to select "candidate chemicals" for "inhibition and disruption of inter sexual communication in these species". Both these articles shed light on the ability of female lepidoptera to attract males and the methods evolved by moths to escape bat predation; the former is of course assumed to be by chemical means, while a different organ is involved in detecting the ultrasonic radar-emissions of bats which help those predators to spot moths in flight, and in evading the bats' attacks.

E.P.W.

Journal of the Lepidopterists' Society 32 (4), (1978)

There is much interesting matter in the last part of Vol. 32 of this well-known and excellent journal which, regrettably still contains too little about Old World insects; we select for mention one article which affects the British check-lists and the nomenclature there recommended to our readers:—

HARRY K. CLENCH (pp. 277-281): *The names of certain holarctic hair-streak genera*. The author picks up the article by Malicky in the publication of the Bale Entomological Society of 1969 which, mainly dealing with early stages and breeding of European Lycaenidae, also contained taxonomic proposals, one being the recognition of the generic difference between the Black and the White-letter hair-streak butterflies and certain other non-British hair-streaks such as *spini* (D. & S.), *ilicis* (Esp.) and *acaciae* (F.). For *pruni* (L.) Malicky therefore substituted *Fixsenia* Tutt 1908, retaining *Strymonidia* for the others. Clench however argues that *Satyrium* Scudder 1876 is more correct for the four others mentioned. As our compilers of the revised Kloet and Hincks 1972 check-list apparently overlooked Malicky's proposal, perhaps they would now consider the matter again particularly in view of Clench's following Malicky in one particular and superseding him in another.

Another article deserving mention here, as of general interest, is the short note by RAYMOND W. NECK (pp. 310-311): *Additional function of the Lepidopteran proboscis*. The author has observed the adult in certain cases to use its coiled tongue for preening and removing water from its vestiture.

E.P.W.

911
1
B852
Ent.

PROCEEDINGS AND TRANSACTIONS OF THE
BRITISH ENTOMOLOGICAL AND NATURAL
HISTORY SOCIETY
INDEX VOLUME 12 (1979)

-
- Abundance of butterflies, national scheme for monitoring, 77, 122
Annual exhibition 1978, 1
Burnet moths, life histories of seven British species, 113
Changes in London's insect fauna, 48
Charaxes, collecting in Kenya, 126
Current literature, 71, 138
Ecuador, natural history of, 130
Editorial, 1
Field Meetings: 1978: Andrews and Meanfield Woods, Shoreham, Kent, 70;
Botley Wood, Hants., 71; Denny Bog, New Forest, 134; Epping Forest,
Essex, 137; Hayling I., Hants., 68; Ranmore, Surrey, 67; Swanage, 69;
Trottscliffe, Kent, 135; Westbourne Marshes, Canterbury, 133.
Gastropacha quercifolia, inheritance of a pale form, 73
Hering Memorial Research Fund, 72, 121
Ichneumonoidea, an outline of the biology, 60
Insect diseases and population control, 124
Insects in Australasia, 61
Insect photography in the tropics, 64
Large blue, lessons and achievements in conservation, 67
Mount Mulu National Park, R.G.S. expedition, 129
National collection of British Lepidoptera, 19
Obituaries: Kettlewell, H. B. D., 101; Riley, N. D., with bibliography, 104
Ocyusa nitidiventris, new to Britain, 46
Officers' reports for 1978, 115
Photography, use of, in insect behaviour, 133
Pieris brassicae, a review of variation, 24
Plebejus argus in Malta, 76
Proceedings, 57, 112
Relations of the resident British lepidoptera to the European fauna, 64
Saudi Arabia, butterflies and hawk-moths of Eastern, 90
Sepsid flies, swarms of, unacceptable to spiders, 16
Ulu Temborong, Brunei, expedition, 1979, 132
West African Coleoptera, 126

PLATES

- I, II (facing p. 36): Annual Exhibition, 1978
III-VI (facing p. 7): Varieties of *Pieris brassicae* (L.)
VII (facing p. 100): Larva and pupa of *Melitaea perseae* Koll., Saudi Arabia
VIII (facing p. 101): Eastern Saudi Arabia, map
IX (facing p. 102): Dr. H. B. D. Kettlewell
X (facing p. 103): Capt. N. D. Riley, C.B.E.

CONTRIBUTORS

- Agassiz, D. J. L., 1, 6, 57, 112, 123,
 125, 129, 132
 Allen, A. A., 1, 6, 13, 57, 58, 60, 61,
 62, 63, 66, 112, 122, 123, 125, 126,
 127, 129, 131, 132
 Alston, H. N. E., 58
 Appleton, D., 11
 Ashby, C. B., 57
 Baker, B. R., 1, 67
 Baker, P. J., 69, 124
 Bland, K. P., 2, 6
 Bradford, E. S., 113, 114
 Bretherton, R. F., 2, 5, 7, 59, 63, 64,
 67, 71, 122, 124, 126, 127, 128, 129,
 132
 Bristow, W. S., 16
 British Museum (Nat. Hist.), 2
 Brown, M. R., 129
 Burton, G. N., 5
 Carter, D. J., 19
 Chalmers-Hunt, J. M., 2, 7, 54, 60,
 70, 129
 Chambers, D. A., 2
 Cilia, J. L., 76
 Clarke, Sir Cyril, 6
 Clarke, Sir Cyril, & Rothschild, M., 6
 Classey, E. W., & Demuth, R., 2
 Collins, N. M., 129
 Cooke, N., 53
 Coope, G. R., 65
 Craske, R. M., 2
 Cribb, P. W., & Dyson, R. M., 5
 Croft, P. J., 6
 Crow, P. N., 2, 15
 Darby, M., 11
 Else, G. R., 12, 56
 Emmet, A. M., 7, 59, 60, 61, 63, 112,
 122, 123, 127, 129, 130, 137
 Evans, K. G. W., 53, 54, 61, 135
 Fairclough, R., 66, 130
 Fairclough, R., & A. F., 2, 8
 Gilbert, P., 104
 Greenwood, J. A. C., 2
 Goater, B., 2
 Godfray, H. C. J., 6
 Grey, M. J., 67
 Halstead, A. J., 58, 114, 124, 128
 Hammond, C. O., 52, 60
 Harman, A., 129, 132
 Harman, T. W., 133
 Harmer, A. S., 2
 Heath, J., 55, 60, 64, 114
 Heckford, R. J., 8
 Higgs, G. E., 2
 Hodge, P. J., 11
 Homer, T. G., 5
 Horton, G. A. N., 2, 9
 Howard, G., 2, 9
 Howarth, T. G., 66, 104
 Hyde, G., 2
 Imber, S. F., p.p. Jewson, B., 2
 Jackson, B. C., 56, 57
 Jacobs, S. N. A., 113
 James, R., 2
 Jewess, P., 132
 Kennard, A., 67
 Kenner-Booker, W., 13
 Kirky, P., 12
 Knill-Jones, S. A., 66, 124
 Langmaid, Dr. J., 9
 Larsen, T. B., 6
 Leech, M. J., 3, 9
 Lorimer, R. I., 3
 Luckens, C., 5
 MacNulty, B. J., 3, 56, 126
 Majerus, M. E. N., 73
 Marcon, J. W., 3
 Martin, P. A., 3, 9
 Mason, J., 64
 Michaelis, H. N., 9
 Miles, S. R., 12, 13
 Muggleton, J., 125
 Murphy, F., 16
 Owen, J. A., 55, 56
 Packer, L. D. M., 12, 13, 131
 Parry, J. A., 11
 Pearce, C. E., 3
 Pelham-Clinton, E. C., 3, 10
 Phelps, H. G., 3
 Philpott, V. W., 66
 Pickles, A. J., 68
 Pickles, A. J., & C. T., 68
 Pittaway, A. R., 90
 Platts, J., 3
 Pollard, E., 77, 122
 Pont, A. C., 138
 Preston-Mafham, K. G., 133
 Pratt, C., 3
 Prior, G., 5, 57, 62, 63, 126, 128, 129
 Revell, R. J., 3
 Revels, R. C., 3, 16
 Richardson, A., 3, 10
 Rivers, C. F., 123, 124
 Rothschild, M., 16
 Russwurm, A. D. A., & Middleton,
 H. G. M., 4
 Robinson, G. S., & H. S., 6
 Samson, C., 130
 Samuels, K., 133
 Saunders, D. A., 4
 Shaw, P. N., 15
 Simpson, A. N. B., 10
 Sims, I. R., 4, 59
 Skinner, B., 4, 66
 Smiles, R., 126

Sokoloff, P., 4, 10, 10, 59, 67, 70, 125, 132, 135
 Souza de, 16
 Sterling, D. H., 4, 10, 134
 Stubbs, A. E., 12, 48, 122
 Torstenius, Stig, & Ashby, C. B., 5
 Tubbs, R. S., 4, 53, 57, 126
 Tuck, K., & Robinson, C. S., 4
 Tweedie, M., 16, 61
 Verdon, P., 113
 Walker, D. H., 4
 Walters, J., 10
 Watkinson, I. A., 4, 10, 60, 61, 63, 122
 Watson, R. W., & A., 4
 West, B. K., 54
 Wild, E. H., 4, 11, 54, 63, 122
 Wiltshire, E. P., 64, 101, 127, 138, 140
 Winter, P. Q., 5
 Withers, B. G., 5
 Worms, C. G. M. de, 5, 53, 60, 128, 129
 Young, L. D., 5
 Young, M. R., 5, 11

ACARI

Acari at Trottscliffe, 137

ARACHIDAE

acerbus, Xysticus, 19
 amentata, Pardosa, 19
 diadematus, Araneus, 17, 18
 dorsata, Diaea, 16
 gigantea, Tegenaria, 18
 montana, Linyphia, 18
 reclusa, Clubiona, 19
 segmentata, Meta, 17, 18
 triangularis, Linyphia, 18
 umbraticus, Araneus, 18
 x-notata, Zyggiella, 18

BIRDS

condor, 130
 cormorant, 69
 Dartford warbler, 135
 dove, 69
 guillemot, 69
 gull, 69
 jackdaw, 69
 kittewake, 69
 krameri, Psittacula, 68
 pigeon, 123
 puffin, 69
 redstart, 69
 tawny owl, 113

COLEOPTERA

angustatus, Dyschirius, 11
 aurentata, Strangalia, 60, 61
 barbicornis, Magdalis, 11

bifasciatus, Aridius, 51
 bimaculatus, Anthicus, 11
 bipunctata, Adalia, 125
 brunnea, Serica, 135
 brunneipennis, Anthonomus, 11
 cerdo, Apion, 11
 cervus, Lucanus, 51, 55
 cinereus, Graphoderus, 55
 Coleoptera, British Glacial, 65
 Colorado beetle, 66
 Curculionidae, 66
 decempunctata, Adalia, 125
 defecta, Ocyusa, 47
 dorsalis, Bruchidius, 58
 ericae, Micrelus, 135
 dorsalis, Bruchidius, 58
 ericae, Micrelus, 135
 fagi, Rhynchaenus, 70
 flavipes, Graptodytes, 11
 fulva, Rhagonycha, 135
 graminis, Chrysolina, 135
 griseostriatus, Potamonectes, 11
 hibernica, Ocyusa, 48
 hirtus, Emus, 11
 lapponicus, Dytiscus, 11
 littoralis, Necrodes, 135
 longiceps, Dromius, 11
 longicornis, Thalassophilus, 11
 maura, Ocyusa, 48
 minuta, Gracilia, 11
 minutus, Limonius, 135
 mucronatus, Halipilus, 11
 nebulosus, Leipopus, 70
 nigrata, Ocyusa, 47
 nitidiventris, Ocyusa, 46-48
 palustris, Eubria, 11
 opacus, Gyrimus, 11
 quatuordecim-punctata, Propylea, 135
 querceti, Cethorhynchus, 11
 quercus-calicis, Andricus, 59
 rivularis, Trechus, 11
 rubra, Leptura, 11
 rufipes, Aphodius, 135
 rufipes, Melanotus, 135
 scalesianus, Hydrophorus, 11
 serricornis, Prionocyphon, 11
 setiger, Orthochaetes, 128
 striolatus, Agabus, 11
 substriatus, Gyrimus, 135
 subulatum, Anthicus, 11
 sulcatus, Acilius, 135
 viburni, Gallerucella, 70
 violaceus, Carabus, 135

DIPTERA

Diptera at Trottscliffe, 136
 Diptera at Westbere marshes, 134
 aquilegiae, Phytomyza, 50

balteatus, Syrphus, 135
 bimaculatus, Brachypalpus, 12
 capreae, Iteomyia, 70
 domestica, Musca, 49
 equestris, Mereodon, 70
 fasciata, Didea, 12
 fulgens, Sepsis, 16
 glechomae, Dasyneura, 70
 hemiptera, Alophora, 53
 ilicis, Phytomyza, 70
 imbriciformis, Mallota, 51
 inanis, Volucella, 53
 inflata, Volucella, 12
 luteola, Myolepta, 12
 marginata, Xylomyia, 12
 nana, Agromyza, 70
 pedisequum, Xanthogramma, 53
 potamida, Stratiomys, 53
 pulchella, Oxcera, 53
 punctatissimus, Leptophyes, 70
 rotundatum, Gymnosoma, 53
 rufipes, Physocephala, 53
 Sciara, 19
 Sepsidae, 16-19
 signatus, Leopoldius, 12
 sphegea, Sepedon, 53
 sphondylii, Phytomyza, 70
 taxi, Taxomyia, 70
 tenax, Erisalis, 135
 tenuicornis, Vanoyia, 12
 trilineata, Oxcera, 53
 tristis, Coremacera, 53
 veronicae, Jaapiella, 70
 viridula, Odontomyia, 53
 zonaria, 12, 53

HEMIPTERA

ambiguus, Psallus, 12
 Aphids, 66
 ater, Capsus, 12
 bed-bug (Cimex), 49
 calcaratum, Stenodema, 12
 cornutus, Centrotus, 69-70
 dolabrata, Leptoterna, 12
 elongata, Notostira, 12
 epilobii, Dicyphus, 12
 lacustris, Gerris, 12
 laevigatus, Stenodema, 70
 limbatus, Dolichonabis, 135
 myriformis, Myrmus, 12
 nassatus, Orthotylus, 70
 pallidicornis, Dicyphus, 12
 perrisi, Psallus, 70
 praeusta, Callicorixa, 135
 rufifrons, Orthonotus, 12
 rufipes, Pentatoma, 135
 sabuleti, Ischnodemus, 12
 walkeri, Trichohermes, 137

HYMENOPTERA

Hymenoptera at Trottscliffe, 137
 Hymenoptera at Westbere marshes, 134
 albiditarsus, Zemiotes, 123
 amictum, Heteropelma, 14
 arctiventris, Limerodes, 57
 arrogator, Dyspetes, 126
 austriaca, Vespa, 12
 bidentatus, Hoplisomenus, 58, 127
 bignalli, Apanteles, 15
 blanda, Macrophyta, 13
 bruxellensis, Psen, 13
 bucculentus, Ichneumon, 125
 bucephala, Andrena, 12
 callunae, Apanteles, 63
 calodetta, Apanteles, 66
 cantor, Charops, 13, 14
 chlorophthalmus, Zemiotes, 13
 cineraria, Andrena, 12
 cothurnatus, Poecilostictus, 127
 crabro, Vespa, 135
 cristatus, Netelia, 13
 culpator, Stenichneumon, 127
 debellator, Alomya, 112
 deceptor, Zemiotes, 123
 decipiens, Platylabus, 61
 deliratorius, Ichneumon, 13
 distinguendus, Crossocerus, 13
 dives, Ectemnius, 13, 56
 elongatus, Amblyteles, 14
 endemus, Apanteles, 131
 extensor, Charmon, 13
 fargei, Argogorytes, 12
 femoratus, Cimbex, 15
 flavus, Lasius, 135
 formosus, Apanteles, 131
 gonopterygis, Apanteles, 14
 hirtipes, Nomada, 12
 Holocremnus sp., 15
 honey bee, Apis mellifera, 114
 hyrciniae, Gilpinia, 124
 immunis, Apanteles, 14
 inclusus, Apanteles, 13, 14
 insidiator, Barylipa, 62
 insignis, Passaloecus, 13
 labiata, Andrena, 12
 leucostigmus, Hepiopelmus, 14
 limbatus, Apanteles, 14, 131
 lituratus, Ectemnius, 13
 longicornis, Eucera, 12
 maculatorius, Syzeuctus, 60
 mandator, Agrothreutes, 15
 maurus, Exetastes, 131
 Mesochorus sp., 14, 131, 132
 monostagon, Barichneumon, 14
 niger, Lasius, 135
 obnoxius, Mesostenidea, 14
 pectinipes, Episyron, 13

persuasoria, Rhyssa, 132
 plutellae, Apanteles, 14
 proteus, Amblyjoppa, 125
 proxima, Anrena, 12
 pulchripes, Dusaona, 13
 pulchripes, Rogas, 13, 15
 quadrifasciatus, Endynerus, 12
 ridibundus, Barichneumon, 14
 rubicola, Ectemnius, 13
 rufa, Formica, 56
 ruficornis, Ectemnius, 13
 rufipes, Episyron, 13
 rugulosus, Rogas, 15
 praetor, Rogas, 15
 semiflava, Alomya, 112
 septentrionalis, Ichneumon, 127
 sertifer, Neodiprion, 124
 sexcinctus, Ectemnius, 13
 sexfasciata, Nomada, 12
 subcompletus, Microgaster, 62
 suspiciosus, Ichneumon, 127
 testaceus, Netelia, 61
 thoracicus, Macrocentrus, 13
 thoracicus, Rhexidermus, 14
 truncorum, Heriades, 13
 validicornis, Ichneumon, 14
 violacea, Xylocopa, 12
 xanthomelana, Osmia, 12
 Zyaenarum, Apanteles, 15

LEPIDOPTERA

Lepidoptera, at Trottscliffe, 136
 Lepidoptera, at Westbere marshes, 134
 abietana, Acleris, 6, 10, 11
 abietella, Dioryctria, 9
 abruptaria, Menophra, 69
 absinthii, Cucullia, 3
 absinthiata, Eupithecia, 57
 acaciae, Satyrium (Strymonidia) 140
 acanthodactyla, Amblyptilia, 7
 aceris, Acronicta, 50
 acroxantha, Parocystola, 6, 58, 63, 64
 adjectella, Coleophora, 127
 aegeria, Parage, 52, 60
 aeriferanus, Pycholomoides, 70, 135
 aethiops, Erebia, 4
 affinis, Cosmia, 5
 agathina, Xestia, 1, 4
 aglaja, Argynnis, 16
 albicolon, Sideridis, 3, 68
 albipuncta, Mythimna, 4
 albonigrata, Thera, 127
 alburnella, Teleiodes, 6, 61, 62
 alcea, Carcharodus, wissmanni, 6
 alni (Acronicta, 2, 55
 alnifolia, Coleophora, 128
 alpicola, Parornix, 130
 alpicola, Xestia, 65
 ambigua, Hoplodrina, 70
 anachoreta, Clostera, 4
 angustea, Eudonia, 68, 113
 angusticolella, Tischeria, 137
 antiopa, Nymphalis, 60
 antiqua, Orygia, 6, 50, 55
 apiformis, Sesia, 54
 aprilina, Dichnonia, 4
 arethusa, Arethusana, 22
 argentella, Elachista, 68
 argiolus, Celastrina, 129
 argus, Plebejus, 76, 135; ab. caennensis, 16; ab. cretaceus, 53, 70
 arion, Maculinea, 67
 armigera, Heliopsis, 2, 4, 138, 139
 asella, Heterogenea, 4, 135
 aspidiscana, Eucosma, 6
 atalanta, Vanessa, 62, 67, 79, 87, 97, 129
 atricapitana, Cochyliis, 68
 atropus, Acherontia, 123
 aurago, Xanthia, 4
 aurata, Pyrausta, 67, 112, 113
 aurota, Anaphaeis, 94
 avellana, Apoda, 135
 azalella, Caloptilia, 49
 badiata, Anticlea, 69
 badiipennella, Coleophora, 128
 banksiella, Epischnia, 10
 basiguttella, Stigmella, 7
 beatricella, Aethes, 10
 belemia, Euchloe, 92-93
 betularia, Biston, 55
 biangulata, Euphyia, 2
 biatomella, Elachista, 68
 bicuspis, Harpyia, 55
 bifractella, Apodia, 9
 bilineata, Camptogramma, 69
 bipunctosa, Agonopterix, 10
 blancardella, Phyllonorycter, 10, 61
 boeticus, Lampides, 97, 99
 bombycinia, Polia, 55
 borelii, Gortyna, 22
 bracteella, Oecophora, 8
 branderiana, Pseudosciaphila, 71
 brassicae, Pieris (Large White), 24-26, Pl. iii-vi, 77, 78, 133
 briseisbriseis, Chazara, f. pirata, 5
 britanniodactyla, Capperia, 10
 brumata, Oporoptera, 124
 brunneata, Itame, 65
 brunnichella, Stephensia, 68
 bucephala, Phalera, 70
 caeruleocephala, Diloba, 4, Pl. II, fig. 17
 caesia, Hadena, mananii, 3
 caja, Arctia, 2
 caliginosa, Acosmetia, 71

- camilla, Ladoga, 16, ab. nigrina, 3, ab.
 obliterae, 3
 caniola, Eielma, 60
 caprimulgella, Triaxomasia, 54
 cardamines, Anthocharis, 128, 129
 carduella, Agonopterix, 9
 cardui, Cynthia, 67, 84
 carmelita, Odontostia, 128
 carpinella, Stigmella, 137
 casta, Psyche, 68
 cecropia, Hyalophora, 57
 celerio, Hippotion, 64
 chloerata, Chloroclystis, 21
 chrysippus, Danaus, 96
 chrysorrhoea, Euproctis, 54, 124, 131
 cinerana, Epinotia, 8
 cinerea, Agrotis, 4, 68, 70, Pl. 1, 5
 cinereopunctella, Biselachista, 68
 cinxia, Melitaea, 65
 cirsii, Pyrgus, 133
 clavis, Agrotis, 55
 citrinalis, Hypercallia, 132
 compositella, Cydia, 9
 compta, Hadenia, 1, 53
 confusalis, Nola, 68
 consonaria, Ectropis, ab. waiensis, 4
 consortella, Cosmiotes, 61
 conspicillaris, Egira, 3, 5
 convolvuli Agrius, 61, 100
 coracina, Psodos, 114
 coridon, Lysandra, 3, 5, 79
 cornella, Argyresthia, 62
 corylata, Electrophaes, 69
 cosmophorana, Cydia, 7
 cossus, Cossus, 5, 53-54
 costalis, Hypsopygia, 10 49
 crataegella, Eudonia, 10
 crenana, Epinitia, 6
 crepuscularia, Ectropis, 130
 cribraria, Coscinia, 101
 cristana, Acleris, 7, 21, 130, 137
 crocea, Colias, 61, 93
 croesella, Adela, 6
 cuprella, Adela, 7, 10
 cupriacella, Nemphora, 10
 cydoniella, Phyllonorycter, 10, 11, 61
 daplidice, Pontia, 93, 133
 deceptoria, Lithacodia, 3
 decolorella, Blastobasis, 6
 decorella, Teleiodes, 66
 demarniana, Epinotia, 71
 demoleus, Papilio, 91
 deprivata, Agrotis, 4
 designata, Xanthorhoe, 5
 diana, Eutronula, 7
 diluta, Cymatopporima, 3
 diffinis, Cosmia, 51
 dilutata, Oporinia, 2
 dispar, Lymantria, 139
 distinctata, Aleucis, 123
 distinguenda, Stigmella, 137
 diversana, Choristoneura, 71
 domestica, Bryotropha, 6
 domestica, Cryphia, 56
 dominula, Panaxia, 102, 103
 ecclipsis, Papilio, 113
 egeria, Pararge, 84
 Eilema genus, 2
 elpenor, Deilephila, 3, 50, 125, Pl. 1,
 fig. 8
 elymi, Photedes, 65
 enixalis, Nymphula, 112
 epiphron, Erebia, 65
 erythrogenella, Ectoedemia, 10
 euphrosyne, Boloria, 57
 exclamationis, Agrotis
 exigua, Eupithecia, 70
 exigua, Cosmiotes, 62
 exseleta, Xylena, 3
 extimalis, Evergestis, 133
 exulans, Zygaena, 113
 exulis, Apamea, assimilis, 2
 falconipennella, Caloptilia, 59
 falloui, Euchloe, 93
 falsella, Catoptria, 10
 farinalis, Pyralis, 9, 49
 fausta, Colotis, 95
 fennica, Ochroleura, 21
 ferrugalis, Udea, 63
 fidia Pseudotergumia, 133
 filipendulae, Zygaena, 2, 15, 113
 flammae, Trigonophora, 4
 flammeolaria, Hydrelia, 70
 flavicincta, Entephria, 55, 61
 fletcherella, Scythris, 132
 florella, Catopsilia, 95
 floslactella, Stigmella, 137
 fluctuata, Xanthorhoe, 4, Pl. II, fig. 14
 formosanus, Lozotaenioides, 135
 francillana, Aethes, 6
 fraternana, Epinotia, 10, 60, 112
 freyerella, Cosmiotes, 62
 fuciformis, Hemaris, 16
 fuliginaria, Parascotia, 51, 123, 126
 fusca, Pyla, 68
 fuscata, Lampronia, 10
 fuscobulosa, Hepialus, 2
 galathea, Melanargia, craskei, 3, 4
 galba, Chilades, 99
 galiata, Epirrhoe, 68
 gamma, Authographa, 64, 69, 127, 132
 genistella, Oncocera, 10, 60
 geoffrella, Alabonia, 70
 gerronella, Brachmia, 10
 gerronella, Brachmia, 10
 gilvaria, Aspitates, 135, 136
 glareosa, Paradiarsia, 4, 103
 glaucinalis, Orthopygia, 10

- glauconome, *Pontia*, 93
 glitzella, *Coleophora*, 8
 gnidiella, *Cryptoblades*, 112-113
 gothica, *Orthosia*, 129
 grossulariata, *Abraxas*, 14, 21, 131
 grotiana, *Epagoge*, 135
 halterata, *Lobophora*, 69
 hawk moths (*Sphingidae*) 56
 hecabe, *Eurema*, 95
Helicoverpa, *Heliothis*, 138
 hepariella, *Zelleria*, 6
 hermannella, *Chrysoesthia*, 10
 hirtaria, *Lycia*, 1, 131
 hornigi, *Monochroa*, 49
 hospes, *Athetis*, 66
 hydrolapathella, *Coleophora*, 125, 126
 hyperanthus, *Aphantopus*, 16, 84; ab.
 arete, 57; ab. lanceolata, 3; ab. pal-
 lens, 3
 icarus, *Polyommatus* (common blue) 5,
 68, 69, 82, 84, 98
 idaecella, *Coleophora*, 8
 ilicis, *Satyrium* (*Strymonidia*), 140
 imbecilla, *Eriopygodes*, 2, 22, Pl. I,
 fig. 4
 incanana, *Eana*, 6, 70
 insigniata, *Eupithecia*, 76-77, 128
 instabilella, *Scrobipalpa*, 9
 insulana, *Earias*, 139-140
 interpunctella, *Plodia*, 10, 112
 intimella, *Ectoedemia*, 10
 inulae, *Coleophora*, 71
 io, *Inachis*, 65, 82
 ipsilon, *Agrotis*, 132, 139
 iris, *Apatura*, 16, 53
 irriguata, *Eupithecia*, 129
 jacobaeae, *Tyria*, 21, 22
 jubata, *Alcis*, 1
 jungiella, *Cydia*, 9
 jurtina, *Maniola*, 52, 82, 83, 85, ab.
 atrescens, 4
 juniella, *Cydia*, 68
 karsandra, *Zizeeria*, 98
 kilmunella, *Elachista*, 10
 laburnella, *Leucoptera*, 114
 lacunana, *Olethreutes*, 7
 laetana, *Ancyliis*, 71
 laevigatella, *Argyresthia*, 9
 lambdella, *Batia*, 10
 lanestris, *Eriogaster*, 66
 lapella, *Metzneria*, 11
 lapponaria, *Lycia*, 114
 laricella, *Coleophora*, 70
 lariciata, *Eupithecia*, 57
 leautieri, *Lithophane*, 62, 65, 123, 126,
 129
 leucatella, *Recurvaria*, 6
 leucostola, *Parornix*, 130
 leuwenhockella, *Pancalia*, 67
 liagore, *Colotis*, 94
 lichenea, *Eumichtis*, 61
 lichenella, *Solenobia*, 10
 lienigiana, *Leioptilus*, 8
 ligustri, *Sphinx*, 49, 68, 70
 limbalis, *Uresiphita*, 3, 10
 limosipennella, *Coleophora*, 128
 linariata, *Eupithecia*, 54
 lineana, *Apotomis*, 71
 lineata, *Hyles*, *livornica*, 100
 linneella, *Glyhipteryx*, 54
 literana, *Acleris*, 10, 21
 litoralis, *Mythimna*, 65, 68
 littoralis, *Spodoptera*, 3, 5, 139-140
 litura, *Agrochola*, 3
 livida, *Amphipyra*, 5
 l-nigrum, *Arctornis*, 2
 logaea, *Rhyacionia*, 7
 loniceriae, *Zygaena*, 113
 loti, *Zygaena*, 113
 lubricipeda, *Spilosoma*, 2, 70, Pl. II,
 fig. 18
 lucidella, *Monochroa*, 10
 lucina, *Haecaris*, 67, 133
 luctuata, *Spargania*, 125, 129
 lunularia, *Selenia*, 131
 lutea, *Spilosoma*, 70
 luteolata, *Opisthograptis*, 3, 70
 luzella, *Lampronia*, 6
 machinella, *Coleophora*, 9
 machaon, *Papilio*, *gorganus*, 92, muc-
 tingi 91, *rathjensi*, 6, *syriacus* (ara-
 bensis) 91
 macularia, *Pseudopanthera*, 114
 malvae, *Pyrgus*, 129
 margaritata, *Capaea*, 123, 132
 marginella, *Dichomeris*, 133
 marginepunctata, *Scopula*, 114
 megacephala, *Acronicta*, 69
 megera, *Lasiommata*, 4, 82-83
 medica, *Diaphora*, *rustica*, 1, 69
 mendica, *Diarsia*, 5
 menyanthidis, *Acromicta*, 15
 mercuriana, *Epinotia*, 6
 mespilella, *Phyllonorycter*, 11
 meticulosa, *Phlogophora*, 70
 millefoliata, *Eupithecia*, 3
 metallicana, *Olethreutes*, 7
 Microlepidoptera from Cornwall and
 Devon, list, 8
 Microlepidoptera from Essex, list, 7
 Microlepidoptera from Scotland, list, 7
 microtheriella, *Stigmella*, 137
 milvipennis, *Coleophora*, 128
 minimella, *Semophora*, 6
 minutana, *Gypsonoma*, 9
 mitterbacheriana, *Ancyliis*, 71
 monacha, *Lymantria*, 54, 131
 moneta, *Polychrysis*, 50

- monodactyla, Emmelina, 63
 monoglypha, Apamea, 70
 morrisii, Photedes, 65
 muelleriella, Phyllonorycter, 10
 muralis, Cryphia, 5
 muricata, Ideaea, 135
 muscaeformis, Bembecia, 69
 musculana, Syndemis, 68
 nyopaeformis, Conopia, 54
 nana, Hada, 70
 napi, Pieris, 82, 87, 133
 neophanes, Apomyelois, 10
 nerii, Daphnis, 100
 neustria, Malacosoma, 68, 69
 nickerlii, Luperina, gueneei ab. fusca,
 3, leechi, 22
 nigra, Aporophyla, 54, 55, 61
 nigrata, Pyrausta, 68
 nigricans, Euxoa, 55
 nitidana, Strophedra, 70
 noctuella, Nomophila, 64, 132
 nostrodamus, Gegenes, 99
 nubiferana, Hedyia, 114
 nubilalis, Ostrinia, 55
 nubilana, Neophaloptera, 7
 obductella, Oncocera, 114
 obeliscata, Thera, 13, 127
 obscuratus, Gnophos, 135
 obstipata, Orthonama, 1, 63, 132
 obtusana, Ancyliis, 71
 occulta, Eurois, 5
 ocellata, Cosmorrhoe, 2
 ocellata, Smerinthus, 49
 ocella, Euchromius, 9
 ochraceella, Mymecozela, 11
 ochrearia, Aspitates, 68, 70
 oculea, Amphipoea, 4
 oditis, Leucochlaena, 60
 oleracea, Lacanobia, 62
 Oligostigma, sp., 6
 opima, Orthosia, 3
 or, Tethea, 71
 orbona, Noctua, 2, 14
 orichalcea, Diachrysia, 2
 orithya, Junonia, 97
 ornitopus, Lithophane, 3
 otitae, Coleophora, 10
 oxyacanthae, Phyllonorycter, 10
 palaemon, Carterocephalus, 101
 pallens, Mythimna, 70
 panzerella, Nematopogon, 127
 paphia, Argynnis, 4, 60
 parasitella, Ephesia, 10
 paripunctella, /Teleiodes/ 113
 parrhasius, Chilades, 99
 pauperana, Eucosma, 8, 132, 133
 peltigera, Heliothis, 102
 peribolata, Scotopteryx, 5, 60
 permutatella, Catoptria, 11
 phloeas, Lycaena, 55, 68, ssp. shima, 6
 Phyllonorycter, spp., 128
 piercella, Niditinea, 113
 pilosaria, Apocheima, 55
 pinastri, Hyloicus, 5, 51
 piniaria, Bupalus, 127
 pinicolella, Batrachedra, 10
 pisi, Ceramica, 69
 plexippus, Danaus, crippus, 6, 16
 plumigera, Ptilophora, 3
 poae, Elachista, 8, 10
 podalirius, Iphiclides, feisthamelii, 133
 polydectalis, Oligostigma, 112
 pomerana, Elachista, 8
 populana, Pammene, 6, 9
 populi, Laothoe, 50, 129 (Amorpha)
 porcellus, Deilephila, 69
 postvittana, Epiphyas, 10
 promissa, Catocala, 135
 pronuba, Noctua, 2
 pruni, Fixsenia, 101, 140
 psi, Acronicta, 15
 pudibunda, Dasychira, 70
 pudorina, Mythimna, 2
 punctdactyla, Amblyptilia, 7
 punctinalis, Serraca, 69, 114
 punctulata, Aethalura, 67, 17, 133
 pupillana, Eucosma, 6
 pupillaria, Cyclophora, 3
 purpuralis, Pyrausta, 67-68
 pusaria, Cabera, 4
 pustulata, Comibaena, 3 (Pl. I, fig. 8)
 putrescens, Mythimna, 60
 pygmaeana, Epinotia, 10, 11
 pygmaetat, Eupithecia, 5
 quadripuncta, Oegoconia, 6
 quadripunctaria, Euplagia, 126
 quercifolia, Gastropacha, 73-75
 quercus, Lasiocampa, 4, 60
 quercus, Quercusia, 65
 ramella, Epionotia, 9
 rapae, Pieris, 92
 resinella, Petrova, 7
 rhamnii, Gonepteryx, 14
 rhediella, Pammene, 68
 rhomboidea, Xestia, 3
 ridens, Polyploca, 128
 ripae, Agrotis, 3, 68
 roboraria, Boarmia, 135
 rosaceus, Tarucus, 99
 rubi, Macrothylacia, 69
 rubiginata, Pteryria, 114
 rufipennella, Caloptilia, 59
 rumicis, Acronicta, 15
 rupicola, Cochyliidia, 9, 11
 ruralis, Pleuroptya, 62
 rurinana, Clepsia, 6
 sabinella, Gelechia, 10
 sacraria, Rhodometra, 3, 4, 63

- sagitella *Phyllonorycter*, 9, 10
 salicis, *Leucoma*, 15, 131
 salmachus, *Synanthedon*, 54
 sambucaria, *Ourapteryx*, 131
 sarcitrella, *Endrosis*, 123
Satyrium, 140
 saucia, *Peridroma*, 2
 saxifragae, *Kessleria*, 6
 scabiosella, *Nemphora*, 9
 schreberella, *Phyllonorycter*, 125
 schumacherana, *Olindia*, 70
 schwarziella, *Nematopogon*, 127
 scolopacina, *Apmea*, 135
 scopariella, *Agonopterix*, 9, 71
 scopigera, *Bembecia*, 1
 scotinella, *Gelechia*, 10
 selene, *Boloria*, 1, 16
 semele, *Hipparchia* 55, ssp. *thyone*, 4
 sequana, *Dichrorampha*, 70
 signaria, *Semiothisa*, 21
 similella, *Schiffermulleria*, 6
 similis, *Euproctis*, 13, 131
 simpliciana, *Dichrorampha*, 9
 simulans, *Rhyacia*, 3, 4, 61
 singula, *Neofriseria*, 10
 smaragdaria, *Thetidia* (*Euchloris*), 114, 122
 smeathmanniana, *Aethes*, 68
 sociella, *Aphomia*, 9
 sorbi, *Phyllonorycter*, 10
 sorbiella, *Argyresthia*, 8
 sordens, *Apamea*, 70
 sphenamni, *Etainia*, 137
 spilodactyla, *Pterophorus*, 10
 spini, *Satyrium* (*Strymonidia*), 140
 stabilella, *Cosmiotes*, 62
 straminata, *Idaea*, 135
 strataria, *Biston*, 2, 51-52
 strigillaria, *Perconia*, 6
 strigula, *Meganola*, 135
Strymonidia, 140
 styx, *Acherontia*, 100
 subpropinquella, *Agonopterix*, 9
 subrosea, *Eugraphe*, 21
 subsequana, *Epinotia*, 9, 112
 sylvestraria, *Idaea*, 135
 sylvestris, *Thymelicus*, 84
 tages, *Erynnis*, 69, 79, 81
 tapetzella, *Trichophaga*, 49
 terebrella, *Asara*, 7
 terrealis, *Eurrhyncha*, 11
 theophrastus, *Tarucus*, 99
 thoracella, *Bucculatrix*, 8
 thrax, *Pelopidas*, 100
 thyellina, *Orgyia*, 6
 tiliae, *Mimas*, 15, 49, 113
 tithonus, *Pyronia*, 86
 tityus, *Hemaris*, 2
 torva, *Notodonta*, 132
 trapezina, *Cosmia*, 132, ab. *nigra*, 4, Pl. I, fig. 6
 tridens, *Acrionicta*, 15
 trifolii, *Lasiocampa*, 3, 60, 68
 trifolii, *Zygaena*, 113
 trigrammica, *Charanyca*, 70
 trimaculata, *Lomographa*, 5, Pl. I, fig. 7
 truncicolella, *Eudonia*, 10
 trux, *Agrotis*, 60
 tunbergella, *Micropterix*, 138
 turbidana, *Apotomis*, 71
 ulmella, *Scoparia*, 6
 unangulata, *Euphyia*, 71
 uncula, *Eustrotia*, 135
 unculana, *Ancyliis*, 7
 unionalis, *Palpita*, 2, 9
 unipuncta, *Mythimna*, 2, 3, 4, 63, 64, 66, 67, 122
 urticae, *Aglais*, 4, 14, 133, ab. *lutea*, 2, Pl. II, fig. 12
 ustella, *Ypsolopha*, 10
 variata, *Thera*, 127
 venata, *Ochlodes*, 69
 venustula, *Elaphria*, 54, 71
 verbacci, *Cucullia*, 69, 71
 vibicella, *Coleophora*, 10, 71
 viciae, *Zygaena*, 113
 vigintipunctana, *Yponomeuta*, 113
 villica, *Arctia*, 69
 viminetorum, *Phyllonorycter*, 123
 vinula, *Cerura*, 50, 55
 viretata, *Acasis*, 4, 59
 vitellina, *Mythimna*, 2, 5
 vulpinaria, *Idaea*, 54, 55
 waga, *Telediodes*, 9
 w-album, *Strymonidia*, 51, 69, 140
 wauaria, *Semiothisa* (*Itame*), 4
 w-latinum, *Lacanobia*, 70
 woodiana, *Celypha*, 10
 xanthographa, *Xestia*, 65
 xylostella, *Plutella*, 68
Ypsolopha, recte *Yponomeuta*, 69
 zollikoferi, *Luperina*, 21

MAMMALS

bat, 140

MECOPTERA

germanica, *Panorpa*, 133

ODONATA

elegans, *Ischnura*, 52*mixta*, *Aeshna*, 53*nymphula*, *Pyrrhosoma*, 52

ORTHOPTERA

domestica, Acheta, 50
 griseoptera, Pholidoptera, 135
 lapponicus, Ectobius, 135
 pallidus, Ectobius, 137
 viridissima, Tettigonia, 51

PLANTS

Plants at Westbere marshes, 134

Abies, 60, 63, 112
 Achillaea, ptarmica, 9
 Ajuga, 128
 Alhagi, 98
 Alnus (alder), 59, 128
 Anvillea, 96
 apple, 54, 62
 Artemisia, 9
 ash, 11, 70
 aspen, 9
 Asphodelus, 100
 Astragalus, 98, 99
 Atropa belladonna, deadly nightshade,
 112, 113
 aubergine (egg-plant), 100
 bee orchid, 69
 Berberis, 58
 birch, 6, 7, 60, 61, 66
 blue-bell (Endymion), 70
 bracken, 53
 bracket-fungus, 6, 123
 bramble, 11
 Brassica, 91, 92
 buckthorn, 53
 Calotropis, 96
 Capparis, 94, 95
 Carpinus, 128
 Cassia, 95
 Chamaecyparis, 126, 129
 Cirsium, 9
 Citrus, 91
 Compositae, 99, 128
 Convolvulus, 97, 100
 Corylus (hazel), 128, 137
 crab apple, 11
 Cupressus, 62, 65, 126
 Cyclamen, 128
 Daedalea quercina, 6
 date-palm, 91, 94, 95, 99
 Diplotaxis, 93
 Dipsacus (teasel), 86
 Dryas, 130
 elm, 51, 125, 128
 Epidendrum paniculatum, 16
 Equisetum, 11
 Eucalyptus, 6, 58
 Eupatorium, 9
 fennel, 92, 99

field maple, 70, 137
 figwort, 69, 71
 Genista, 10
 Gleditschia, 58
 grass, 68, 100
 ground-ivy, 70
 Halimione, 9
 Haplophyllum, 92
 hawthorn, 69, 76, 128, 131
 heather, 60, 62, 64, 123
 Helianthemum (rock-rose), 132
 Heliotropium, 99
 hog-weed, 70
 holly (Ilex aquifolius), 70
 holm-oak, 69
 hornbeam, 137
 hyacinth, 113
 Ipomoea, 100
 ivy, 53
 Jasminum, 100
 juniper, 133
 kidney-vetch, 69
 Knautia, 10
 laburnum, 114
 Lantana, 91, 100
 Leguminosae, 100
 lemon, 91
 Leptadenia, 96
 Lotus, 98
 mandarine, 91
 marram, 68
 Marubium, 10
 Moricandia, 93
 moss, 10, 113
 Myosotis, 128
 Myrica, 113, 128
 nettle (Urtica), 62, 97
 Neurada, 97
 Nigella (love in a mist), 113
 lucerne (Medicago), 91, 93, 95, 98
 Malva, 97
 oak, 6, 7, 55, 59, 113, 132
 Ochradenus, 93
 orchid, 6
 Sedum (orpine), 113
 pennywort, 113
 Pergularia, 96
 Phaseolus, 98
 Picea abies, 10
 Pinus, 15, 114
 Piptoporus betulinus, 6
 Plantago, 128
 Polygala, 132
 Polygonaceae, 100
 poplar, 54, 131, Populus alba, 9
 privet, 123
 Prosopis, 99
 Prunus spinosa (blachthorn), 14, 127
 Pulicaria, 9

- red clover, 70
 Reseda, 93
 Rhanterium, 92, 93, 97, 100
 rhododendron, 132
 Rumex, 10
 Rosaceae, 10, 11
 Salix, 7, 9, 10, 14, 70, 123
 Sarothamnus, 9
 scabious, 7
 sea-buckthorn, 131
 sea pink, 69
 Sesbania, 94, 95, 98
 Silene, 10
 Sinapis 92
 Sisymbrium, 92
 Solidago (golden-rod), 11
 Sorbus, 123
 sweet basil (*Ocimum basilicum*) 92, 94
 sweet william, 53
 sycamore (*Acer pseudoplatanus*) 59
 Teucrium, 10, 96
 tomato, 62
 tree lupin, 68
 trefoil, 94, 98
 Trigonella, 98
 Ulex, 10
 Vaccinium, 8
 Vernonia, 97
 vetch, 94, 98
 Viburnum opulus (guelder-rose), 70
 Viscum, 10
 Vitis (vine), 100
 wild rose, 69, 137
 willow-herb, 129
 Withania, 100
 wych elm, 69
 yew, 70
 Zilla, 93
 Zizyphus, 99

REPTILES

adder, 137

ERRATA

p. 69 for *Ypsolopha* READ *Yponmeuta*
 p. 124 for *hyrciniaca*, READ *hyrciniae*

The Society's Publications

ILLUSTRATED PAPERS ON BRITISH MICROLEPIDOPTERA

Still available, a small number of copies of the recently published volume of twelve articles reprinted from the "South London" Proceedings between 1944 and 1957 with the twelve original colour plates.

These papers comprise LAMPRONIIDAE and ADELIDAE, LITHOCOLLETIS and OECOPHORIDAE (three parts) and ALLIED FAMILIES by S. N. A. Jacobs; PSYCHIDAE, PLUTELLIDAE and GLYPHPTERYGIDAE and ALLIED GENERA by L. T. Ford; CALOPTILIA and LYONETIIDAE by S. C. S. Brown; ERIOCRANIIDAE and MICROPTERYGIDAE by J. Heath and MOMPHA by S. Wakely. For ease of use the pages and plates have been renumbered and are fully indexed accordingly; in addition there is a new appendix drawing attention to species belonging to these groups which have been added or sunk. There is also a list of species which relates names used in the text to up-to-date nomenclature and classification.

A *limited* edition of 500 copies was published in the Autumn of 1978, bound in cloth, price £9; £6 to Members of the Society. Postage, where applicable, 60p extra. Cheques should be sent to R. F. Bretherton, Esq., c.B., Folly Hill, Birtley Green, Bramley, Surrey.

A FIELD GUIDE TO THE SMALLER BRITISH LEPIDOPTERA

The Society also announces the publication, probably in late summer this year, of the above important and entirely new work, bringing up to date and uniting the well-known Guide by the late L. T. Ford, B.A., and the Supplement, both hitherto advertised on this page, with much additional matter. Bound in stiff paper cover. Price and procedure for purchase, same as for above "Illustrated Papers".

THE NATURAL HISTORY OF THE GARDEN OF BUCKINGHAM PALACE

(Proceedings and Transaction 1963, Part 2)

Compiled by a team of specialist.

£1.00

A LEPIDOPTERIST'S HANDBOOK

The Amateur Entomologist's Society is pleased to announce the publication of its latest Handbook, written by Richard Dickson. It is intended as a 'vade mecum' for both beginners and initiated lepidopterists and deals with all aspects of the subject in a series of eleven chapters and four appendices. There are 34 line illustrations and 13 photographs to augment the text and the binding has been sewen to meet constant use.

It is apractical book on the various facets of breeding, collecting, storing, conservation and photography of lepidoptera and should appeal to most lepidopterist. Although the various techniques relate to the British fauna, most are valid for lepidopterists anywhere.

The price is £3.00 plus postage and is available from A.E.S. Publication Agent, 137 Gleneldon Road, London, SW16 2BQ. (An invoice will be sent with orders, including postage).

CONTENTS

Cilia, J. L., <i>Plebejus argus</i> (L.) in Malta	76
Current Literature	138
Field Meetings	133
Hering Memorial Research Fund, Report on	121
Jackson, B. C., A note on breeding the pinion-spotted Pug, <i>Eupithecia insigniata</i> (Hüb.)	76
Majerus, M. E. N., The inheritance of a pale form of <i>Gastropacha quercifolia</i> (L.)	73
Obituaries: (i) Dr. H. B. D. Kettlewell	101
(ii) N. D. Riley, C.B.E., with bibliography	104
Officers' Reports for 1978	115
Pittaway, A. R., The butterflies and hawk-moths of eastern Saudi Arabia	90
Pollard, E., A national scheme for monitoring the abundance of butterflies: the first three years	77
Proceedings	112
Rivers, C. F., Insect diseases and population control	124

MEETINGS OF THE SOCIETY

are held regularly at the Society's Rooms, but the well-known ANNUAL EXHIBITION takes place 27th October, in Chelsea Old Town Hall. Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings. The current Programme Card can be had on application to the Secretary.





SMITHSONIAN INSTITUTION LIBRARIES



3 9088 01267 2044