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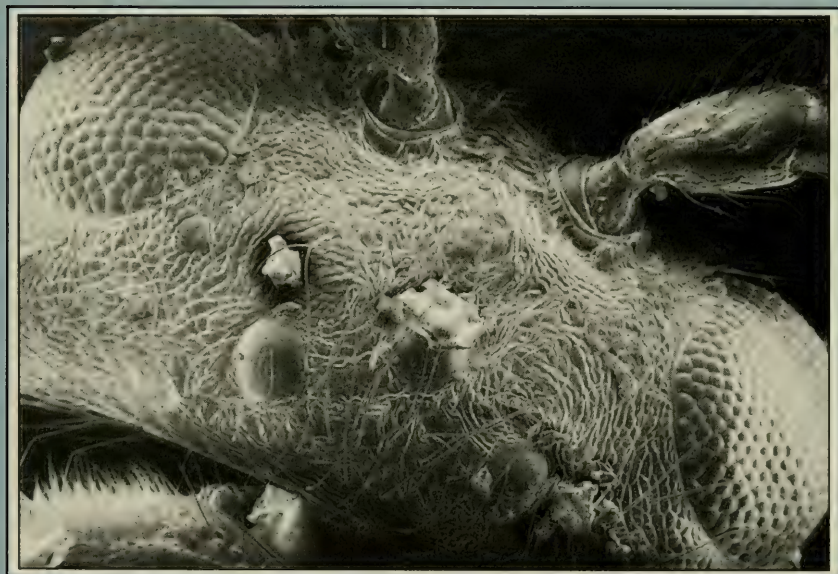
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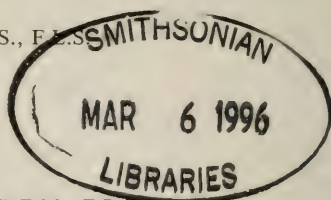
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Cover illustration: Scanning electron microscope picture of the head of a female gall wasp, *Cynips divisa* Hartig (Hymenoptera: Cynipoidea). Photo: M. Iley.

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**THE DISTRIBUTION AND HABITS OF THE SMALL
CARPENTER BEE *CERATINA CYANEA* (KIRBY, 1802)
(HYMENOPTERA: APIDAE) IN BRITAIN**

GEORGE R. ELSE

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INTRODUCTION

Ceratina cyanea (Kirby, 1802) is a small, almost hairless metallic blue or blue-green bee. It is the sole representative of its genus in north-west Europe, though numerous species occur further south, around the Mediterranean. The genus is especially well represented in North Africa (Daly, 1983), the Levant, and south-west Asia. Formerly it was considered to be one of the great rarities among the British bee fauna and few collections, either museum or private, contained specimens. It is listed as 'rare' by Falk in his account of the scarce and threatened bees of Great Britain (1991). Falk defines a 'rare' taxon as one with a small population that is not at present endangered or vulnerable, but is at risk; such species are estimated to exist in only 15 or fewer 10-kilometre squares since 1970. However, a reappraisal of the status for this species would seem to be in order as it has been reliably recorded since 1970 from 18 10-kilometre squares (Fig. 1) and, in the western Weald (from which most recent records originate), from thirty-three 2-kilometre squares (Fig. 2).

While collecting aculeate Hymenoptera on Oxenbourne Down, a reserve of the Hampshire and Isle of Wight Wildlife Trust, 6 kilometres south of Petersfield, Hampshire, on 14.vii.1972, I encountered a dead female *C. cyanea* wedged between the split ends of a dry bramble (*Rubus fruticosus* L. *sensu lato*) stem. On sorting out my catch at home later that day I found I had collected another female. These were the first records of the species from Hampshire.

C. cyanea has long been known both to nest and overwinter in dead, dry stems (e.g. Smith, 1846; Shuckard, 1866). Prior to my finding this bee, I had not sought stem nests of any aculeate. However, Danks' excellent account of the biology of British stem-nesting aculeate Hymenoptera (1971) (which contains a key to the nests of these species) proved to be invaluable as an introduction to the subject, and the key briefly described the nest of this bee. On further visits to Oxenbourne Down on 23.ix and 7.x.1972 I searched for suitable stems and found a number of dead, cut bramble stems which each had an obvious burrow in the exposed pith. On opening these stems, some were found to contain overwintering adults of both sexes of *C. cyanea*; in some instances a stem contained several individuals.

Locating occupied stems is undoubtedly the easiest way of finding this very local bee, as more can be found in this way than by searching for specimens visiting flowers. Furthermore, the adult occurs in every month of the year, although the flight period extends only from May to August or early September.

BRITISH HABITAT AND DISTRIBUTION

In Britain *C. cyanea* is a strongly thermophilous species, being confined to warm, sheltered sites, particularly those which are exposed to the sun for much of the day, and where the soil heats up quickly. Thus, the bee is associated with scrub on the south-facing slopes of chalk downland (there are no reports of the species from north-facing slopes), open rides in woodland on chalk, disused sand pits, and the

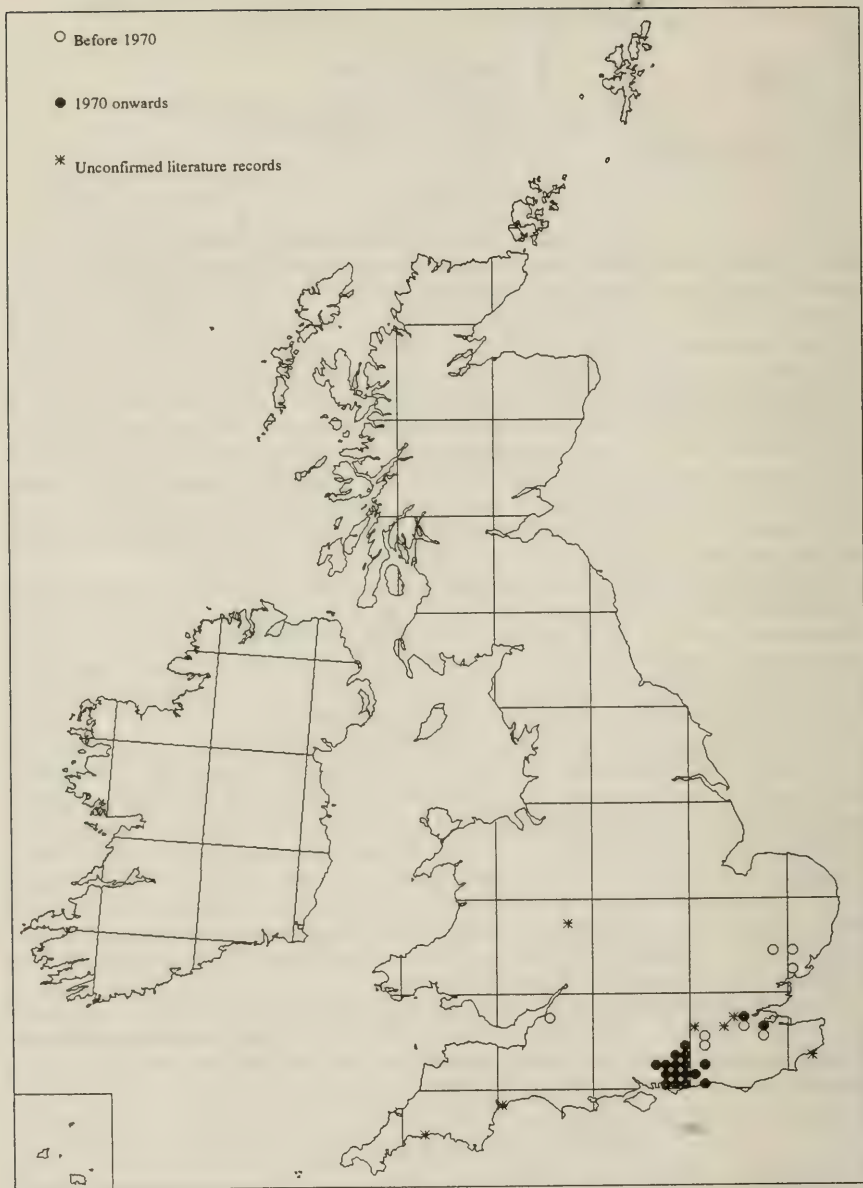


Fig. 1. British distribution of *Ceratina cyanea*.

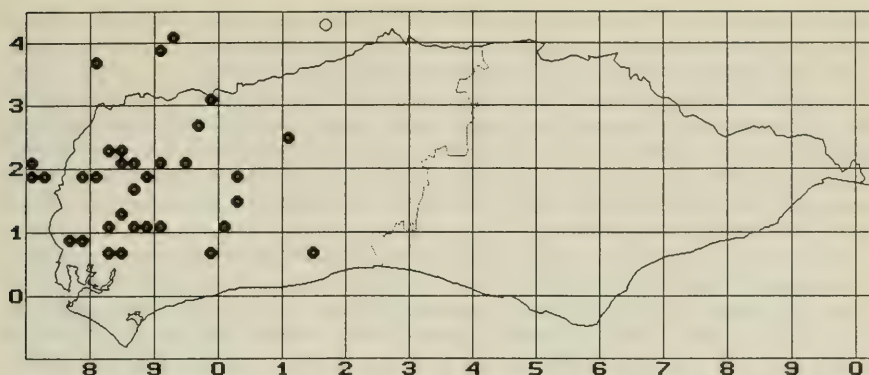


Fig. 2. Distribution of *Ceratina cyanea* in Sussex.

edges of heathland. The species is sometimes locally common in suitable stems.

Although *C. cyanea* occurs as far north as southern Sweden (Erlandsson, 1954; Janzon & Svensson, 1988), recent British records (post-1970) of the species are entirely from south-east England. Records (Figs 1 and 2) are known from the following counties: eastern Hampshire, West Sussex, Surrey, north Kent and south Essex. There are older, confirmed records from Avon and Suffolk, and unsubstantiated reports in the literature from south Cornwall (Clark, 1906, 1907), Devon (Smith, 1876), and Hereford & Worcester (Saunders, 1896). All post-1970 records have been confirmed.

LIFE-CYCLE IN SOUTHERN ENGLAND

The following account is based on a personal study carried out on Oxenbourne Down in 1972-73. Unfortunately no figures of the immature stages suitable for publication were prepared at that time. However, as no other, detailed observations on the nesting biology of this species seem to have been published, the following contribution may be of interest.

The nest

Both sexes become active during May, when the presence of mounds of fresh, fine, pith fragments directly beneath the cut ends of dead stems betray the presence of females engaged in nest building. Mating also seems to occur at this time. Nest burrows are excavated only in dead, broken stems in which the pith has been exposed; common examples are those of bramble and rose (*Rosa* species). Such stems usually become broken by the action of large herbivores, or as a result of scrub-clearance. In my experience preferred stems lie on, or are suspended close to, the ground in sunlit situations. Female *C. cyanea* will often accept as nest sites cut, loose pieces of dead *Rubus* stems ('trap-nests') laid out on short turf in open areas. Stems of sufficient length (e.g. about 30 cm or more) will sometimes attract two females, each excavating a nesting burrow from opposite ends of the stem.

The nest burrow varies from about 57 to 110 mm in length and is usually characterized by a constriction just within the entrance. An occupied nest has been illustrated by Westrich (1989). Smith (1846) observed *C. cyanea* entering stems excavated by the

small megachiline bee *Hoplitis claviventris* (Thomson) [as *Osmia leucomelana*] and thought it probable that the former species may use a ready-made burrow as a nest site; this, however, has not been confirmed and seems unlikely.

Cells are 7–9 mm in length and 3 mm in width, and are separated from one another by pith fragment partitions, these being about 1 mm wide. Male and female cells are not segregated within the nest. Sometimes the last cell to be built (i.e. that nearest the nest entrance) has no outer partition. In such an instance the female sometimes remains just within the nest burrow and guards her brood; she may remain with it until the young adults emerge.

Each cell is provisioned with a roughly brick-shaped pollen loaf; one typical loaf measured 6 mm long, 4 mm wide and 3 mm deep. Loaves have a shallow dorsal depression and, of those examined on the study site, were always bright yellow in colour. The entire ventral surface of the provision probably lies on the side of the cell nearest the ground (most stems containing nests of this species are usually horizontal or nearly so).

C. cyanea is polylectic. An analysis of pollen in loaves from three Oxenbourne nests by G. Clarke produced the following results (the percentages were calculated by identifying 200 pollen grains from each sample and halving the results). Nest 1: yellow-rattle (*Rhinanthus* species) 37%; cinquefoil (*Potentilla* cf. *erecta* (L.)) 24%; buttercup (*Ranunculus* cf. *acris* L.) 20%; Asteraceae (probably a cat's ear (*Hypochoeris* species)) 15%; cornflower (*Centaurea cyanus* L.) 2%; and purging flax (*Linum catharticum* L.) 2%. Nest 2: Asteraceae (probably a cat's ear (*Hypochoeris* species)) 48%; yellow-rattle (*Rhinanthus* species) 29%; buttercup (*Ranunculus* cf. *acris*) 15%; and birdsfoot-trefoil (*Lotus corniculatus* L.) 8%. Nest 3: Asteraceae (probably a cat's ear (*Hypochoeris* species)) 50%; cinquefoil (*Potentilla* cf. *erecta*) 27%; yellow-rattle (*Rhinanthus* species) 9%; buttercup (*Ranunculus* cf. *acris* L.) 8%; and Asteraceae (ragwort, or near (cf. *Senecio* species)) 6%. The lowest percentages may only indicate grains fortuitously picked up whilst the females were drinking nectar, or wind-blown grains contaminating a major pollen source. Bees have also been observed (in various British localities) at bulbous buttercup (*Ranunculus bulbosus* L.), bramble (*Rubus*), common tormentil (*Potentilla erecta* (L.)), burnet rose (*Rosa spinosissima* L.), viper's bugloss (*Echium vulgare* L.), common speedwell (*Veronica officinalis* L.), germander speedwell (*V. chamaedrys* L.), thyme (*Thymus* species), wild basil (*Clinopodium vulgare* L.), self-heal (*Prunella vulgaris* L.), harebell (*Campanula rotundifolia* L.) and rough hawkbit (*Leontodon hispidus* L.), but it is not known whether the bees were foraging from these, or simply visiting them for nectar. An Oxenbourne Down specimen was collected carrying an unidentified orchid pollinium attached to the upper portion of the clypeus (S. P. M. Roberts (pers. comm.)). He has also observed individuals of *Ceratina curcubitina* (Rossi) carrying orchid pollinia on their faces in Crete).

THE IMMATURE STAGES

The egg is laid on the posterior part of the pollen loaf, with its base glued to the inner side wall of the cell. The egg is elongate, strongly curved and rather translucent; except for the transparent apices. It is about 4 mm long and slightly less than 1 mm wide at its mid-point. Following oviposition the cell is sealed with a partition of pith fragments.

The larva lies on a membranous pad (usually stained by the pollen and is therefore sometimes difficult to see) which is about 2 mm long and 1 mm wide. Part of this pad is firmly attached to the provision, with the remaining posterior portion attached

to the cell wall. The larva is firmly attached to the pad and while the feeding phase continues it is most difficult to remove a larva from the pad without causing injury. The pad seems to be composed of the accumulation of the exuviae from earlier instars.

The fully grown larva is faintly brownish in colour (caused by food in the gut) and possesses a fleshy, slightly raised lateral ridge which extends from the first to the penultimate segment; at this instar the spiracles are distinct. The mandibles are strongly sclerotized, brown, narrow and unidentate, the tooth extending a little beyond the apex of the mandible. With the exception of the mandibles, the prepupa (a fully fed larva which has voided the excrement it accumulated during its development) is entirely white and is about 6 mm in length. Its trunk, including the head capsule, is weakly sclerotized; the head bears a pair of prominent antennal tubercles. The lateral ridge characteristic of the mature larva has been lost and the spiracles may be indistinct. The thoracic segments are swollen, their intersegmental divisions being only weakly defined. The surface of the thorax is smooth and almost devoid of wrinkles, except in the immediate vicinity of the spiracles. The abdominal intersegmental divisions are obvious, except for that between the last two segments. Michener (1953) draws attention to the absence of body tubercles, the unidentate mandible and the distinct antennal tubercle of *Ceratina* larvae.

The larva spins no cocoon and remains quiescent for a few days prior to pupation. The most noticeable feature of the pupa is its long glossa and galea.

Parasitoids

I have found a larva of an ichneumonid wasp (possibly *Aritranis signatorius* (F.)) in the act of devouring a *C. cyanea* larva. Unfortunately the wasp larva died in its cocoon.

In mainland Europe, Malyshev (1968) records *Aritranis heliophilus* Tschek [as *A. mediterraneus* Tschek] (a species not known from Britain) as a parasitoid of *C. cyanea*. Daly *et al.* (1967) review the natural enemies of *Ceratina* species in North America; Daly (1983) describes those parasitoids recorded from *Ceratina* nests in Iberia and Tunisia.

The hibernaculum

The new generation of bees emerges from the pupa by August or early September and may occasionally be found visiting flowers at this time. The autumn and winter months are spent as an adult within a hibernaculum. This may be the cleaned-out parental nest, as has been noted in other *Ceratina* species found in temperate regions (Daly, 1983). The hibernaculum resembles a nest but lacks partitions. Burrow lengths of hibernacula vary: I have found the mean length of 21 hibernacula to be 78 mm (range 25–170 mm); the internal diameter is 3–4 mm. Usually a little pith adheres to the walls, but the burrow contains no pith fragments. Most hibernacula that I have found were in bramble stems, but others were in hemp agrimony (*Eupatorium cannabinum* L.), and one in a dead Apiaceae stem. Adults of both sexes occupy the hibernacula from September to May, either singly or in small groups (rarely more than six individuals to a stem). They always enter the burrow head first and remain in this position throughout the winter.

Females in particular are usually long-lived, with an adult life-span of almost a year. One hibernaculum which I collected in late January contained an apparently old, diapausing female which may have been overwintering for a second time (its age was assessed by its discoloured and abraded wings). If this was correct, then the specimen must have been about 18 months old when collected.

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I am grateful to the Hampshire and Isle of Wight Wildlife Trust (formerly the Hampshire and Isle of Wight Naturalists' Trust) for permission to collect aculeate Hymenoptera on Oxenbourne Down in 1972–73, to G. H. L. Dicker, M. Edwards and P. Harvey for their records of this species, and to G. Clarke (formerly of the Department of Botany, The Natural History Museum, London) for identifying the pollens present in samples which I submitted to him for analysis. S. P. M. Roberts very kindly prepared the distribution maps (drawn on DMAP).

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BOOK REVIEW

Australian beetles, by J. F. Lawrence and E. B. Britton, Melbourne University Press, 1994, x + 192 pages, hardback, Aus \$39.95, about £28.—For anybody imagining that this book could only be of interest to someone going to visit Australia, think again. This book is of international interest in putting together in concise and available form the authors' thoughts on the higher classification of the Coleoptera. The text is highly illustrated with line figures and there are several coloured plates to whet the appetite with bright exotic forms. This is a must for coleopterists.

RICHARD A. JONES

A FURTHER STUDY OF THE BEHAVIOURAL PATTERNS OF SIX SPECIES OF BRITISH BUTTERFLY WHILST *IN COPULA*

S. A. KNILL-JONES

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Between 1989 and 1994 I have been fortunate enough to observe six species of British butterfly *in copula* and now describe their behavioural patterns. This follows my earlier observations on 6 other species (Knill-Jones, 1989).

SMALL SKIPPER (*THYMELICUS SYLVESTRIS* PODA)

At 11.23 a.m. on 4.viii. 1991 I was walking to Golden Hill, Freshwater when I came across a pair of small skippers (*Thymelicus sylvestris* Poda) *in copula* at rest on an oxeye daisy (*Leucanthemum vulgare* Lam.). The female was facing due west and the male north 15 degrees east as they basked in warm hazy sunlight. They remained motionless except for the opening and closing of their wings in that position until 12.30 p.m., six minutes prior to separation, when they both quickly altered their positions in two movements ending up with the female facing north 10 degrees east and the male due west.

When I first noticed them their wings were closed, but after 5 minutes they opened their wings and except for four occasions at intervals of 20 minutes when they both had their wings closed for about 5 minutes, their wings remained partially opened whilst they were *in copula*. The female's wings were open from 10 to 45 degrees whereas the male on two occasions around noon had its wings nearly fully open at 75 degrees. Occasionally both sexes, with the female more frequently, would briefly close their wings for a few seconds especially when the wind blew them. The female did show some other movement when after each period of about 15 minutes had passed it would roll its head & antennae whilst its forelegs remained static.

At 12.36 p.m., after 6 minutes preparation when they changed positions on the flower, they separated with the male flying off first, leaving his mate feeding on the daisy with her wings partially open until she flew off five minutes later.

They remained *in copula* for 1 hour and 13 minutes.

GREEN HAIRSTREAK (*CALLOPHRYS RUBI* L.)

May 31st, 1994 was a warm, cloudless, sunny day when Brian Warne and myself visited Compton Down with a view to observing the butterflies there. While walking up a footpath towards the down Brian disturbed a pair of *Callophrys rubi* (L.) *in copula* which had been resting on a sycamore and they flew a few yards before alighting on a long blade of grass at 11.48 a.m. After a little bodily movement they settled down with the female facing due west and the male facing east south east. Throughout the whole time *in copula* their wings remained tightly closed and they only opened them to fly away after separation.

At 12.10 p.m. the female briefly moved its front legs and at 12.12 p.m. the male did likewise. Throughout their time together similar slight leg movements were made at intervals of between 10 and 20 minutes. At 12.22 p.m. and 12.35 p.m. they both moved their positions slightly before resorting to their initial ones. At 12.49 p.m. the female moved to west north west and the male east south east and at 1.02 p.m. they moved again, rotating with the position of the sun to north west and south east respectively. At 1.50 p.m. there was a gust of wind which caused them to alter their

position with the male facing directly up the blade and its mate down the grass blade. Now there was also some bodily movement shown by the female and at 2.37 p.m. they moved a further inch up the grass blade. At 2.40 p.m. there was considerable bodily movement as they tried to separate and 5 minutes later they successfully parted and the male flew off. The female remained motionless for a further 2 minutes and at 2.47 p.m. it flew off into the distance. I had observed them *in copula* for 2 hours and 57 minutes.

COMMON BLUE (*POLYOMMATUS ICARUS* ROTT.)

Shortly before noon on a warm sunny day on 9.ix.1991, whilst walking on Tennyson Down, I noticed a pair of *Polyommatus icarus* Rott. flying together over some old thistle heads. At 11.54 a.m. they settled on a small thistle head and mated. Soon the male was facing due east with its wings open and the female faced due west with its wings closed. After 3 minutes the male closed its wings before opening them again two minutes later. It continued this movement of its wings for 10 minutes until it finally closed them. Except for a brief moment when facing south its wings remained closed for the final 20 minutes. The sun was fully out all the time and there was a cloudless sky. The female however had its wings closed for the whole time whilst they were *in copula* except for 4 minutes at 12.10 p.m. when facing due south, her wings were held at an angle of 45 degrees.

Approximately every 5 minutes they would change position on the flower head and each faced all the main points of the compass for 3 to 5 minutes. Both sexes opened their wings when facing south directly towards the sun. About 5 minutes before separation there was considerable movement as they rotated several times around the thistle attempting to find a new position. When they were static their abdomens pulsed rhythmically giving considerable movement.

At 12.25 p.m. they both opened their wings (they separated). The male flew off almost immediately to a nearby thistle. Its mate remained on the original flower for 2 minutes before departing. They had been *in copula* for 31 minutes.

Compared to *Lysandra coridon* Poda., *P. icarus* remained in its original resting place for the whole duration whereas *L. coridon* moved its position once after being disturbed. The time spent *in copula* was four times longer with *L. coridon*.

GLANVILLE FRITILLARY (*MELITAEA CINXIA* L.)

On 11.vi.1994, a warm sunny day apart from the occasional passing cumulus clouds, I went to Compton Bay with a view to seeing a pair of *Melitaea cinxia* *in copula*. My visit was rewarded and at 10.38 a.m. I noticed a pair flying together; after a minute they had mated. They flew a couple of yards and I observed that the larger female carried the male in flight. They settled on a blade of grass and after a few minutes the male ended up facing south south west and the female north west. They stayed there until 11.04 a.m. when the male changed its direction to face due south. Their wings were mainly open and up until 11.54 a.m.; there was considerable opening and closing of the wings. Throughout the whole time *in copula* the male remained the passive partner with its wings being closed for a far longer period than its mate. The female opened and closed its wings far more often. Between 12.14 p.m. and 1.00 p.m. they both kept their wings closed except for an occasional flap.

At 1.00 p.m. they moved about 15 feet to a grass flower where the female held its wings fully open and the male held its wings at an angle of 75 degrees. At 1.02 p.m. there was considerable movement and they flew a few more feet and alighted on a

yellow flower of the horseshoe vetch (*Hippocrepis comosa* L.) where they began to feed at about 10 minute intervals. At 1.10 p.m. there was further bodily movement and their position changed through an angle of 180 degrees before finally coming to rest with the male facing due west and the female east north east. During this time their wings remained open until 1.40 p.m. when the male closed its wings and its mate's were fully open. This situation continued until 2.34 p.m. when there was considerable movement and they flew off together, quickly separating in mid-air.

They had been *in copula* for 3 hours and 55 minutes, the longest that I have observed for any butterfly.

SPECKLED WOOD (*PARARGE AEGERIA* L.)

At exactly mid-day on 17.iv.1989 I came across what I thought was a single *Pararge aegeria* L. attempting to fly. I put my finger under it and realized that it was a pair *in copula* which on being disturbed, flew for several feet until they settled onto another blade of grass. The male rested with its wings folded and faced north west in the sun whilst the female faced downwards in a south easterly direction with its wings also folded. The male remained motionless with its wings closed even though the sun was fully out, although the female made three rapid movements when it opened and closed its wings. After 5 minutes both of the butterflies flapped their wings as they separated. The male left first and the female about 20 seconds later.

It is difficult to say how long they had been *in copula* before I found them amongst the grass but it seems that this species is *in copula* for only a short time, probably less than a half an hour. I have often seen them flying together in pairs and I have observed this courtship behaviour continuing for about 30 minutes, but I have yet to witness them actually mating.

GATEKEEPER (*PYRONIA TITHONUS* L.)

At 3.22 p.m. on 28.vii.1991 on the way to Golden Hill, Freshwater I noticed a pair of *Pyronia tithonus* (L.) *in copula* at rest in the afternoon sunshine on a blackberry leaf. After 2 minutes they flew 3 feet to another piece of bramble and I observed that the female carried the male whilst in flight. At rest the female faced due east and the male faced west 10 degrees north. Between 3.24 p.m. and 4.17 p.m. they flew to five different resting places, three of which were on blackberry and two on blackthorn. On two occasions they changed perches when they were disturbed by a bee, but they moved of their own free will on the other occasions. On all except two occasions the female faced due east and the male west 10 degrees north. Once the female faced west 10 degrees north and the male due east when they flew to a bramble flower and for a brief period of 5 minutes the female faced south 10 degrees east and the male due north at another resting place.

There was no opening and closing of the wings by either sex during the whole time *in copula* except when the male opened its wings on being disturbed by a bee and when on one occasion it opened its wings several times after alighting on a new bramble leaf. There was no such movement in spite of the bright afternoon sunshine, when the temperature in the shade was over 70 degrees, which is an unusual feature in comparison to other species of butterfly that I have observed.

At 4.17 p.m. they moved for the last time alighting on a blackberry leaf and remained there motionless until 5.02 p.m. when they separated. The male flew off first; its mate followed 4 minutes later having remained motionless with its wings closed for 3 minutes before a hoverfly disturbed it. She opened her wings and flew off a minute later. They remained *in copula* for 1 hour 40 minutes.

I give below a table of the durations, in order of the length spent *in copula*, for the 12 species that I have observed over the last 11 years.

Date	Species	Time	Duration
17.iv.1989	<i>Pararge aegeria</i> L.	12 noon–12.05 p.m.	5 min
9.ix.1991	* <i>Polyommatus icarus</i> Rott.	11.54 a.m.–12.25 p.m.	31 min
13.v.1984	<i>Pyrgus malvae</i> L.	12.28–1.00 p.m.	32 min
4.viii.1991	<i>Thymelicus sylvestris</i> Poda	11.23 a.m.–12.36 p.m.	1 h 13 min
3.vii.1984	<i>Maniola jurtina</i> L.	3.05–4.25 p.m.	1 h 20 min
7.vii.1984	<i>Melanargia galathea</i> L.	10.45 a.m.–12.20 p.m.	1 h 35 min
28.vii.1991	<i>Pyronia tithonus</i> L.	3.22–5.02 p.m.	1 h 40 min
12.ix.1984	<i>Pieris rapae</i> L.	4.30–6.15 p.m.	1 h 45 min
27.vii.1984	* <i>Lysandra coridon</i> Poda	10.40 a.m.–12.45 p.m.	2 h 5 min
31.v.1994	<i>Callophrys rubi</i> L.	11.48 a.m.–2.45 p.m.	2 h 57 min
26.ix.1983	* <i>Lycaena phlaeas</i> L.	11.35 a.m.–2.40 p.m.	3 h 5 min
11.vi.1994	* <i>Melitaea cinxia</i> L.	10.39 a.m.–2.34 p.m.	3 h 55 min

*denotes a species in which the actual mating to the time of separation was observed.

Except for *Melitaea cinxia* L. when separation took place in mid-air it was always the male which left first whilst the female remained static for a minute or two before flying off.

ACKNOWLEDGEMENTS

I should like to thank my mother for reading and commenting on the manuscript and to Brian Warne for his patience while I was observing *Callophrys rubi* L.

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BOOK REVIEW

The book of the spider by Paul Hillyard. London, Hutchinson, 1994, 196 pages, 26 plates, numerous figures in text, £16.99, hardback.—Although the author works on spiders at the Natural History Museum in London, this is a popular rather than an academic collection of interesting facts and entertaining anecdotes on a variety of arachnological topics.

He discusses arachnophobia and its causes but without coming to any conclusion. Also he mentions some of the modern treatments to ameliorate this condition. He passes on to folklore and then ballooning, venomous spiders (actual and believed), a brief account of a spider's life and some especially interesting types of spider, uses of spider silk and various webs, South American spiders and finally a brief history of arachnology from Aristotle to the present day with accounts of the lives and works of some well-known arachnologists.

This is a book for those who are mildly interested in spiders, rather than for those who prefer a more academic treatment. It may well act as an antidote to the irrational fear of spiders. It would certainly intrigue the young. Alternatively it would make a good bedside book.

The book is pleasantly printed and produced. I think that it is a pity that the illustrations in the text are frequently unlabelled and unexplained.

FRANCES MURPHY

**RHEOTANYTARSUS RIOENSIS (DIPTERA: CHIRONOMIDAE),
A NEW SPECIES OF THE PENTAPODA GROUP
FROM THE CANARY ISLANDS**

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Rheotanytarsus species of the *pentapoda* group are characterized by the form of two structures of the male hypopygium: the narrow, elongate apices of the gonostyles turned downwards at the tip, and the narrow, gently sinuate or curved appendage 2a. The form of the flattened plates at the tip of appendage 2a appear to be good species discriminators, but these are usually indistinguishable in normal mounts as they project nearly vertically from the shaft of the appendage, are very thin and nearly transparent. In general, in this genus pupal structure provides confirmation of specific identity.

The described west Palaearctic species of the *pentapoda* group are *pentapoda* (Kieffer) and *photophilus* (Goetghebuer). Specimens of all stages of a further species of this group were collected by PDA from an irrigation conduit on Tenerife.

Terminology follows that of Sæther (1980), except that the flattened setae on the pupa are referred to as taeniae (singular taenia, adjective taeniate), a replacement term for the misnomer 'filament'.

Abbreviations used. AR antennal ratio: in adults, ratio of length of apical flagellomere divided by the combined length of the more basal flagellomeres; in larvae, length of basal segment to combined length of the remaining segments. LR leg ratio: ratio of metatarsus length to tibial length. BR bristle ratio: ratio of length of longest seta of tarsal segment 1 divided by minimum width of tarsal segment 1. VR venarum ratio: ratio of length of Cu to length of M.

DESCRIPTION

Holotype male deposited in Zoologische Staatssammlung, Munich; paratypes also in the University of La Laguna, Tenerife, The Natural History Museum, London, and in the authors' collections.

Adult male, total length 2.1–2.7 mm (n = 6). Head including appendages brown, eyes black; thorax brown, scutellum and halteres pale; anterior legs pale at base of femur, progressively more brownish to metatarsus, thereafter brown; posterior legs only weakly darkened to tarsus with tibial combs conspicuously black; abdomen brownish, a little darker posteriad.

Head. AR 0.8–1.2 (m = 1.0, n = 11). 7 or 8 temporal setae; 2 postocular setae; 19–27 clypeal setae. Lengths of palp segments: 30–55, 30–40, 93–130, 103–138, 160–215 μ m (n = 9).

Thorax. 7–11 dorsocentral setae (n = 9) extending from anterior edge of dorsiventral muscle attachment to scutellum; occasionally there may be 1–3 additional setae in the humeral area. 20–26 (n = 8) biserial acrostichals ending at mid-thorax. 1 prealar seta. 8 scutellar setae. Wing length 1.46–1.75 mm (n = 8), 3.4–3.7 times as long as broad. Anal lobe absent. Costa not produced. VR 1.32–1.44 (n = 8). Membrane and veins with dense macrotrichia from near base to tip. Legs: lengths (in μ m) and proportions (n = 6):

leg	fem	tib	tar 1	tar 2	tar 3	tar 4	tar 5	LR	BR
1	760–830	380–460	780–900	420–470	300–350	270–310	120–150	1.8–2.0	2.2–3.4
2	690–790	500–620	300–350	150–180	110–130	80–100	60–70	1.3–1.5	3.0–5.7
3	760–880	630–750	420–510	260–330	240–270	150–180	85–100	1.2	4.5–6.1

Anterior tibia with a peg-like spur apically; mid and hind tibia with a pair of small apical combs, each with an outwardly curved spur about twice the length of the comb setae.

Abdomen. Tergites and sternites with setae arranged in anterior and posterior transverse bands; a longitudinal lateral row also present on tergites; setal numbers:

tergite:	IV	V	VI	VII	VIII
anterior band	8	7-9	6-10	7-8	8-9
posterior band	11	8-10	9-11	5-10	6-10
lateral row	5	5	5(6)	4	3
sternite:	IV	V	VI	VII	VIII
anterior band	5	5	6-7	6-8	14-15
posterior band	5	7	6-8	6-10	10-14

Hypopygium (Fig. 1). Anal tergite with 6 very short setae spreading forwards from between the anal point combs, 5 or 6 about $18\ \mu\text{m}$ long setae on each side of the anal point base, and 3 slightly longer setae immediately below the anal point. Anal point contracted to the posterior extent of the combs, thereafter slightly swollen to the

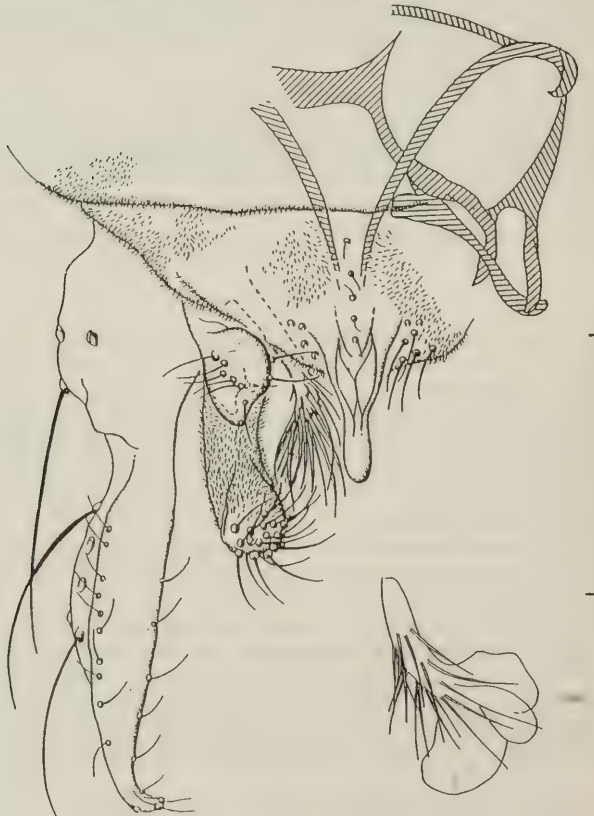


Fig. 1. *Rheotanytarsus rioensis*. Male hypopygium dorsal and appendage 2a lateral. Scale = 0.1 mm.

rounded apex; anal combs high. Gonostyles swollen, contracted strongly in distal quarter, the narrow, gradually narrowing apex bent downwards at tip. Appendage 1 with 2 inner marginal setae, 5 or 6 dorsal setae and 1 ventral seta directed inwards. Appendage 1a peg-shaped, reaching, or not quite reaching, the inner apical margin of appendage 1. Appendage 2 somewhat clubbed apically, where there is a patch of setae dorsally, most of which are curved forwards. Appendage 2a narrow, nearly parallel-sided, with setae on inner margin from near base; at apex with three flat extensions.

Adult female, length 1.7–2.2 mm (n=6). Colour as in male.

Head. Antennal flagellomere lengths: 70–100, 53–60, 63–68, 58–63, 75–88 μm (n=5). 6–9 temporal setae. 2 postorbital setae. 21–26 clypeal setae. Lengths of palp segments: 20–35, 30–45, 103–115, 108–120, 166–200 μm (n=5).

Thorax. Dorsocentral setae: 8–9 from anterior margin of dorsiventral muscle attachment to scutellum; in addition a humeral patch of 3–6 setae connected to the posterior dorsocentrals by one or two intermediate setae. 20–24 biserial acrostichal setae. 1 prealar seta. 8 scutellar setae. Wing (Fig. 2), length 1.44–1.60 mm (n=5); 3.1–3.4 times as long as broad. Anal lobe slight. Costa not produced. VR 1.4–1.5. Legs: lengths (in μm) and proportions (n=3):

leg	fem	tib	tar 1	tar 2	tar 3	tar 4	tar 5	LR	BR
1	640–680	380–390	690–740	380	270–280	240	120	1.6–1.7	2.8
2	610–650	420–500	280–290	130–150	100–110	60–80	60	1.3–1.5	3.8–5.3
3	670–700	560–630	380–390	220–240	200–210	120–130	80	1.1–1.2	5.0

Tibial spurs and combs as in male.

Genitalia (Fig. 3). Cerci with a sharp, nearly right-angled point dorsally, gently curved posteriorly and strongly curved ventrally to base. Seminal capsules 70 μm long. Notum 2.1 times as long as seminal capsules. Gonapophysis VIII with ventrolateral lobe broad, weakly rounded, and dorsomesal lobe strongly projecting, smoothly rounded.

Pupa (*Rheotanytarsus* Pe2 Langton 1991), length 3.0–3.9 mm (n=10). Cephalothorax brownish, somewhat darker anterodorsally, around the base of the wingsheaths and ventrally at the base of the legsheaths; wing sheaths margined with brown. Abdomen very pale brown, laterally darker, these lateral bands intensifying posteriad. Anal segment brown, anal lobes with a median colourless band.

Cephalothorax. Frontal setae and cephalic tubercles absent. Frontal apotome granulate towards apex. Thoracic horn (Fig. 4a) 225–265 μm long (n=9); 6.6–8.9 as long as broad, without setulae or points. Nose of wingsheaths prominent. Lateral

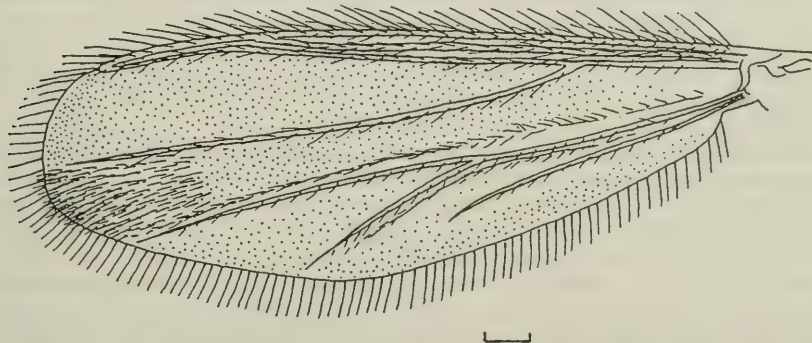


Fig. 2. *Rheotanytarsus rioensis*. Female wing. Scale=0.1 mm.



Fig. 3. *Rheotanytarsus rioensis*. Female genitalia ventral and cercus lateral. Scale = 0.1 mm.

anteprenotal setae about $80\ \mu\text{m}$ long, narrow taeniate; median anteprenotal seta narrow taeniate. Precorneal setae length: $35\text{--}40\ \mu\text{m}$ (setaceous); $75\ \mu\text{m}$ (narrow taeniate); $100\text{--}160\ \mu\text{m}$ (narrow taeniate). Dorsocentral setae bristle-like; lengths $15\text{--}25$; $28\text{--}50$; $15\text{--}18$; $30\text{--}50\ \mu\text{m}$. Suture with a narrow band of granules along margin.

Abdomen (Fig. 4b). Tergites II–VI with a pair of dark brown point patches anteriorly, twice as broad as long on tergite II, progressively reduced and more circular on following segments; point patches small, e.g. little more than 0.1 length of tergite on IV. Tergites III–V covered with minute shagreen points arranged in more or less transverse rows, less extensive on II; on VI and VII this fine armament is progressively reduced posteriorly; tergite VIII with antero-lateral shagreen patches only. 70–89 hooks in hook row of tergite II. Segment VIII with a single posterolateral brown spur. Chaetotaxy:

	I	II	III	IV	V	VI	VII	VIII	IX
dorsal	3	4	5	5	5	5	5	1	0
lateral	0	3	3	3	3	3	3	3	28–36
ventral	2	4	4	4	4	4	4	1	

Larva, length 3.9 mm. Greenish-pink in life, smudged brownish posteriorly. Head brown, mentum and apices of mandibles dark brown.

Antenna (Fig. 5e), segments 80, 23, 7.5, 5, $5\ \mu\text{m}$ long; AR 2.0. Antennal seta on first segment at 0.55–0.7 from base; ring organ at base of first segment; blade about as long as second segment, accessory blade about half as long as blade. Lauterborn organs on segment 2 reaching tip of antenna. Mentum (Fig. 5d) with anterior outline weakly convex; teeth generally very worn (Fig. 5a); median tooth simple, weakly shouldered laterally; the inner four of the five lateral pairs of teeth about equal in size, the outermost much smaller. Ventromental plates (Fig. 5d) about six times as

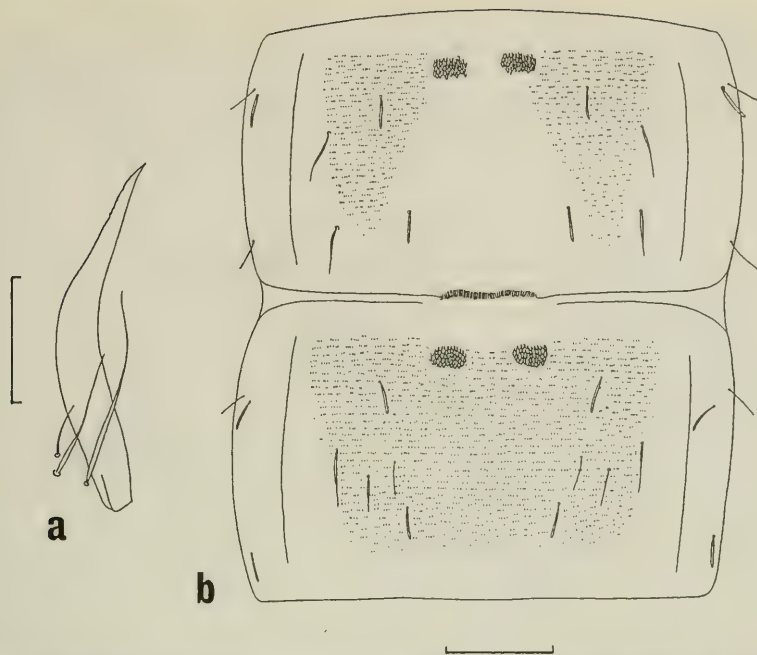


Fig. 4. *Rheotanytarsus rioensis*. Pupa: a. thoracic horn and precorneal setae, b. abdominal segments II and III dorsal. Scale = 0.1 mm.

wide as long, nearly touching medially. Mandibles (Fig. 5b) with outer tooth extending as far as inner apical tooth; three inner teeth. Labrum (Fig. 5c), labral lamella with about 24 teeth, pecten epipharyngis undivided, with about 16 teeth. Maxillary palp as in Fig. 5f.

SYSTEMATIC CONSIDERATIONS

The hypopygium of only one previously described *Rheotanytarsus* species possesses appendage 1a (digitus) in common with *rioensis*: an African species, *ororus* Lehmann (Lehmann, 1979). It is, however, not a member of the *pentapoda*-group, for its styles are not markedly narrowed and bent downwards at their tips. (The generic description and key in Cranston *et al.* (1989) require emendation to include the presence of appendage 1a in some species.) The pupa of *rioensis* is similar to that of *pentapoda* (Langton, 1991), but differs from all previously described *Rheotanytarsus* in the extensive shagreen of many of the abdominal segments, necessitating emendation of the generic description in Pinder & Reiss (1986). Very few females and larvae of this genus have been described; those of *rioensis* show no striking differences to allow separation.

ECOLOGY

Known only from Tenerife, Canary Isles.

Adults were collected from a swarm over an open conduit on 15.xii.1983 in Barranco del Rio at an altitude of 480 m. Subsequent collections at the same place on 14.xii.1985 included adults (males and females) and pupae with associated larvae. The conduit

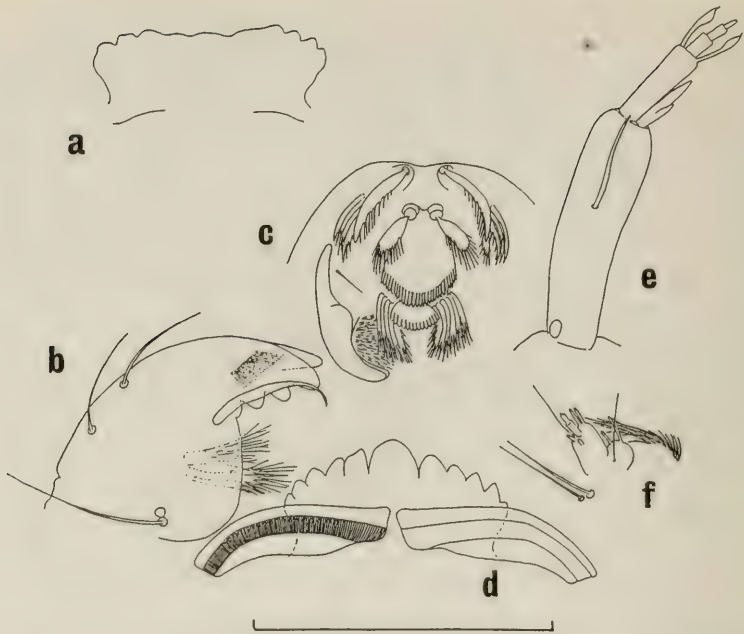


Fig. 5. *Rheotanytarsus rioensis*. Larva: a. characteristically worn mentum, b. mandible, c. labrum, d. mentum and ventromental plates, e. antenna, f. maxillary palp. Scale=0.1 mm.

was rectangular in cross-section, about 0.6 m wide with a water depth of about 0.25 m. The water velocity was between 0.5 and 1.0 m s⁻¹. Algae covered the sides and base of the conduit which had no loose substratum.

Two other species of Chironomidae were also found at the same site: *Paratrichocladius rufiventris* (Meigen) and *Cricotopus vierriensis* Goetghebuer.

Two further records of this species are known from collections made by Malmqvist *et al.* (1993) in riffles in the natural stony bottomed stream in Barranco del Rio at an altitude of 1450 m on 2.xi.1991 and in the stream Ijuana at an altitude of 770 m on 16.iv.1991. The specimens were identified from pupal material.

ACKNOWLEDGEMENTS

We are grateful to Mrs A. M. Matthews for the original drawing of the male genitalia, and to Dr F. Reiss for advice and the loan of the types of *Rheotanytarsus photophilus* and *pentapoda*.

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BOOK REVIEW

Insect conservation biology by M. J. Samways. London, Chapman & Hall, 1994, xvi + 358 pages, hardback, £37.50.—The growing popularity of conservation in western countries has not been matched by a public awareness of the nature and relative scale of the damage that human activities inflict on different forms of wildlife. Vertebrate taxa receive most of the attention, but this book assembles a body of compelling evidence to show that the risk of extinction is greater for insect species, not only because there are immensely more of them, but also by virtue of their often exacting habitat requirements. The first chapter illustrates the evolutionary adaptation of insects to almost every terrestrial ecosystem. The author draws on some interesting data; for example in a survey of Seram rainforest, over half the estimated 43.3 million individual arthropods in one hectare were Collembola, reflecting the importance of habitats in the soil. The very success of insects, which has produced perhaps 10 million extant species, belies the vulnerability of many species which are so closely adapted to geographically restricted biotopes that even a slight change can wipe them out, often to the point of total extinction. In the tropics, both the diversity of species and the threats to them may seem to make British conservation issues pale into insignificance. However, despite our relatively small insect fauna, our ratio of species to land area appears to be surprisingly high by world standards.

The remaining introductory chapters describe the many ways in which insect habitats have been damaged, while also outlining the aims and responsibilities of national and international organizations which seek to ameliorate this loss. A central problem, which has a chapter of its own later in the book, is the fragmentation of biotopes. This is less serious for relatively mobile animals, especially birds, whose requirements often seem uppermost in the minds of those who influence conservation policy. Fragmentation prevents species from re-colonizing suitable sites following chance local extinctions. In the longer term it could also prevent species from keeping pace geographically with climate change or other large-scale events (as many did during past glaciations). When fragmentation and other problems are viewed in the context of tropical ecosystems, current conservation efforts seem inadequate in scale and often inappropriate in emphasis.

The author goes on to examine ways in which conservation could become more effective by taking proper account of insect population ecology. The ability of species to disperse in a fragmented landscape must be understood in order to determine the optimum size and shape of reserves and the value of different types of 'corridor' between otherwise isolated habitats. He stresses the need to think about very small-scale 'micro-sites' within biotopes, which are essential for survival. Studies on single species show that their different developmental stages and sometimes the two sexes have greatly different micro-site requirements. This does not necessarily mean that we must tinker with sites to help favoured species, since a broader-brush management of the landscape can achieve diversity in a way that is compatible with the economic use of the land.

Although there are still places where the protection of natural ecosystems is the main objective of conservation, there are many other parts of the world where the

sympathetic management of agricultural and other 'disturbed' land is important. The author describes systems of 'adversity agriculture' in which populations of vulnerable species can often fall below a 'minimum viable level', leading to local or even total extinctions. This has happened even to former pest species such as the Rocky Mountain grasshopper (*Melanoplus spretus*) in North America. The risk of extinction is lower in 'agroecology' systems, in which areas of natural vegetation can support a high proportion of the local insect fauna while serving as refugia for natural enemies of crop pests. There are, however, no absolute rights and wrongs in agricultural methods. Burning, for example, is very harmful to many species, but others depend on it. Similarly, although biological control is often a 'green' alternative to the use of chemical pesticides, it can be disastrous when the agents released are able to persist and to attack non-target species.

The author looks at the pros and cons of 'restoration ecology' and concludes that it is worthwhile in some cases, as when trees are planted for agroforestry in deforested tropical areas, or when herb-rich grassland is re-established in temperate farmlands. Restoration strategies can be helped by knowing the specific requirements of individual species, but the most vulnerable species are usually less able to recolonize the restored sites than widespread ones with greater tolerance of varied conditions. Some of the vulnerable species get special attention and can be artificially re-established, but the author sees this as a last resort.

The rate at which insect species are being lost worldwide, according to one estimate quoted by the author, could be 19 per hour over the next 30 years. Such figures serve both to stimulate concern about individual species and to emphasize that attempts to save a favoured few cannot address a problem of such proportions. The need is for an 'umbrella' approach which can take account of both small-scale and large-scale elements of the landscape. To the extent that individual species can be helped, there is a need to improve methods of assessing their status; for example by recording the number of habitat sites per 10-km square; not just mapping a dot for the entire square. Attention also needs to be focused on species which are good indicators of diversity and which can be recorded efficiently in site surveys, rather than on taxa which happen to enjoy the most popularity. On a global scale, it is important to identify the regions of 'mega-diversity' and endemism where efforts should be concentrated.

By concentrating on the biology behind conservation, this book helps to identify the most urgent uses to which time and money should be devoted. However, the author admits that such an analysis is not supported by human attitudes towards insects, which often involve taxonomic favouritism or hypocrisy, as exemplified by those who are less aware of their own daily mass slaughter of insects than of the sadism of pulling the wings off a fly. Governments that ignore the wider conservation issues may pass laws to protect species against collecting or trade, but the result is often a high black market price.

The extensive bibliography testifies to the great deal of work that has gone into producing this book. Its emphasis on fundamental issues and on scientific evidence will complement other recent works which have concentrated more on practical conservation. A subject like this is intrinsically hard to divide into distinct sections, but there could perhaps have been less overlap and repetition of ideas. It required a good index, and the one provided here is certainly comprehensive, although it fails to list all the entries for some important topics. The author's commitment to the cause makes this much more than a dry academic treatise, but it will perhaps be more useful to students, research workers and policy makers than to the amateur conservationist.

REPORT OF THE DISCUSSION MEETING HELD ON 12 MAY 1992 TO CONSIDER INVERTEBRATE CONSERVATION IN THE UNITED KINGDOM

STEPHEN R. MILES

At the beginning of this meeting a handout entitled "Invertebrate conservation—major discussion points", produced by the author, was provided to each participant to focus on the major issues within this subject; this is reproduced below. A brief introduction was also given to the meeting, explaining the history and role of the Joint Committee for the Conservation of British Invertebrates, by Helen Smith, its Conservation Officer. An introduction to the Wildlife Link organization was provided by Steve Brooks, the JCCBI representative.

Stephen Miles, BENHS representative to JCCBI, then read out a paper reviewing the existing status of invertebrate conservation in the UK, suggesting a change to the status quo, in that a single invertebrate conservation membership organization should be formed. This paper is also reproduced below.

INVERTEBRATE CONSERVATION—MAJOR DISCUSSION POINTS

1. Do you consider that invertebrate conservation is well served by:
 - a. the Joint Committee for the Conservation of British Invertebrates, (JCCBI) which is mainly a national advisory organization for policy and project formulation;
 - b. governmental organizations, e.g. English Nature, and the Scottish and Welsh successors to the former Nature Conservancy Council and the Joint Nature Conservation Committee (custodians of the Invertebrate Site Register);
 - c. the main non-governmental conservation organizations, e.g. the county wildlife trusts, World Wide Fund for Nature, Woodland Trust, the National Trust and Butterfly Conservation;
 particularly as to how the organizations that have reserves, manage them for insect conservation or promote the well-being of the invertebrates within them?

2. Do we need to worry about the retention of invertebrate habitats and their appropriate management? At each of this society's annual exhibitions, exciting new discoveries of species found in new localities are exhibited each year, despite some reported losses. Even species new to Britain are a regular occurrence.

3. How many county trust nature reserves have been specifically set up to safeguard invertebrate habitats? Is it unrealistic to expect any to be set up just for what is perceived to be the narrow field of invertebrates?

4. As well as the JCCBI, which is only a committee, is there a need for a separate organization specifically set up to campaign for the conservation of invertebrate habitats?

5. Or should the existing entomological societies take on this role through the JCCBI? (As in theory they do at present).

or

Should the JCCBI be somehow reconstituted into a national invertebrate conservation trust?

or

Should it be suggested that Butterfly Conservation broaden its role to take on all insects, or even all invertebrates?

6. How does Butterfly Conservation's mainly anti-collecting stance on Lepidoptera fit in with the necessity to collect voucher specimens of nearly all other groups of invertebrate species, as well as many moths?

7. Do we as entomologists promote our subject and educate others in its complexities sufficiently?

8. Does the JCCBI need to advertise itself more to entomologists and to the general nature conservation community?

9. How can invertebrate conservation be funded in the non-governmental organization sector? Clearly there should at least be one general invertebrate conservation organization to which people can make donations or leave legacies.

10. Would invertebrate conservation benefit from having a demonstration reserve where the special management techniques that ensure that a wide variety of habitat niches are continually available could be readily seen by other natural history organizations?

11. Would the Balfour-Browne Club (the water-beetle organization) defend a site containing rare solitary bees and wasps, or Butterfly Conservation promote the conservation of a site containing no interesting butterflies? In effect with a multiplicity of order- or family-based entomological conservation groups is the advance of invertebrate conservation hindered?

REVIEW OF THE EXISTING STATUS OF INVERTEBRATE CONSERVATION IN THE UK

As one of the two current representatives for this society to the Joint Committee for the Conservation of British Invertebrates I considered that it was about time the society's membership was consulted for their views on the way invertebrate conservation is organized and promoted in this country. Personally I have been somewhat dissatisfied with the extent to which invertebrates and their special habitat needs are considered by the mainstream conservation organizations. The positive publicity which invertebrates other than butterflies receive in the natural history press appears to me to be absolutely minimal. But unlike most other species groups the lack of a specific membership organization representing the promotion of the conservation of all invertebrates seems to be the major omission. Birds have the RSPB, plants have Plantlife. Apart from JCCBI, which is after all only a committee, what do invertebrates have?

To look at the organization of invertebrate conservation I suggest we will need to examine the following points.

Have the existing bodies that work either directly or indirectly to secure and promote the conservation of invertebrate habitats and their appropriate management succeeded in this role?

Could or should the entomological community in the UK and Europe be better organized or focused in our conservation role? Can we afford to be complacent; can we assume that all the niches invertebrates inhabit will always be represented, at least somewhere in Europe.

Existing bodies able to influence invertebrate conservation

The existing bodies in this field in the UK are principally the statutory government bodies: English Nature, Countryside Council for Wales, Scottish Natural Heritage and the Joint Nature Conservation Committee. In the voluntary sector there is the JCCBI itself, the British Entomological and Natural History Society, the Amateur

Entomologists' Society, the Balfour-Browne Club (for water beetles), the British Dragonfly Society, Butterfly Conservation and lastly the Initiative for Scottish Insects. The county trusts network through the Royal Society for Nature Conservation are also relevant as are the National Trust and the World Wide Fund for Nature.

Are these bodies effective? I will comment briefly on their performance and propose some questions worth exploring on some of them.

You have heard about the JCCBI; may I remind you however that it is primarily an advisory and policy group and it is rarely able to do anything to defend specific sites. It does have a very valuable role though as a forum for airing views on legislation and other political issues likely to affect invertebrate conservation. I believe it is not as effective as it could be due inevitably to the fact that it lacks a firm financial foundation and as a consequence is not staffed on a full-time basis. If JCCBI is to continue more effectively in the future how can the funding problem be resolved?

I am not sure that the entomological community fully supports the JCCBI, or that they would feel it necessary to support any other type of organization that might be set up to promote invertebrate conservation. Perhaps entomologists are mainly lone workers, as many people have suggested to me, not feeling the need to co-ordinate their activities in the same way that the ornithologists have in recent years.

If we look at the statutory organizations, as they have only recently been completely reorganized by the government following the dismembering of the former Nature Conservancy Council, it is perhaps too early to say whether they will be as effective as the latter body appeared to be. The present plans to do without an entomologist in the headquarters of Scottish Natural Heritage do not bode well for the future though. To the outsider the old NCC achieved a lot as a unified body; certainly insect conservation appeared to be successfully promoted by some of the BENHS's own distinguished members employed by it. The "Research and Survey in Nature Conservation Series" reviews of different invertebrate groups are useful in synthesizing the requirements for habitat management of the invertebrate fauna. The one-day workshops arranged for staff of other nature conservation organizations to attempt to advise them on how to adopt the special management requirements of invertebrates are examples to us all of the sort of promotion work that needs to be done. I understand these events are being continued in England at least, by one of NCC's successor bodies, English Nature.

The designation of certain SSSI's has been considerably assisted following the receipt of knowledge about sites representing important invertebrate assemblages through the Invertebrate Site Register scheme. However I understand that not all the best sites for invertebrates will be designated SSSI, firstly because in some cases their vegetation features are not correspondingly as good. Secondly it is said to be more difficult to defend SSSI's designated purely on invertebrate interests only. If this is truly the situation is the JCCBI or the entomological community sufficiently well organized and do we hold sufficient data to be able to challenge this? I believe we do not.

The British Butterfly Conservation Society or Butterfly Conservation as it is now known, from its inception nearly 25 years ago, is arguably the most successful non-governmental insect conservation organization in this country. Of course it has obvious advantages; it is dealing with a small species group which are probably the most popular group of insects world-wide. Perhaps its members can be more active in a conservation sense, as they are mostly observers or other types of sympathizers to the cause of butterfly conservation. Thus as non-collectors they do not have to be involved with curation activities or concerned about taxonomic problems, leaving more time for active involvement in butterfly promotion and site management. The acquisition by Butterfly Conservation of its own reserves has also been a significant step forward.

Regarding the county wildlife trusts, how many of their in excess of 2000 reserves are devoted to invertebrate conservation you may ask? Our president writing nearly 20 years ago in an article entitled "Insect conservation and a county trust" (AES Conservation Group Bulletin 4, 1971), summarized the typical position of a county trust then, in this case the Gloucestershire Trust; none of its reserves were specifically devoted to insects. Its primary aim was to acquire at least one example of the major habitat types present in the county. Has this situation improved in the intervening period in better favour of invertebrates throughout the wildlife trusts' network?

The National Trust appears to me to have improved its record on invertebrate habitat management. Provided its management committees and land agents take notice of the entomological advisers to its Biological Survey team, it will be well placed to continue to assist the conservation of the invertebrate habitats in its ownership. Members should note a member of this team sits as an observer at the main JCCBI meetings.

What improvements are needed in invertebrate conservation?

The JCCBI does not appear to campaign for site retention; should it change or must we rely on the hope that the county wildlife trusts will by chance save sites holding important invertebrate assemblages? Could the JCCBI do more? For example should its future remit include advising landowners of nature conservation sites, on how to manage them appropriately for invertebrates? Are we as entomologists organized in such a way as to be able to influence the trusts and government organizations in the procurement of important invertebrate sites? Are these organizations maintaining the appropriate conditions on their existing reserves for the invertebrate inhabitants?

In a speech nearly 2 years ago (28 November 1990) the departing chairman of the Nature Conservancy Council, Sir William Wilkinson, highlighted the gradual decline in interest of SSSIs through lack of adequate management. A paper I have seen suggests that there is a high representation of nationally important invertebrates on National Nature Reserves and SSSIs. Have we voiced our concern that these special sites are managed appropriately for their invertebrate interest? While I have great respect for the abilities of the staff of the government nature conservation organizations, I believe we rely too much on them. Are they too constrained now by a government policy which does seem less than committed to the national series of SSSIs particularly since the break up of the old Nature Conservancy Council? At present, however, I have little confidence in the ability of entomologists as a group, as we are currently organized, outside of the government organizations, to have any influence in safeguarding the well-being of important invertebrate sites.

I believe there is considerable scope for us to have greater influence in the future over these matters provided we are organized in some way under a single umbrella group, but one that is not just a committee. Surely this would command more respect for entomologists if we could actively campaign for site retention and correct management as well. Certainly then we could not only give more support to the Government's invertebrate conservation advisers but also be a more influential force in non-governmental nature conservation. At present JCCBI appears often to just lend its name to other groups' campaigns. Should we in fact become a little more strident?

The setting up of a new organization would be a major undertaking, as the existing entomological societies often find it difficult to fill their functional voluntary positions. Reorganization of the JCCBI is probably the best option. Additionally in either case there would be major problems with funding. It is also important here, to make the

observation that if any of us wished to leave some wealth or land specifically to the invertebrate conservation cause, apart from butterflies, there is no organization to which such resources could be left in our wills. This should change.

There is one further important point I would like to make and that is that there is a growing anti-collecting sentiment in the wider world and perhaps particularly within Butterfly Conservation, RSPB, and in Europe in Germany influenced by extreme "Green" politics. There is a danger here, I believe, in that those groups who look down on the formation of natural history collections and even despite the modest insect collector are going to be seen as making all the running in invertebrate conservation initiatives. Entomologists or the main entomological organizations that fully acknowledge the need for specimen collection do need to become more involved in invertebrate habitat conservation.

It should also be borne in mind that it is more politically expedient to prohibit collecting and thus the collector than to act to save invertebrate habitats. And the collector is of course the main person able to feed back information about species declines.

Conclusion

The platform of success of the Amateur Entomological Society's recent habitat conservation book (Fry, R. & Lonsdale, D., 1991, *Habitat conservation for insects—a neglected green issue*), and of the Royal Entomological Society's 15th symposium publication *The conservation of insects and their habitats* (Collins, N. M. & Thomas, J. A., eds) are the flagships on which an invertebrate conservation organization could go forward. These publications plus the invertebrate and insect "red data books" and the NCC's invertebrate species reviews reveal that we have a large amount of knowledge to make a start in seeking a higher profile for invertebrates and their habitats; it is time we invested more effort in such activities.

Our insect survey expertise can form the basis for the designation of SSSIs as in the recent case of Richmond Park being named in the press as one of the most important UK sites for beetles. Although the species survey is essential and one of the foundations of our interest I believe we need to combine it with more efforts in the public relations and political lobbying aspects of entomology which most of us appear to avoid. Perhaps there is an obvious reason for our lethargy which I am too naive to see, but if we don't take command of the situation it will be manipulated by others to the detriment of entomology.

In a paper given to the 3rd European Congress of Entomology in 1986 (Velthuis, H. W., ed.), the dipterist Martin Speight said, "the one group within Europe's population that might be expected to be promoting conservation of Europe's entomofauna is the entomologists. But do entomologists promote insect conservation?" he asked. It seems he was convinced they did not. For his next statements were to this effect.

"Among amateur entomologists in particular there is a tendency to use insects as an escape from the trials and tribulations of normal human existence, to practice as it were, zen through the art of entomology".

Although Martin's comments are perhaps slightly off-putting and extreme I think he is making an important point. He went on to say "if entomologists are *not* prepared to put time and effort into the promotion of insect conservation, they can hardly expect other people to do so".

Finally for those entomologists who are not already aware of it they should know that nature conservation was pioneered in this country by an insect collector, Charles Rothschild. He founded the Society for the Promotion of Nature Reserves in 1912, the forerunner of the Royal Society for Nature Conservation. It is ironic isn't it that

80 years later, of the major natural groups, invertebrate conservation could be said to be the least financially supported and organized in this country in a unified sense. However perhaps this discussion meeting will re-assure me that all is well and that I am being pessimistic—as usual, as Council would say.

DISCUSSION SESSION

Despite the range of points provided in the handout and in the preliminary papers, the meeting appeared to settle down to the consideration of seven major topics. These were: habitats; the county wildlife trusts and their reserves; the multiplicity of different entomological groups; the Joint Committee for the Conservation of British Invertebrates (JCCBI); Government agencies, SSSIs and information collection; SSSIs; and, finally, collecting.

Habitats

FRANCES MURPHY said achievement of balance in invertebrate conservation is difficult; the management of one group of invertebrates may be to the detriment of others. Habitat conservation is better than purely caring for individual species, thereby political lobbying for the retention of these habitats is essential.

STUART BALL indicated that in entomology there was still much work to be done on finding out where species occur. This was the great value of the Invertebrate Site Register scheme as information fed to the scheme, such as where the best invertebrate assemblages occurred, led to its use in assisting site management plans. He also felt that a single invertebrate conservation group promoting invertebrate habitats for conservation would not be effective. It was a far better approach to base reserves on habitat types and manage them to maintain the broad assemblage associated with that habitat. In future, he thought, emphasis should be placed on habitats not well represented in existing reserves.

The county wildlife trusts and their reserves

A disparate collection of views was expressed regarding invertebrate conservation and the county wildlife trusts as follows.

IAN FERGUSON cited the observation that most interesting insect species invariably seem to occur outside reserves.

MARTIN DRAKE mentioned that county wildlife trusts tend to purchase reserves of SSSI quality, often because they desired representative types of each major habitat type present in their county.

ROGER MORRIS stated that entomologists need to be on the boards of management of their local wildlife trusts and trust reserves to influence and advise in favour of sympathetic management for invertebrates.

DAVID LONSDALE mentioned that local entomologists are often active within their local wildlife trust but central groups, like JCCBI, don't hear of their activities, perhaps this represents a lack of coordination between entomologists.

Multiplicity of different entomological groups

Knowledge of what occurs on any one site needs to be shared.

STEVE BROOKS maintained that the British Dragonfly Society believe that they are good at achieving this and able to influence conservation landowners in the process,

despite being a small organization themselves. He felt that mass membership is not desirable within organizations as it can dilute the knowledgeable members and reduce influence. In this context he did not believe that Butterfly Conservation would become the main organizer of invertebrate conservation in the UK, because of their lack of specialists in the other orders.

STUART BALL felt that small active organizations like the Balfour-Browne Club were very effective.

STEPHEN MILES had asked during his address "Should there be a unified invertebrate group to promote invertebrate conservation?" If so he felt it must not duplicate what others were already doing. This approach was not felt by the conservation professionals from English Nature and the Joint Nature Conservation Committee, present at the meeting, to be likely to be effective. It was maintained that a "mega" invertebrate society would still not stop loss of sites. There are three general entomological societies in the UK. It was felt that there was no need for any others.

A major concern of the meeting was that Butterfly Conservation could take over as the main conservation organization for invertebrates, as it is keen to take on a wider role. The meeting felt that Butterfly Conservation would not be able to take on this responsibility. However the general opinion was that it might set the agenda for the issue of insect collecting. Butterfly Conservation is viewed as a large society of non-specialists, as is the RSPB, however that organization is also very successful.

The need for special interest groups organized by taxon was therefore justified as they can work with other larger groups, like the RSPB, and influence them. This should be the way forward.

JOHN MUGGLETON felt that more interest in the conservation of invertebrate assemblages needs to be shown by other entomological societies. Furthermore a specific society dedicated to promoting reserves for insect/invertebrate conservation alone might lead to more appropriate management for insects rather than other things.

Joint Committee for the Conservation of British Invertebrates (JCCBI)

The view of some at the meeting was that this committee should promote itself and its products more, as it was not well-known. For instance many people had not heard of the "code for insect collecting" or the "code for insect re-establishment", both produced by the committee. However JCCBI's limitations in not being a society were a problem, it could not publish its own activities without its own funds. It was pointed out that it was up to individual societies who finance some of JCCBI's activities to publish the details of the committee's activities. But it was also recognized that most societies normally want to promote their own activities, not those of a third party, especially if promotion costs money.

DAVID LONSDALE said that the AES Conservation Committee feeds ideas to JCCBI. It had promoted various ideas in attempts to raise funding for the JCCBI because he considered that JCCBI should have a full-time conservation officer. He also recognized that JCCBI needed to move forward from discussion to action.

To be effective JCCBI needs to be able to act quickly, much more so than at present; its purpose, it was considered, should be to influence and educate people in the merits of invertebrate conservation. But it could not concern itself with sites or it would very quickly be bogged down in paperwork.

Government agencies, SSSIs and information collection

IAN FERGUSON perceived that invertebrates were well down the list of priorities for these agencies. They act to announce SSSIs but the designation is then perceived as being ignored by the government. Countryside legislation is seen as excellent but can so often be overruled, even against the government's own expert advisers, the countryside agencies, English Nature etc.

Others felt that organizations like English Nature were "tied by the leg", unable to tell a landowner what to do positively. These organizations have limited budgets, their staff are not necessarily expert on every order, they need information to be channelled to them efficiently by entomologists through the wildlife trusts and local and national recording schemes.

ROGER MORRIS said there was a perception that many entomologists were not keen on sending information in to these organizations because they saw this whole process as a chore. What was the role of entomologists, were they collectors or surveyor/consultants? Were they interested in the wider issues of legislation and conservation?

PETER CHANDLER confirmed that he just wanted special sites to be still extant, not lost to development or other threats.

SSSIs

Some members felt these should be based more on invertebrate assemblages rather than as traditionally they are perceived, just on plant communities.

In relation to landowners the SSSI system appeared coercive but "environmental sensitive areas" were seen more positively as co-operative systems. However the problem still remains that SSSI designations are largely ignored by government when it suits them. Habitat management of SSSIs was seen as a priority. Overall the SSSI system is seen very positively with many sites being successfully defended at public enquiries but MARTIN DRAKE inferred that one weakness was that designations cannot enforce appropriate management, they can only ban specified harmful practices.

Collecting

Butterfly Conservation was perceived as having an anti-collecting attitude, which may be its worst attribute in the eyes of other entomologists. Collecting was seen as not absolutely necessary for butterflies but essential for the learning process of correct identification for all other groups. The case for collecting needs to be strongly and favourably stated by all entomologists, the meeting decided.

Conclusions

Habitat management and conservation of broad assemblages of invertebrates, birds, animals and plants was seen as the focus, a holistic approach; it being considered as a trap for the unwary to concentrate on management just for a few single species of invertebrates. Specialist interest groups based on taxon were still desirable; overall the meeting appeared to conclude that there was no need for a single dominant invertebrate conservation group.

The British Entomological and Natural History Society was identified as having a future additional role: to promote invertebrate conservation more, perhaps through including more articles on this topic in its journal.

EDITORIAL

HOUSE STYLE 5: COUNTY NAMES IN RECORDS

Accurate presentation of records is of vital importance, and details of locality are arguably the most vital. The overriding consideration must be whether or not someone reading of an insect's discovery can identify the locality. This is not so that collectors can rush off to the same place to make further captures, but to aid distribution and recording schemes which may take place years into the future.

A grid reference is the nearest we can get to pin-pointing the exact spot, but rows and rows of grid reference numbers make poor reading, and offer little insight into patterns of distribution. The traditional compromise has always been: (i) the locality (be this a named wood, hill, river, lake etc); (ii) the nearest village, town, city or district, and (iii) the county or vice-county.

Localities, villages and towns rarely change their names, though many appear more than once across the country. Access to a gazetteer will clear up many misunderstandings before they occur. Counties on the other hand have proved troublesome, particularly their borders. With the interest in county lists, promulgated particularly since the Victoria county histories, has also come the confusion created by boundary changes, the creation and the abolition of various administrative areas. With the possible dissolution of Avon and Humberside and the restructuring of Yorkshire into a form resembling its former Ridings, more confusion looks on its way.

The vice-county system

In an attempt to overcome some of this confusion and standardize recording, the British vice-county system created by Watson (1852) was formalized in Dandy (1969). Vice-counties for Ireland, H1 to H40, were created by Praeger (1896, 1901) and Ragge (1965) gives a list of these together with an explanation of the subsequent changes used by recent Irish biogeographers. A complete list of British and Irish vice-counties is given in several publications, notably Druce (1932) and appears at irregular intervals in *Watsonia*, the journal of the Botanical Society of the British Isles.

The 'Watsonian' system remains well known and moderately well understood and forms the basis for much biological recording. However, individual entomologists do still go their own ways; among recent 'county' lists some stick rigidly to vice-county boundaries (e.g. Duff, 1993) while others have overridden these artificial frontiers by creating other equally artificial perimeters (e.g. Plant, 1993).

In putting forward records in the journal, the vice-county scheme would seem to be the best, but it is impossible to lay down the law about how individuals record their finds. The following list of abbreviations, expanded and revised from the list given by Buck (1959), is supplied in the interests of conserving space on the printed page. Watsonian vice-counties, together with modern and old administrative areas are listed. As will be quite clear from Dandy's (1969) maps and accompanying text, the strict vice-county boundaries are sometimes significantly different from modern-day 'equivalents'.

Sometimes, the terminology of modern equivalents can seriously upset understanding of the original vice-counties. South of the River Thames, 'London' is divided between West Kent (VC16) and Surrey (VC17). According to Dandy (1969) West Kent includes 'the south-eastern part' of London and Surrey 'the south-western part'. But the modern London postcodes 'SE' and 'SW' do NOT correspond. Nunhead Cemetery, London SE15 is actually south-western in the Watsonian sense and hence in 'Surrey'. For many border localities, examination of old Ordnance Survey maps may be necessary.

Capitalization of cardinal points

The cardinal points, north, south, east and west, and their various combinations, do not ordinarily take capital letters when spelled out in full. Thus: the north part of the wood, the northern slope of the downs, the north-easterly direction of the wind. However, if part of a place name, a capital letter is required, thus: West End, East Sussex, North America, West Devon but [the] south [of] Devon, South Coast (of England) but south coast of Ireland (and elsewhere).

Punctuation of abbreviations

In the following list, Salop and Hants (and by analogy Northants) are not followed by a full stop because they are not abbreviations, but are older names for their respective counties. Middx is not followed by a full stop because it is a contraction rather than an abbreviation.

RICHARD A. JONES

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List of county name abbreviations

Where it is not desired to spell the names of counties in full, the following abbreviations should be used. Watsonian vice-counties (VCs) may differ significantly from modern administrative boundaries. Reference to Dandy (1969) is advised.

Note: many counties take their names from county towns, the names of which should not be abbreviated. Thus Aberdeenshire may be abbreviated to Aber., but Aberdeen (the city) should always be spelled in full. Confusion is also possible because the corresponding Watsonian vice-county names are South and North 'Aberdeen', not South and North Aberdeenshire. In the following list, vice-county numbers are given and the Watsonian vice-county names when these are necessary.

Aberdeenshire	Aber.	[VCs 92, S. Aber. and 93, N. Aber.]
Anglesey	Angl.	[VC 52, (East Anglia should be abbreviated to E. Anglia)]
Argyllshire	Argyll.	[Most of the mainland is VC 98, Main Argyll, others are VC 101, Kintyre, VC 102, S. Ebudes, VC 100, Clyde Is. of Bute and Arran]
Armagh	Arm.	[VC H37]
Ayrshire	Ayr.	[VC 75]
Angus	Angus	[also known as Forfar, VC 90]
Antrim	Antrim	[VC H39]
Avon	Avon	[a modern administrative area]

Banffshire	Banff.	[VC 94]
Bedfordshire	Beds.	[VC 30]
Berkshire	Berks.	[VC 22]
Berwickshire	Berw.	[VC 81]
Borders	Borders	[modern administrative region of south-east Scotland comprising several former counties]
Brecknockshire	Breck.	[alternative name for Breconshire, not to be confused with Breckland, the Breck of East Anglia]
Breconshire	Brecon.	[VC 42]
Buckinghamshire	Bucks.	[VC 24]
Buteshire	Bute.	[part of VC 100, Clyde Is.]
Caernarvonshire	Caer.	[mainland part is VC 49, Caernarvon, Anglesey is VC 52]
Caithness	Caith.	[VC 109]
Cambridgeshire	Cambs.	[VC 29]
Cardiganshire	Card.	[VC 46]
Carlow	Carlow	[VC H13]
Carmarthenshire	Carm.	[VC 44]
Cavan	Cavan	[VC H30]
Central	Central	[modern administrative area comprising several former counties]
Channel Islands	Chan. Is.	[although technically part of the British Isles, sufficiently foreign to warrant separate status]
Cheshire	Ches.	[VC 58]
Cheviotland	Chev.	[VC 68, the northern part of Northumberland]
Clackmannan	Clack.	
Clare	Clare	[VC H9, includes Aran Isles]
Cleveland	Cleve.	
Clwyd	Clwyd	[modern administrative county of Wales, comprising several former counties]
Clyde Isles	Clyde Is.	[VC 100, comprising Bute, Arran and other islands of Argyllshire]
Cork	Cork	[VCs H3, W. Cork, H4, Mid Cork and H5, E. Cork]
Cornwall	Corn.	[VCs 1, W. Corn. and 2, E. Corn.]
Cumberland	Cumber.	[VC 70]
Cumbria	Cumbria	[modern administrative county]
Denbighshire	Denb.	[VC 50]
Derbyshire	Derbys.	[VC 57]
Derry	Derry	[VC H40]
Devon(shire)	Devon	[VCs 3, S. Devon and 4, N. Devon]
Donegal	Don.	[VCs H34, E. Don. and H35, W. Don.]
Dorset	Dorset	[VC 9]
Down	Down	[VC H38]
Dublin	Dublin	[VC H21]
Dumfriess & Galloway	Dumf. & Gall.	[modern administrative area comprising several former counties]
Dumfriesshire	Dumf.	[VC 72]
Dunbartonshire	Dunb.	[VC 99, Dunbarton, not to be confused with Dumbarton the county town]
Durham	Dur.	[VC 66, to distinguish city from county, use Co. Dur. if necessary]
Dyfed	Dyfed	[modern administrative county]

East Anglia	E. Anglia	[combination of several VCs]
East Lothian	E. Loth.	[also known as Haddingtonshire, VC 82]
Easternness	Easternness	[VC 96, the north-east part of Inverness-shire]
Ebudes	Ebudes	[various isles of Argyllshire and Inverness-shire, VCs 102, S. Ebudes, 103 Mid Ebudes, 104, N. Ebudes]
Edinburghshire	Edin.	[VC 83, also known as Midlothian]
Elgin(shire)	Elgin.	[VC 95, also known as Morayshire]
Essex	Essex	[VCs 18, S. Essex, 19, N. Essex]
Fermanagh	Ferm.	[VC H33]
Fife(shire)	Fife	[VC 85, includes Kinross-shire]
Flintshire	Flint.	[VC 51]
Forfarshire	Forf.	[VC 90, also known as Angus]
Galway	Gal.	[VCs H15, S. E. Gal., H16, W. Gal. and H17, N. E. Gal.]
Glamorgan(shire)	Glam.	[VC 41]
Gloucestershire	Glos.	[VCs 33, E. Glos. and 34, W. Glos.]
Grampian	Gramp.	[modern administrative area comprising several former counties]
Greater London	Gt. Lond.	[modern administrative area comprising parts of several former counties]
Greater Manchester	Gt. Manc.	[modern administrative area]
Gwent	Gwent	[modern administrative county]
Haddingtonshire	Hadd.	[VC 82, also known as E. Lothian]
Hampshire	Hants	[VCs 11, S. Hants and 12, N. Hants; VC 10 is Isle of Wight]
Hebrides	Hebr.	[Outer Hebrides are VC 110]
Hereford & Worcester	Heref. & Worcs.	[modern administrative area]
Herefordshire	Heref.	[VC 36]
Hertfordshire	Herts.	[VC 20]
Highland	Highland	[modern administrative region of Scotland comprising several former counties, not to be confused with 'the Highlands', a more general term]
Humberside	Humb.	[modern administrative region]
Huntingdonshire	Hunts.	[VC 31]
Inverness-shire	Inv.	[VCs 96 Easternness, 97 Westernness]
Isle of Man	I.o.M.	[VC 71]
Isle of Wight	I.o.W.	[VC 10]
Isles of Scilly	I.o.S.	[also known as the Scilly Isles; part of VC1, W. Corn.]
Kent	Kent	[VCs 15, E. Kent, 16, W. Kent]
Kerry	Kerry	[VCs H1, S. Kerry and H2, N. Kerry]
Kildare	Kild.	[VC H19]
Kilkenny	Kilk.	[VC H11]
Kincardine(shire)	Kinc.	[VC 91]
King's County	King's Co.	[former name for Offaly, VC H18]
Kinross	Kinr.	[part of VC 85, Fife]

Kintyre	Kintyre	[VC 101, part of Argyllshire]
Kirkcudbrightshire	Kirk.	[VC 73]
Lanarkshire	Lan.	[VC 77]
Lancashire	Lancs.	[VCs 59, S. Lancs., 60 W. Lancs.]
Laois	Laois	[VC H14]
Leicestershire	Leics.	[VC 55, includes Rutland]
Leitrim	Leit.	[VC H29]
Leix	Leix	[former name for Laois, VC H14]
Limerick	Lim.	[VC H8]
Lincolnshire	Lincs.	[VCs 53, S. Lincs., 54, N. Lincs.]
Linlithgowshire	Linlith.	[VC 84, Linlithgow, also known as West Lothian]
Londonderry	Lon.	[alternative for VC H40, Derry]
Longford	Longf.	[VC H24]
Lothian	Loth.	
Louth	Louth	[VC H31]
Main Argyll	Main Argyll	[VC 98]
Mayo	Mayo	[VCs H26, E. Mayo and H27, W. Mayo]
Meath	Meath	[VC H22]
Merionethshire	Merion.	[VC 48]
Merseyside	Mersey.	[modern administrative region]
Middlesex	Middx	[VC 21]
Midlothian	Midloth.	[also known as Edinburghshire, VC 83]
Monaghan	Monag.	[VC H32]
Monmouthshire	Mon.	[VC 35]
Montgomeryshire	Montg.	[VC 47]
Morayshire	Moray.	[also known as Elginshire, VC 95]
Nairnshire	Nairn.	[part of VC 96, Easternness]
Norfolk	Norf.	[VCs 27, E. Norf., 28, W. Norf.]
Northamptonshire	Northants	[VC 32]
Nottinghamshire	Notts.	[VC 56]
Northumberland	Northumber.	[VCs 67, Northumber. S., 68 Cheviotland]
Northumbria	Northumbria	
Offaly	Offaly	[VC H18]
Orkney Isles	Ork. Is.	[VC 111]
Outer Hebrides	Out. Hebr.	[VC 110]
Oxfordshire	Oxon.	[VC 23]
Peebleshire	Peeb.	[VC 78]
Perthshire	Perth.	[VCs 87, W. Perth, 88, Mid Perth, 89, East Perth]
Pembrokeshire	Pemb.	[VC 45]
Powys	Powys	[modern administrative county]
Queen's County	Queen's Co.	[former name for Laois, VC H14]

Radnorshire	Rad.	[VC 43]
Renfrewshire	Renf.	[VC 76]
Roscommon	Rosc.	[VC H25]
Ross & Cromarty	R. & Crom.	[VCs 105, W. Ross, 106, E. Ross]
Roxburgh(shire)	Rox.	[VC 80]
Rutland	Rut.	[part of VC 55, Leics.]
Selkirk(shire)	Selk.	[VC 79]
Shetland Isles	Shet. Is.	[also known as Zetland, VC 112]
Shropshire	Salop	[VC 40]
Sligo	Sligo	[VC H28]
Somerset	Som.	[VCs 5, S. Som, 6, N. Som.]
Staffordshire	Staffs.	[VC 39]
Stirling(shire)	Stirl.	[VC 86]
Strathclyde	Strath.	[modern administrative region]
Suffolk	Suff.	[VCs 25, E. Suff., 26, W. Suff.]
Surrey	Surrey	[VC 17]
Sussex	Sussex	[VCs 13, W. Sussex, 14, E. Sussex]
Sutherland	Suther.	[VCs 107, E. Suther., 108, W. Suther.]
Tayside	Tay.	[modern administrative region]
Tipperary	Tip.	[VCs H7, S. Tip. and H10, N. Tip.]
Tyne & Wear	Tyne & Wear	[modern administrative region]
Tyrone	Tyr.	[VC H36]
Warwickshire	War.	[VC 38]
Waterford	Wat.	[VC H6]
Westerness	Westerness	[VC 97, north-east part of Inverness-shire]
Western Isles	Western Is.	[modern administrative region]
West Lothian	W. Loth.	[also known as Linlithgowshire, VC 84]
West Midlands	W. Midl.	[modern administrative county]
Westmeath	Westmeath	[VC H23]
Westmorland	Westmor.	[VC 69]
Wexford	Wex.	[VC H12]
Wicklow	Wick.	[VC H20]
Wigtownshire	Wig.	[VC 74]
Wiltshire	Wilts.	[VCs 7, N. Wilts., 8, S. Wilts.]
Worcestershire	Worcs.	[VC 37]
Yorkshire	Yorks.	[VCs 61, S.-E. Yorks., 62, N.-E. Yorks., 63, S.-W. Yorks., 64, Mid-W. Yorks., 65, N.-W. Yorks.]
Zetland	Zetl.	[VC 112, also known as Shetland Isles]

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ANNOUNCEMENT

Bedfordshire butterflies and moths—I am taking part in an historical review of Bedfordshire Lepidoptera since the beginning of the century when the Victoria County History was published and have been looking for early records. Recently I was very pleased to find a few specimens taken by W. G. Nash who collected in the early part of this century. His collection was sold in the 1930s and some of it came into the BENHS collections and thence to members as “duplicates”. I would be most interested to hear from anyone who has any of his specimens or indeed any others from Bedfordshire in their collection. Charles Baker, 3 Holywell Close, Studham, Dunstable, Beds., LU6 2PB.

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY
VOLUME 8, PART 1, JANUARY 1995

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- 7 A further study of the behavioural patterns of six species of British butterfly whilst *in copula*. S. A. KNILL-JONES
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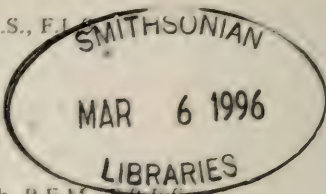
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Cover illustration: The elephant hawkmoth, *Deilephila elpenor* (L.). Photo: Robin Williams.

NOTE: The Editor invites submission of photographs for black and white reproduction on the front covers of the journal. The subject matter is open, with an emphasis on aesthetic value rather than scientific novelty. Submissions can be in the form of colour or black and white prints or colour transparencies.

BRITISH SPECIES OF *METOPIA* (DIPTERA: SARCOPHAGIDAE) WITH TWO SPECIES NEW TO BRITAIN

NIGEL P. WYATT

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AND STEVEN J. FALK

Herbert Art Gallery and Museum, Jordan Well, Coventry CV1 5QP.

The flesh-flies (family Sarcophagidae) are medium sized to large silvery or yellowish-grey pollinose flies, usually with tessellate, spotted or banded patterns on the abdomen. The world fauna consists of approximately 2500 species, of which 56 were included in the most recently published checklist of the British fauna (Kloet & Hincks, 1976); however this total has now increased to 59 following subsequent additions and amendments (Rognes, 1986; Pape, 1987; Wyatt & Sterling, 1988; Wyatt, 1991). Four subfamilies are recognized by Verves (1986) of which two, the Sarcophaginae and Paramacronychiinae, have mainly necrophagous or parasitic larvae (either with invertebrate hosts or acting as agents of myiasis in mammals), while the other two, Macronychiinae and Miltogrammatinae, are mainly cleptoparasites with their larvae developing within the nests of aculeate Hymenoptera.

Sarcophagids are represented by a substantially larger number of species in Continental Europe than in the British Isles: for example, Pape (1987) gives accounts of 30 species of Miltogrammatinae recorded in Fennoscandia and Denmark, while only nine are known from Britain (Kloet & Hincks, 1976) including only two species of *Metopia*: *M. campestris* (Fallén) and *M. argyrocephala* (Meigen). Here we record a further two species of *Metopia*, *M. staegerii* (Rondani) and *M. grandii* Venturi, both of which are widely distributed in the western Palaearctic and eastwards, and we provide a key for their identification.

There is a key to British Sarcophagidae (Emden, 1954—as a subfamily of Calliphoridae), but this now requires updating. Some species may be more easily identified by using more recently published keys to the western Palaearctic fauna, such as that by Pape (1987) which includes most of the British species including all of the Miltogrammatinae, and provides illustrations of the diagnostic characters for species of *Metopia*. Verves (1986) regards *staegerii* as a junior synonym of *argentata* Macquart, the latter being an older name, which may therefore be preferred in future publications.

KEY TO BRITISH SPECIES OF *METOPIA*

1. Middle tibia with 1 av seta. Male: fore tarsus with very long posterior hairs, the longest up to 4 times the width of the tarsus itself; frons with broad dark frontal vitta approximately 3.3 times as broad as fronto-orbital plates, thus lacking an extensively silver frons *M. campestris* (Fallén)
Recorded from nests of Pompilidae, Vespidae and Sphecidae. England, Wales, Scotland (north to Sutherland), Ireland, generally distributed.
—Middle tibia without av seta. Male: fore tarsus without or with only short hairs on posterior surface 2
2. Abdomen: syntergite 1 + 2 lacking median marginal setae. Male: dark frontal vitta 3.5 times as broad as fronto-orbital plates, thus lacking an extensively silver frons *M. grandii* Venturi
Hosts unknown. Southern England and Wales, northwards to Glamorgan, Worcestershire and Norfolk.

- Abdomen: syntergite 1 + 2 usually with a pair of median marginal setae, but these occasionally weak or absent. Male with broad contiguous, fronto-orbital plates, obliterating the median vitta, thus frons extensively silver (females of following species presently inseparable) 3
3. Male: fore tarsus with long curled hairs on posterior surface, the longest 1.5 times the width of the tarsus *M. staegerii* (Rondani)
Hosts unknown. Fairly widespread but local, England: Devon, Suffolk, Norfolk, Oxon; Scotland: Forfar, Moray.
- Male: fore tarsus without long hairs on posterior surface
..... *M. argyrocephala* (Meigen)
Recorded from nests of Vespidae, Sphecidae and Apidae. England, Wales, Scotland (to Moray Firth), generally distributed.

M. argyrocephala and *M. campestris* remain the two most frequently encountered British species, with a wide distribution encompassing both inland and coastal areas. These two *Metopia* species are cleptoparasites of various aculeates; Pape (1987) cites that both *M. argyrocephala* and *M. campestris* are recorded from a variety of ground-nesting aculeate species, especially sphecids, but also a few vespids, apids and pompilids. There are no published biological data available yet for *M. staegerii* or *M. grandii*, but it is likely that their biology is similar, but perhaps with differences in the range of host species, or in the preferred location of the host nest.

METOPIA STAAGERII RONDANI, 1859

This species is predominantly recorded from coastal dunes, but it has also been taken at inland sites with sandy soil in Oxfordshire and Suffolk. At Winterton Dunes in east Norfolk males were observed to be especially common basking on birch shrubs on mid dune while others were on hind dune areas together with *M. argyrocephala*, and at Elvedon Holiday Village in the west Suffolk Breck a solitary male was collected with a series of *M. argyrocephala* on chalk heath with scrub and conifer plantations.

Females of *M. staegerii* cannot be separated from those of *M. argyrocephala*. All current British records are based on males.

Material examined and other records (BMNH: The Natural History Museum, London; OUM: Hope Entomological Collections, Oxford University Museum). S. Devon: Dawlish Warren (SX9676), two males, 29.vi.1957 and 26.vii.1962, G. M. Spooner (BMNH). N. Devon: Maiden Down (ST0716), two males, 9–16.vii.1949, E. C. M. d'Assis Fonseca; 9.vii.1949, J. Cowley (BMNH); Braunton Burrows (SS4534), 21.vi.1987, S. J. Falk. Oxon: Shotover (SP5606), 6.viii.1903, A. H. Hamm (OUM). W. Suffolk: Elvedon Holiday Village (TL8080), one male, 23.vii.1994, S. J. Falk. E. Norfolk: Winterton Dunes (TG4920), 7.vii.1993, S. J. Falk. England: one male, no locality or date, A. Piffard (BMNH). Forfar: Monifieth (NO4932), 6.vi.1915, 24.vi.1917, A. E. J. Carter (OUM). Moray: Culbin Sands (NH9862), 14.vi.1984, J. H. Cole (pers. comm.). Also occurs widely elsewhere in the western Palaearctic east to the Altai Mountains.

METOPIA GRANDII VENTURI, 1952

This species has been recorded mainly from inland sites. At Sot's hole in Staffordshire a male was found resting on oak foliage beside a sandy bank, whereas another male collected at Woodbastwick Fen in East Norfolk was found on bramble foliage in an area of damp woodland and fen with little light soil in the vicinity.

Material examined and other records. S. Devon: River Tamar, one male, 10.vii.1949, E. C. M. d'Assis Fonseca (BMNH). Somerset: Dunster (SS9943), one male, 24.v.1953, E. C. M. d'Assis Fonseca (BMNH). W. Kent: Woolwich Wood, one male, 30.vii.1953, E. C. M. d'Assis Fonseca (BMNH). E. Norfolk: Woodbastwick Fen (TG3316), 5.vii.1993, S. J. Falk. Herefordshire: Stoke Wood (SO53), one male, 24.vii.1902, J. H. Wood (BMNH). Worcestershire: Wyre Forest, one male, 3.vi.1934, C. J. Wainwright (BMNH). Staffordshire: Sot's Hole, West Bromwich (SP0192), one male, 8.viii.1986, M. Bloxham. S. Glamorgan: Kenfig Hill, one male, 5.vi.1903 (SS7981), Col. J. W. Yerbury (BMNH). Also occurs widely elsewhere in the Palaearctic region, from western Europe to Japan.

The authors recommend that all British records of *Metopia* species are reappraised.

ACKNOWLEDGEMENTS

Thanks are due to John Ismay and Jonathan Cole for providing extra records of *M. staegerii*, and to Mike Bloxham for the extra record of *M. grandii*.

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BOOK REVIEW

Die Schmetterlinge Österreichs (Lepidoptera). Systematisches Verzeichnis mit Verbreitungsangaben für die einzelnen Bundesländer, by P. Huemer & G. Tarmann. Tiroler Landesmuseum Ferdinandeum, Innsbruck, 1993, 224 pages, Price ÖSch 200, (about £12).—Although Austria is some distance across Europe from Britain, this nicely-produced list of the Lepidoptera of that country will be of great interest to British lepidopterists, for several reasons.

Following some introductory remarks, a list of superfamilies, families and subfamilies is given, with the number of Austrian representatives in each category: this makes a useful and readily accessible comparison with our own fauna. For example, the list gives 207 Austrian Coleophoridae, 45 Sesiidae, 310 Pyraloidea, 25 Hesperioidea, 187 Papilionoidea, 463 Geometridae and 582 Noctuidae in a total lepidopterous fauna of nearly 4000 species. The sequence of superfamilies, which

reflects the result of recent research, may come as a surprise to some of us: for instance, Cossoidea, Sesioidea, Zygaenoidea and Choreutoidea are placed just before the Tortricoidea; Urodoidea, Schreckensteinoidea, Epermenioidea, Alucitoidea, Pterophoroidea and Copromorpoidea are placed between Tortricoidea and Pyraloidea; and the Lasiocampoidea and Bombycoidea (which includes Sphingidae) come before the butterflies.

The main list is attractively presented and easy to read, but all taxonomic categories are in italics. Reference back to the introductory list, in which Roman characters are usefully employed, suggests this may have been inadvertent. The species are numbered, giving a total of 3963 species, and a table to the right of the species list indicates records of each species in the 10 Austrian provinces (*Länder*)—an extremely interesting bonus. The sequence of species in some families may be unfamiliar and, although in line with some recent studies, is still controversial and unlikely to be the last word. There appears to be general agreement at present that the most satisfactory arrangement of Noctuidae commences with Herminiinae and concludes with *Agrotis*, and Huemer and Tarmann adhere to the sequence proposed by Fibiger & Hacker (1990). Another change which is adopted here is in the pyrales, in which a sound overview remains a problem. The Pyraloidea are composed of two taxa accorded full family ranking: Pyralidae comprising Galleriinae, Pyralinae and Phycitinae, and Crambidae in which Crambinae, Nymphulinae, Schoenobiinae, Scopariinae, Heliiothelinae, Evergestinae, Odontiinae, Glaphyriinae and Pyraustinae are included.

A consequence of intensive research into some taxonomic groups has resulted in a proliferation of genera which this reviewer considers unfortunate. Other workers have made sensible use of the subgenus to indicate differences between groups of species, for example in Zygaenidae and Noctuidae. No subgenera are indicated in the presently reviewed work, but full play is made with novel genera, particularly those proposed by Beck and by Berio for Noctuidae, and a number of them refer to British species. Thus in Sesiidae, we now have *Pyropteron chrysidiformis* and *Synansphecica muscaeformis*, and in Noctuidae *Pyramidampa pyramidea* and *P. berbera*, *Loscopia scolopacina*, *Leucapamea ophiogramma*, *Eremobina pabulatricula*, *Melanarta melanopa*, *Coranarta cordigera*, *Aneda rivularis* (= *cucubali*), *Colonsideridis albicolon*, *Putagrotis puta* and more. Apart from devaluing the rank of genus, cross-reference to other recently published lists is made more difficult, especially when no generic synonymy is given. A further plethora of irritating changes results from the concept that the species name is adjectival to, and not in apposition to, the generic name, affecting particularly certain Geometridae, in genera such as *Perizoma*.

Subspecific rankings are used sparingly; it would have been helpful to include the nominotypical combination, with author and date, in square brackets, where this does not occur in Austria, e.g. with 3900 *Standfussiana lucerneae* and 3912 *Xestia alpicola*.

There is a useful list of species which have been incorrectly reported from Austria in the past, an extensive table of annotations concerning unconfirmed records, a very full bibliography and separate indices for species and for higher taxa.

Misprints are annoying in any work, but an abomination in a definitive check list. They are very difficult to eliminate altogether, and even this carefully-produced work has its share, such, aptly, as 2866 *hulimiata* for *humiliata*!

This is the first list of the Lepidoptera of Austria to have been written, and is a valuable addition to the published faunas of the European countries.

THE LIFE CYCLE, DISTRIBUTION AND HABITS OF *HYPENA OBSITALIS* (HÜBN.) (LEPIDOPTERA: NOCTUIDAE) IN DEVONSHIRE

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This is an account of further studies into the life cycle, distribution and habits of *Hypena obsitalis* (Hüb. n.) (the Bloxworth snout) since the discovery of a colony by the author on the Torbay coast (Dobson, 1991). The same field work techniques that were used during the 1990 to 1994 investigations were also used in the same area during 1947 to 1959 when the author's home was in Torquay, suggesting very strongly that the species did not then occur in the Torbay area. Alas now living in Hampshire, it has not been possible to carry out a weekly survey throughout the year, but the data provided should illustrate the moth's life cycle and habits in Devonshire.

Following the discovery of the colony on 2 and 3.viii.1990, Dr Barry Henwood obtained a female *obsitalis* on 8.viii at the same location (Henwood, 1991). Of the four larvae received in the post from him, two were fed with *Parietaria judaica* L. and the others with *Urtica dioica* L.; the former two were reared successfully and resulting imagines emerged on 15.ix.1990, but the latter two struggled and died before pupating. As the imagines had been set for exhibiting, the cycle through to the following year could not be studied.

In the Channel Islands the imago has been recorded in every month of the year except February during 1960 and 1963 and on 8.ii.1972 over 200 were counted overwintering in an old German bunker (Emmett & Heath, 1983). It has also been found in garden sheds, garages and other buildings (Skinner, 1984). To find possible overwintering sites, the location was visited on 19.i.1991. Using a beating tray and a stick, an attempt was made to find or dislodge specimens from possible hiding places: low hedges, tangled undergrowth, scrub on upper cliff slopes, rabbit holes and deep crevices in the cliff just above the beach, but without success.

From the August 1991 breeding of ova and larvae sent through the post by Barry Henwood and Bernard Skinner, seven specimens were retained for overwintering. From 12 to 17.ix the imagines were put into a clear plastic box, dimensions 279 × 159 × 102 mm with *Parietaria judaica* L., tissue and a small cotton wool ball soaked in red wine steeped in sugar to give the moths sustenance. The plastic box was placed on the raised carpeted floor of a wooden shed in Basingstoke. However on 21.ix, the maximum day temperature in the shade outside the shed was 23.5 °C and because the imagines were so lively, the container was kept for a week during daylight hours in a cool bedroom and at night in the shed. At dusk on 29.ix five were lively when disturbed, one was crippled and one dead. At dawn on 5.x, when the temperature was 6 °C and the imagines in a state of torpor, the five healthy imagines were transferred to another container with similar contents. It was then discovered that two ova had been laid on a piece of tissue. The imagines then remained in a state of torpor. After a hard frost outside, minimum temperature of -3.5 °C, during the night of 6/7.xii, they were examined next morning and found still alive, though in torpor. With even severer frosts forecast, newspaper was wrapped around the container, which was placed on boxes about a metre off the floor. During the night of 10/11.xii the minimum temperature outside was -8.5 °C, and the next day three imagines were dead and the ova collapsed. A bag of potatoes covered with newspapers in the shed was also frosted. The following night there was another severe frost, minimum temperature -8 °C, during which the remaining two succumbed.

From observations of the imagines in the shed, at 15 °C or higher outside temperature, the moths were very alert and any movement in the shed would result in them flying, particularly at dusk. From 14 °C down to 7 °C they were quiet and would not fly unless the container was tapped and below 7 °C outside temperature, they were in a state of torpor. In the protection of the shed they survived an outside temperature of -3.5 °C, but in their habitat it is feared they would not survive a temperature lower than -5 °C in their overwintering site. It has been found since that the shed temperature is 1 °C warmer on a cold night than the outside temperature. The probable overwintering sites would be in a deep cover of scrub, ivy and vegetation, because of a lack of suitable buildings in most locations. The species can survive the winter in south Devonshire with its milder climate and close proximity to the sea. However, if the south Devonshire coast were to experience a severe winter, the species would die out.

The next step was to find when overwintering imagines would awaken. A careful watch was kept on the weather forecasts and in recording temperature, making an allowance for the south Devonshire coast. The temperature at dusk first reached 16 °C on 14.v.1992. On 24.v with a dusk temperature of 16 °C the location was visited from dusk onwards. No imagines were in flight. *Parietaria* and *Urtica* were swept vigorously to check if there were any larvae. One female was swept out from a thick growth of *Parietaria* deep within the hedge and close to the thick vegetation on the other side. The following night also with optimum weather conditions for most other species with many moths again in flight, not one *obsitalis* was seen, probably due to the temperature being only 13 °C. Then a return to Hampshire had to be made. Bob Heckford (pers. comm.) informed me later that on 12.vi. he saw two worn imagines at two locations. On 20.vi another evening visit was made, but no imagines were seen. The *Parietaria* that had not been cut by the council workmen was searched randomly for ova and then tapped with a stick over a beating tray but no ova or larvae were found. So it appeared that overwintering specimens were reappearing during late May to early June and the ova probably overlooked.

With a long illness in 1993, the author was unable to visit Devonshire, but with improved health in 1994, was determined to find first brood larvae, the second brood larvae having been found on 22.viii.1992 in another location (Pickles, 1993). An estimation had to be made for suitable dates for finding the larvae. Breeding the second brood in captivity took 5 days for the ovum, 16 days for the larva, 16 days for the pupa, resulting in a total of 37 days (Henwood, 1991). Calculating forward from imagines seen on 12.vi, larvae should be found from 17.vi to 3.vii. Calculating back from imagines on 2.viii (Dobson, 1991) and 11.viii (Henwood & Skinner, pers. comm.), larvae should be found from 2 to 17.vii and from 10 to 27.vii respectively. A holiday to south Devonshire was booked for the week 16 to 23.vii. Unbeknown to the author, Roy McCormick made visits to three of the locations and David Wedd made one to the second location during 1994. Their records have been added to the 1994 results.

To protect the species, locality and local feature designations and map references have been omitted. All locations listed are within the Torbay Borough Constituency Boundary and are on or near an imaginary north-north-west to south-south-east line spanning 10.5 km. Height and distance measurements are either based as accurately as possible on Ordnance Survey map data or estimated.

First location: hedgerow with good growth of *Parietaria judaica* L. up to 1.25 m in height amongst *Urtica dioica* L. and other herbage beneath a canopy of shrubs and trees; aspect—east and shaded, 105 m above sea level and 220 m from the sea; known history—female, early viii.1991 (B. P. Henwood, pers. comm.), imagines 1992

(Clarke, 1993), 9.vi.1994 none (R. F. McC.), 17.vii.1994 *Parietaria* and *Urtica* searched and beaten, foliage disturbed, none, though probably in pupal stage, if there (A. H. D.).

Second location: horizontal cleft in cliff, third of way up from beach between scree and scattered herbage below and overhanging rock above with restricted *Parietaria* growth with nearby dense herbage and foliage against cliff, also adjacent footpaths with *Parietaria* growth along sides and with empty and inhabited buildings nearby; aspect—cliff, north-north-east and shaded, paths, various and sunny or shaded, 30 to 10 m above sea level, 15 to 40 m from the sea; known history—22.viii.1992, larvae from which imagines were bred from 16.ix.1992 (Pickles, 1993), 7.vi.1994 none, 17.vii.1994 cliff site, tapping some *Parietaria* onto beating tray produced one larva in third and three in fourth instars, edge of path beneath fencing, one fifth instar larva on *Parietaria* (A. H. D.) (third instar larva died in the next instar, parasitized, the cocoon posted to Dr A. A. Allen, who bred on 5.viii.1994, a female *Metorus colon* (Hal.) (Hymenoptera: Braconidae), a species attacking a wide range of lepidoptera larvae and which does not seem attached to a particular habitat or larval strategy), the fourth and fifth instar larvae produced imagines on 2 and 3.viii.1994, 3.viii.1994 imago and larvae, 13 and 22.viii.1994 larvae (R. F. McC.), 25.viii.1994 larvae in last instar, which produced imagines which laid third brood ova in September, and worn imagines (D. J. W.).

Third location: rocks and sparse herbage near path at base of cliffs; aspect—east and sunny until mid-afternoon, seen 7 m above sea level, 12 m from sea; known history—12.vi.1992, worn imago (R. J. H.), 19.vii.1994 whole area searched above and below cliffs, which are now too dangerous to climb, no *Parietaria* in sight, deep clefts in upper cliffs for overwintering imagines. Nearest *Parietaria* found on wall of car park 400 m away as the crow flies, full grown larvae of *Autographa gamma* (L.) beaten out and a larva in its second instar which looked like *obsitalis*, but proved to be *gamma* in the third instar.

Fourth location: coastal path with mostly low compact hedges with lush growth of *Parietaria* in places, but many plants next to path were cut down by council workmen during the first half of June, 1994; a derelict garden shed found nearby, but most of roof missing so little protection for overwintering imagines; low thick scrub down to cliffs, danger of cliff fall to part of path; aspect—south-west to south-east, sunny except for one continuously shaded patch of *Parietaria*, 20 to 35 m above sea level, five to 50 m from the sea; known history—2 and 3.viii.1990, 12 imagines (Dobson, 1991), 8.viii.1990, female (Henwood, 1991), 29.vii.1991, male (A. H. D.), 11.viii.1991 two females (B. P. Henwood & B. F. Skinner), 6.ix.1991, imago (Heckford, 1992), 24.v.1992, female (A. H. D.), 12.vi.1992, one worn imago, (R. J. H.), 10.vi.1994 none (R. F. McC.) (temperature not high enough for flight), morning 19.vii.1994 using beating tray under *Parietaria* produced larvae of *Vanessa atalanta* (L.) and *Autographa gamma* (L.), but no *obsitalis*. Towards end of beating session a male flew out of a bush. *Parietaria* growing in the shady area was collected to feed larvae back at the cottage, later when checking the foodplant before putting it into larvae containers, three scattered ova under one leaf later produced *gamma* larvae and two singleton ova under other leaves produced *obsitalis* larvae; night 20/21.vii.1994 pre-dusk to 22.00 hours, seven imagines, one female ovipositing on *Parietaria* near where ova had been found, at 00.05 hours, one imago and at 00.45 hours, two imagines in flight (A. H. D.); 3.viii.1994 none, 26.viii.1994 larvae (R. F. McC.).

Fifth location: cliff top site, short grass with *Parietaria* growing at base of walls; aspect—various and sunny, except in shade cast by walls, 52 m above sea level, 120 m from the sea; known history—28.vii.1989, one female at M. V. light (Henwood, 1991) and believed to have been a migrant, the first confirmed county record, 22.vii.1994

a brief visit at 22.30 hours, two females, one ovipositing on *Parietaria*, and a male seen (A. H. D.).

From a few ova, ex female secured on 20.vii.1994, second-brood imagines were bred on 21 and 22.viii.1994. The two kept for overwintering have been going into and out of torpor with the range of temperature experienced. They are still alive today (9.x.1994) but now in torpor with the overnight temperature in the shed having dropped to 2 °C. To facilitate recharging the contents of the plastic box when the temperatures were higher, the box was kept in the refrigerator overnight so that at 5 °C next morning the imagines were in a state of torpor.

Regarding flight habits, the original statements (Dobson, 1991) still remain true, though the moth will fly after midnight. The species usually ignores light; only two of the 1994 imagines flew towards torch light. The species was attracted neither to Barry Henwood's bulb over a sheet nor to Dobson's actinic (Heath) trap, 1.5 and 2 m respectively from the imagines' flight paths.

Abroad, *Urtica dioica* is a recorded foodplant and the Iford, Dorset specimen was seen amongst nettles (Emmett & Heath, 1983). In south Devon, the only foodplant appears to be *Parietaria judaica*; however, the few *Urtica* plants seen could have been worked at the wrong time or overlooked in preference to *Parietaria* with which the author was having success. It is still advisable for others to work both plants. In captivity the species has been reared successfully on *Soleira soleirolii* (Dandy) (Riley, 1992). The ovum and larva in the early instars could be confused with *Autographa gamma* (L.). The ovum of *gamma* in its development turns to a shade of pale green similar to *obsitalis*. Its larva in the first two instars is like *obsitalis* in its stance at rest, colour and markings but it has three pairs of prolegs compared to the four pairs of *obsitalis*. The larva does seem to prefer shady places (Seitz, 1914). The pupa of *obsitalis* has not yet been found in the wild on mainland Britain; in captivity the larva spins a flimsy cocoon amongst leaves of *Parietaria* out of which the pupa can fall, when the leaves are moved.

The life cycle in Torbay will now be compared with statements in literature. It was believed that *obsitalis* was 'single-brooded, flying from August to October and after hibernation in May and June' (Skinner, 1984). From the data, there appears to be a staggered awakening from the overwintering state from late May to mid-June. This could be the result of weather and variation between the aspects and micro-climates of the locations. The earliest first brood cycle commenced with ova laid in early June resulting in imagines about 17.vii as witnessed in locations four and five. The latest first brood cycle with ova laid at the end of June resulted in imagines emerging in early August and with larvae on 17.vii as witnessed in location two. The second brood imagines emerge from late August to mid-September with a flight period until mid-October, earlier or later according to the temperature. All these cycles can be affected by the weather; in 1990, June was the dullest, coolest and wettest for many years resulting in the first brood imagines flying in early August in location four. Could there be a third brood? Dobson and Wedd have experienced ova of a third brood being laid in captivity, but there is no evidence yet of it taking place in nature in the British Isles. In Continental literature there is some confusion over the broods, probably the result of an extended ovipositing period and overlapping broods; in May and June and in August and September. Observed in May and December in Portugal, the larva lives in April and May and in the late summer (Spuler, 1908); south of France, southern Europe, north Africa and Asia Minor, moth from April to September, sometimes later according to terrain, larva in Spring (Culot, 1914-17); localities chiefly in southern France, June, July to October (Lhomme, 1923-35); in Alsace, Valais and southern Alps to 1000 m, mostly common in two to three not clearly separated generations from early June, overwintering to mid-May, the moth comes into houses

to overwinter, larvae from May and in the autumn (Forster & Wohlfahrt, 1971); throughout the whole year, often captured in caves and dark places (Calle, 1983); Greece, flight period March to December, two or three generations, adults of autumn generation overwinter in caves, holes and buildings (Hacker, 1989). The flight periods do vary according to terrain and latitude, hence June to October in France and March to December in Greece. Could Spuler's statement imply that ova overwintered or did he overlook a March flight? The earlier authors appear to have been unaware of overwintering. A number of sites for overwintering on the Continent and the Channel Islands have been mentioned but as yet none has been found in Devon and it is hoped that further work will be carried out by others to resolve this. However the Rye, Sussex specimen of 6.iii.1983 being disturbed in a garage, flew and resettled on a beam (Tweedie, 1983) (the previous September being good for migrant moths, followed by a very mild winter, strongly suggest that the specimen overwintered).

It has been suggested that *obsitalis* occurred in south Devon, in the late 19th century, but the only statement that has been found is the late Captain Stidston's: 'In my own collection there are eight specimens rather old and worn. I recognise my setting of early collecting days and therefore may have been taken in the South Hams district but, of course, the record cannot stand' (Stidston, 1952). The species is now established in Torbay and further to the south Roy McCormick (pers. comm.) has found larvae on 16.viii.1994 in a location by the mouth of the River Dart. David Wedd (pers. comm.) has found larvae common on *Parietaria* in an open site on the north Cornwall coast, but it is very doubtful if this colony was established by the 1943 migrant specimen at Boscastle, for the extremely low temperatures of the 1947 severe winter would have wiped out any colonies in the south-west. If such weather does not recur, the future prospects for this species on mainland Britain are good. Parasitism is low at present and the colonies, being on or close to cliffs, should be safe from development. It should be found in more localities, where its foodplant occurs, from Land's End to the Isle of Purbeck.

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ANNOUNCEMENT

Microlepidoptera of Middlesex: an appeal for records.—Following on from the success of the recent publication of *Larger moths of the London area* the London Natural History Society now proposes to work towards publication of a checklist of the microlepidoptera of Middlesex. It is expected that this exercise may take about 5 years to complete.

The term Middlesex involves the entire vice-county 21 and thus includes all the London boroughs north of the River Thames with the exception of the five lying east of the River Lea; these five are in South Essex. Middlesex also incorporates some areas which lie in the current administrative county of Hertfordshire, notably the Potters Bar area. Records are actively sought from appropriate persons for all those families generally regarded as “micros”—thus including the Psychidae which were formerly referred to as “macros”, as well as those which are sometimes referred to as “mesolepidoptera” (Tortricidae, Alucitidae, Pyralidae and Pterophoridae).

Records should include the species name, the Bradley and Fletcher code number (to avoid nomenclatural confusion) the date where possible and the locality. Records will be assumed to relate to imagines unless “mine”, “larva” or other qualifying statements are given alongside. Localities will ideally involve a place name and a four figure grid reference. Place names should be those appearing on the Ordnance Survey maps; precise localities, such as the names of nature areas or ecology parks in London are desirable, but if these do not appear on OS maps the nearest locality should always be given. Where a grid reference can not be obtained, a precise address as it appears in one of the various published books of street maps of London should be used. Site lists will ideally be presented in log book order to facilitate data entry. Overnight trap dates should be given according to the example 23/24 August or 23 August, and not as 24 August. Approximate counts and sexes are desirable for immigrants. Confidentiality of selected records may be requested. Records are required from all time, not just the present period.

Records should be addressed to C. W. Plant, 14 West Road, Bishop's Stortford, Hertfordshire CM23 3QP, who will happily provide more detailed information. All communications will be acknowledged and records from outside Middlesex contained in mixed lists will always be forwarded to appropriate recorders unless directions are given to the contrary.

THE DISTRIBUTION AND HABITS OF THE BEE *HYLAEUS PECTORALIS* FÖRSTER, 1871, (HYMENOPTERA: APIDAE) IN BRITAIN

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R. C. L. Perkins (1900) described *Prosopis palustris* as a species new to science, which had been collected at Wicken Fen, Cambridgeshire, and in similar localities in Suffolk. Both this name and *Prosopis kriechebaumeri* Förster, 1871, are now regarded as junior synonyms of *Hylaeus pectoralis* Förster, 1871. For many years following its discovery in Britain, this small bee was found only in a number of wetland sites in East Anglia (particularly at Wicken Fen). There is also an unconfirmed record from Matley, New Forest, Hampshire, in August 1901 (Morley, 1903).

On 26.vii.1972 I collected both sexes of a *Hylaeus* in fenland adjacent to the River Alver at Browdown, near Lee-on-Solent, Hampshire, which I assumed were large individuals of *H. communis* Nylander. However, it soon became apparent that these were *H. pectoralis*. Further visits to the site in 1972, and in later years, demonstrated that it was well established in this locality. In subsequent years I also reared numerous specimens of the bee from nests, built in the galls of the chloropid fly *Lipara lucens* Meigen, collected in the same area. From 1973 onwards I searched for the species in other, similar wetland localities in the county and found a further 17 sites. Most of these localities are on the coast, but some are also inland (including Matley, corroborating Morley's old record). Searches by me in suitable localities in other counties produced records from Dorset, Essex, the Isle of Wight, Suffolk, and West Sussex. Further recent records by others are from Cambridgeshire, Norfolk, Suffolk, Surrey and West Sussex. In addition, there are pre-1970 records from Northamptonshire, Suffolk and north Norfolk. All records (for most of which there are voucher specimens in The Natural History Museum, London) are shown on the distribution map (Fig. 1).

H. pectoralis is a good example of an "Anglo-Dutch" or "Doggerland" species. Before Britain became separated from mainland Europe (c. 6000 years ago) it was joined to the Continent by a largely swampy land bridge, through which the Rhine flowed northwards. Some species of insects which occurred on the banks of the river are, in Britain, still mainly confined to south-east England. These "Doggerland" species also include the bee *Colletes halophilus* (Verhoeff) and the sphecid wasp *Mimumesa spooneri* (Richards) [sometimes cited as *Psen spooneri*] (Richards, 1964).

HABITAT, NESTING HABITS AND PARASITOIDS

H. pectoralis is associated with stands of the common reed, *Phragmites australis* (Cav.). Perkins (1900) described the bee as "burrowing in the dry stems of reeds". More recently J. P. Field (pers. comm.) reared a specimen from a bundle of cut, dead *Phragmites* stems suspended as "trap nests" from a pole within a reed bed. However, the majority of nests have been found in the vacated, spindle-shaped galls of *Lipara lucens*. These galls are located on the apices of the flower stems of the *Phragmites*, their development inhibiting flowering (Fig. 2). In a gall containing a larva of *L. lucens* the ensheathing leaves are tightly pressed together (forming a sharp apical point) and are green in colour. *L. lucens* overwinters within a puparium in the cavity which it created as a result of its larval feeding activity within the basal half of the gall (Fig. 3). By this time the gall has generally assumed a brown coloration, following the death of the leaf sheaths. The adult fly emerges in the early summer

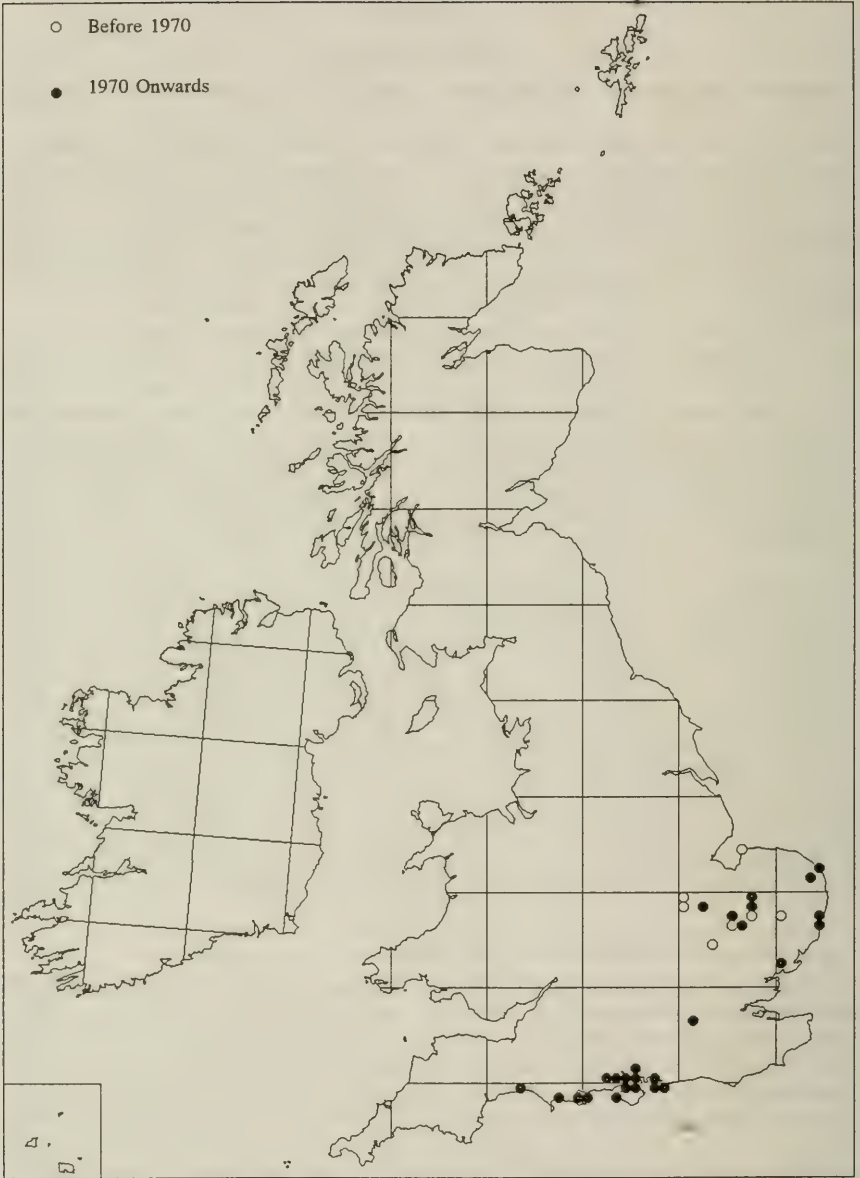


Fig. 1. British distribution of *H. pectoralis*.



Fig. 2. Old gall of *Lipara lucens* Meig. on *Phragmites australis* (Cav.) stem. Browdown, Hampshire (G. R. Else).

and it is only then that the gall becomes available for use as a nest site by the bee. Old galls, which may contain nests of this bee, can further be recognized by their frayed tips.

The female *H. pectoralis* apparently always removes the fly's empty puparium from the gall chamber, as this has never been found in one containing a nest (those without such a nest contain the eclosed puparium, unless the *L. lucens* larva was parasitized or eaten by a bird). The female bee builds its nest within the gall chamber, the cells sometimes extending into the apical leaf sheathing. The nest entrance is between the leaves which form the apex of the gall, and is generally not clearly visible. The galls of *L. lucens* vary considerably in size, and this dictates the number of cells each can contain, the usual range being from two to eight, as the cells are constructed as a linear series (Fig. 4). Those cells destined to contain female progeny are generally the first to be built (i.e. the cells furthest from the nest entrance), whereas males are found in those built nearest the nest entrance. In common with those of other British *Hylaeus*, cell linings are formed from a secretion of the female's salivary glands, the viscous liquid being spread on to the inner walls of the gall with the bee's short, bilobed glossa;



Fig. 3. Opened gall chamber of *L. lucens* gall with puparium of this species *in situ* (G. Dickson).



Fig. 4. Occupied cells of *Hylaeus pectoralis* Förster in gall of *L. lucens*. (G. Dickson).

the cell partitions are constructed in similar fashion. On drying, the secretion produces a thin, transparent, cellophane-like membrane which is impermeable to water (it also ensures the cells retain the semi-liquid pollen/nectar provision). British pollen sources are not known, but the species is probably polylectic (as in Germany (Westrich, 1989)). In Britain individual bees have been observed visiting bramble (*Rubus fruticosus* L., *sensu lato*), angelica (*Angelica* species), hogweed (*Heracleum sphondylium* L.), wild carrot (*Daucus carota* L.), hawkbit (*Leontodon* species) and field milk-thistle (*Sonchus arvensis* L.) flowers.

A provisioned nest is sealed with a substantial plug of compacted, finely shredded reed leaf fragments which often extends up into the leaf sheath of the gall. This plug immediately betrays the presence of a nest when a gall is opened by carefully tearing away the outer leaf sheathing. *H. pectoralis* overwinters as a prepupa within its cell; the larva does not spin a cocoon. A photograph of an opened nest also appears in Imms (1971).

I have reared both the evanioid wasps *Gasteruption assectator* (L.) and *G. jaculator* (L.) from nests of this bee. No other parasitoids seem to have been recorded.

ACKNOWLEDGEMENTS

I am most grateful to M. Edwards and S. Falk for their records of this species, and to S. P. M. Roberts for preparing the distribution map of *Hylaeus pectoralis* (drawn on DMAP). G. Dickson kindly permitted the use of his photographs (Figs 3 and 4) to illustrate this paper.

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BOOK REVIEWS

The butterflies' fly-past by Clive Simson. Leeds, Peregrine Books, 27 Hunger Hills Avenue, Horsforth, Leeds LS18 5JS, 1994, xviii + 127 pages, £19 (post free), hardback. —'This book is in no way a textbook'. So begins, and ends, the author's first sentence, and for this much we should be forever thankful. Were it otherwise, what gems from many an entomological encounter, what field-notes from past years and what other pleasures we should have missed. These, together with carefully detailed observations from the wider field of natural history, liberally populate this unusual book—and all is achieved without the aid of a single dot-distribution map.

But I have jumped the gun, for the stage is set by a foreword written in forthright style by Wilson Stephens, Editor of *The Field* from 1951 to 1977. Here, one or two sacred cows are, of necessity, put to slaughter, but in a well reasoned, open and totally honest fashion, a manner which is matched by each page of the ensuing fly-past.

The author admits to having chosen unusual chapter headings. What, I wonder, will the reader make of 'Big Fritz and little Fritz', 'Purple is for Caesar', 'A brown study', 'Putting on the Ritz', 'Birth of the blues', 'Streaking', 'Buddleia bugs', 'All white' and 'Skip for joy'? All these, in the author's inimitable style, relate to groupings of the

fifty-five species of our native butterflies, a 'native' being interpreted as one which must regularly be present *in some form* throughout the year. In writing of these fifty-five species, many accurate observations are made of the various life stages and inevitably details are given of successful captures with the net. What is so refreshing is to find these captures chronicled in such an honest way—no pussy-footing here—specimens have not just been recorded, they have actually been *taken*. I have no intention of opening a contentious can of worms generously sprinkled with hot potatoes, for many people 'have a thing' about butterflies. Far better, let the author's wise words speak for themselves: 'Of course, moderation is the key word. I do not believe that butterfly collecting in moderation, can seriously affect butterfly populations. There is no need for a long series of a species, all looking the same, so prevalent in Edwardian times. What is essential is the conservation of habitat and the careful control of chemicals.' There is more, but to know how much more you should read the book.

On a point of detail we read 'I have released every female *iris* I have bred'. How fortunate this was for the brood of binocular-carrying enthusiasts, assembled under the watchful eye of the ever present warden, in that wood near Oxford. In the following few seconds they learned more from a man who knows his craft than from many an hour spent in scanning the oak tops. Books written in this style have been absent for far too long. In the 30s I treasured J. H. Bell's *Days with a butterfly net*, then came the first of the P. B. M. Allan classics to be followed later by his others, and now, Clive Simson offers us a new one to savour.

Butterfly illustrations have not been lacking in recent years. Some are fine, clinically executed examples of set specimens, others are best termed fanciful and leave much to be desired. The eight delightful colour plates by Mandy Shepherd which grace this book are truly alive and match the spirit of the words upon the pages. This spirit ('butterflies are beautiful; they are fun') pervades the book and has full rein when novel methods are required to assist the lepidopterist in reaching new ground. Over the years I too have tried a few innovations, yet surely only Clive Simson could have thought of seeking the aid of an ex-RAF inflatable dinghy!

Happy paddling to you Sir, albeit these days with the paddle of memory. Your invitation to review this delightful book has been accepted with great pleasure.

BRIAN R. BAKER

Colour guide to hoverfly larvae (Diptera: Syrphidae), by G. E. Rotheray, *Dipterists' Digest* number 9, Derek Whiteley, Sheffield, 1994, 156 pages (including 16 colour plates), £11.95, paperback.—After an introduction discussing how to recognize hoverfly larvae and how to find them, short illustrated keys lead variously to species or genus. Generic accounts give a brief description of overall appearance, offer some confirming characters and give notes on the varying biologies of these curious and fascinating creatures. There is an extensive reference list. However, the main reason people will buy this book is for the colour plates which show the larvae of 76 species. Most of these are photographed in life, although a few are of preserved specimens. Opposite these are further explanatory notes and diagrammatic sketches. There are also a few colour photographs of habitats and larval damage.

I found the layout somewhat underdesigned and the headings are not as clear as they could have been. Since the generic accounts are sadly in alphabetic rather than taxonomic order the index to genera is redundant and an index to species would have been much more useful. On the whole though a neatly produced and useful book and excellent value.

R. A. JONES

THE ACULEATE WASPS AND BEES OF CROW WOOD,
FINNINGLEY IN WATSONIAN YORKSHIRE,
WITH THE INTRODUCTION OF
A NEW NATIONAL QUALITY SCORING SYSTEM

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Crow Wood has been found to be an excellent locality for aculeate wasps and bees, having 135 recorded species, nine species of national importance, and 15 species of regional significance.

Crow Wood, an area of about 152 ha, is situated immediately to the south of Finningley (VC63, SK6697). The region has sandy acid soils of remnant heathland. At present, Crow Wood consists of old sand and gravel pits gradually being filled with waste materials, coniferous afforestation, regenerating woodland with flowery areas, open sandy surfaces, some of which are used as motor-cycle and go-kart tracks, grassland, and arable farming. The dry open areas with ditches and mounds of sand and gravel provide nesting areas for many aculeate wasps and bees.

About 50 visits have been made to Crow Wood, mainly during May, June, July, and August, with a few during March, April, and September. Most visits were made by J.T. Burn (1971–1991: in excess of 36 visits to a sample area of about 18 ha) and M.E. Archer (1986–1989: 10 visits to a sample area of about 55 ha). Collecting was by visual observation, but J.T. Burn also collected by sweeping low mixed vegetation. A smaller number of visits were made by J.H. Flint (1965) and P. Skidmore (1973).

Biological names are according to Kloet & Hincks (1978), except for the Dryinidae which are according to Olmi (1984, 1989).

This paper was written by M. E. Archer (M.E.A.). The contributions of J.T. Burn were the many records from his large number of visits, and all information relating to the Bethyliidae and Dryinidae.

RESULTS—SPECIES PRESENT AT CROW WOOD

A full list of recorded species is given in the Appendix. The taxonomic distribution is given in Table 1, at the family level. The 135 species represent about 46% of the aculeate wasp and bee species (including the bethylids and dryinids) of Watsonian Yorkshire. In addition the following ant species (Formicidae) have been recorded: *Myrmica ruginodis* Nylander, *Formica fusca* L., *Lasius niger* (L.).

The accumulated records from any locality can be analysed to understand the ecological relationships of the recorded species and the conservation value of the locality in a regional or national context. This paper assesses ecological relationships with the concepts of cleptoparasitic load and aerial nester frequency and conservation value with the aid of regional and national quality scores and species quality scores.

QUALITY ASSESSMENT OF SOLITARY SPECIES

Two species are nationally rare or 'red data book species' (Falk, 1991). Both of these, *Psen bicolor* (RDB2) and *Nomada fulvicornis* (RDB3), reach the northern boundary of their British distribution in Watsonian Yorkshire.

Table 1. The number of species of aculeate wasps and bees recorded from Crow Wood.

Family	No. species
Solitary wasps	
Dryinidae	14
Bethylinidae	2
Chrysididae	7
Mutillidae	1
Pompilidae	12
Eumenidae	4
Sphecidae	36
Total solitary wasps	76
Solitary bees	
Colletidae	3
Andrenidae	17
Halictidae	13
Megachilidae	2
Anthophoridae	10
Total solitary bees	45
Total solitary wasps & bees	121
Social wasps and bees	
Vespidae	5
Apidae	9
Total social wasps & bees	14

Seven species are nationally scarce or notable species (Falk, 1991). *Andrena tibialis*, which is a category A scarce species, reaches the northern boundary of its British distribution in Watsonian Yorkshire. The other six species, which are category B species, are either at the northern boundary of their distribution (*Cleptes semiauratus*, *Priocnemis schioedtei*, *Nysson trimaculatus*, *Andrena humilis*, *Nomada flavopicta*), or are more widespread in Britain (*Crossocerus palmipes*).

Fifteen species are rare in the context of Watsonian Yorkshire (Archer, 1993a); these are indicated in the Appendix.

There are 27 species of solitary wasps and bees, which although not rare in Watsonian Yorkshire, have a local distribution being more or less restricted to sandy habitats (Archer, 1994a). Seventeen of these local species (indicated in the Appendix) are found at Crow Wood.

The 105 species of solitary wasps and bees can be considered to have a common, frequent, occasional or rare status in Watsonian Yorkshire (Archer, 1993a) (Table 2). The dryinid and bethylid species cannot be given a status as insufficient information

Table 2. The regional coding of the 105 species of solitary wasps and bees recorded from Crow Wood (Dryinids and Bethylinids excluded).

Status	No. species
Common	39
Frequent	31
Occasional	20
Rare	15

exists on their distributions. By giving each species a value depending on the above statuses, including a higher value for the nationally scarce and rare species, a regional quality score of 416 can be calculated by the addition of the status scores (Table 3). Dividing this quality score by the 105 species gives a regional species quality score of 4.

Table 3. The regional status scheme of the 105 species of solitary wasps and bees recorded at Crow Wood.

Status	Status value (A)	No. species (B)	Status score (A × B)
Common	1	38	38
Frequent	2	31	62
Occasional	4	19	76
Rare	8	8	64
Nationally scarce	16	7	112
Nationally rare	32	2	64
		105	416

Summation of status value times number of species gives a final regional quality score of 416. Dividing this by the number of species (105) gives a regional species quality score of 3.96, approximately 4.

Ball (1992) proposed a methodology for scoring the value of invertebrates at sites in a national context. Archer (in press) has adopted this methodology for use in Watsonian Yorkshire. Using the Ball methodology on the 105 Crow Wood species, a national quality score of 274 and a national species quality score ($274 \div 105$) of 2.6 can be calculated (Table 4).

Table 4. The Ball (1992) national status evaluation of the 105 species of solitary wasps and bees recorded at Crow Wood.

Status	Status value (A)	No. species (B)	Status score (A × B)
Common	1	62	62
Local	2	26	52
Regional notable	4	8	32
Scarce B	8	6	48
Scarce A	16	1	16
Rare	32	2	64
		105	274

Two objections can be raised against the Ball methodology. First, many regions of England and Wales lack a list of regionally notable species making it sometimes impossible to apply Ball's methodology. Secondly, a national scheme should logically give a species status based upon that species' importance in a national and larger geographical setting but not in a smaller or regional distribution.

To overcome the above two objections M.E.A. suggests the following scheme in which the statuses of 'common', 'local' and 'regionally notable' of Ball are replaced by: 'universal', 'widespread' and 'restricted'. At present there is no objective way of assigning a 'universal', 'widespread' or 'restricted' status to the species of the British aculeate Hymenoptera. From personal experience M.E.A. has therefore assigned

British aculeate Hymenoptera one of these three statuses based upon abundance and distribution within England and Wales. Ireland, the Channel Islands and Scotland have not been included: little information is available on Irish distributions of aculeate Hymenoptera; fauna of the Channel Islands relates more to France than the British Isles; and Scotland's cooler climate greatly reduces diversity. A 'universal species' would therefore refer to a common species found throughout England and Wales, usually with some extension into Scotland. A 'widespread species' would be one found in about three-quarters of England and Wales, usually either with a distribution in Wales, southern and midland England or in northern and western England and Wales. A 'widespread species' would also be found throughout England and Wales but either with a local distribution or a less-than-common abundance. A 'restricted species' would be one mainly found in about one-half of England and Wales, and usually confined to southern England and East Anglia. The status of a species may not be fixed and can change as its range or abundance changes. As such the statuses of species need to be kept under constant review. Using this new methodology for the 105 Crow Wood species a national quality score of 266 and a national species quality score ($266 \div 105$) of 2.5 can be calculated (Table 5).

Table 5. The Archer national status scheme of the 105 species of solitary wasps and bees recorded at Crow Wood.

Status	Status value (A)	No. species (B)	Status score (A × B)
Universal	1	56	56
Widespread	2	39	78
Restricted	4	1	4
Scarce B	8	6	48
Scarce A	16	1	16
Rare	32	2	64
		105	266

CLEPTOPARASITIC LOAD

The cleptoparasitic load (CL) is the percentage of aculeate species that are cleptoparasites (or parasitoids) on other host aculeates (Table 6). A more-or-less complete list of species in a locality should be made before the CL is calculated to avoid possible bias of either host or cleptoparasitic species. *Cleptes semiauratus*, dryinids and bethylids are not considered as they are parasitoids on non-aculeate hosts. *C. semiauratus* is a parasitoid on the cocoons of sawflies, e.g. *Nematus ribesii* (Scop.). The two bethylid species are parasitoids on lepidopterous larvae. *B. cephalotes* has been recorded using hollowed-out plant stems to shelter its larvae while feeding on its paralysed host. Dryinids are predators and parasitoids of Homoptera Auchenorrhyncha.

Table 6. The relative frequency of the cleptoparasitic species among the solitary wasps and bees from Crow Wood.

	No. hosts (H)	No. cleptoparasites (C)	Cleptoparasitic load CL = $100 \times C / (H + C)$
Solitary wasps	49	10	16.9
Solitary bees	32	13	28.9

The CL for the species of solitary bees is higher than the CL for the species of solitary wasps.

AERIAL NESTER FREQUENCY

The aerial nester frequency (AF) is the percentage of host aculeate species that have aerial nest sites. Again a more-or-less complete list of species in a locality should be made before the AF is calculated to avoid possible bias of either aerial or subterranean nesters. Aerial nests are often in old beetle burrows in dead wood, or the central cavities of stems such as those of bramble. Subterranean nesters nest in the soil, usually in burrows dug by themselves, but sometimes in crevices or pre-formed burrows. The AF for the species of solitary wasps is higher than the AF for the species of solitary bees (Table 7).

Table 7. The nesting habits of the host solitary wasp and bee species from Crow Wood.

	No. aerial nesters (A)	No. subterranean nesters (S)	Aerial nester frequency $AF = 100 \times A / (A + S)$
Solitary wasps	10	39	20.4
Solitary bees	3	29	9.4

DISCUSSION. QUALITY ASSESSMENT

The regional and national status schemes of Ball and Archer respectively can be applied to other sandy habitats in Watsonian Yorkshire (Archer, 1984, 1985, 1988, 1989, 1992b, in press), Lincolnshire (Risby Warren, Archer, 1994b), Nottinghamshire (Sherwood Forest, Archer, in press) and Leicestershire (Charnwood Forest, Archer, 1992a). These sites are compared in Table 8. These sandy habitats vary greatly in size from the sand pit at Swincarr Plantation to the eroded Precambrian mountain range of Charnwood Forest. The number of species of aculeate wasps and bees varies from 35 species at Swincarr Plantation to 147 species at Charnwood Forest. The records are from recent times except for the records from pre-coniferized Allerthorpe Common which date from the 1920s until the 1950s and Charnwood Forest which date from the beginning of the twentieth century until the present. Since species status depends upon the current distribution and abundance of species, species only recorded in earlier times could be assigned the wrong status if the distribution or abundance of a species has changed.

The national quality and species quality scores derived from the Ball and Archer status schemes respectively, for each locality, are of a very similar or even of the same value (Table 8). Crow Wood on its species quality score is ranked fourth on the Ball scheme and equal fourth with Strensall Common on the Archer scheme, out of the eleven data sets. Both schemes would seem suitable as a national status scheme, but the Archer scheme is preferred for the reasons given earlier.

In the context of Watsonian Yorkshire, and considering the number of species, regional quality score, regional species quality score, and the number of national scarce and rare species (Table 8), Crow Wood is ranked second in importance behind pre-coniferized Allerthorpe Common. Since pre-coniferized Allerthorpe Common is no longer in existence, Crow Wood must now be considered the most important sandy locality for aculeate Hymenoptera in Watsonian Yorkshire.

Table 8. A comparison of the criteria of diversity, rarity and area of sandy habitats in Watsonian Yorkshire and elsewhere in England based on the species of solitary wasps and bees (dryinids and bethylids excluded).

	Sherwood Forest	Pre-coniferized Allerthorpe Common	Charnwood Forest	Crow Wood	Strensall Common	Coniferized Allerthorpe Common	Pompocali	Blaxton Common	Risby Warren	Skipwith Common	Swincurr Plantation
Area (ha)	390	2030	11650	152	690	2030	1.7	150	170	312	0.05
No. species	100	129	147	105	91	75	51	109	63	69	35
No. national scarce and rare species	9	10	12	9	6	3	3	6	3	2	1
Regional scheme											
Quality score	—	5.14	—	4.16	2.89	2.12	1.36	3.41	—	1.49	7.4
Sp. quality score	—	4.0	—	4.0	3.2	2.8	2.7	3.1	—	2.2	2.1
Ball's national scheme											
Quality score	290*	381	402**	274	213	167	112	209	119*	105	57
Sp. quality score	2.9	3.0	2.7	2.6	2.3	2.2	2.2	1.9	1.9	1.5	1.6
Archer's national scheme											
Quality score	296	379	402	266	225	175	115	202	114	109	62
Sp. quality score	3.0	2.9	2.7	2.5	2.5	2.3	2.3	1.9	1.8	1.6	1.8

*Regional notable species based on Watsonian Yorkshire.

**Regional notable species based on Archer (1990a).

For the eight Yorkshire localities the regional species quality score and Archer national species quality score from each locality show a significant linear positive relationship (correlation coefficient, $r = 0.84$, $p < 0.01$). Similarly, the regional quality score and Archer national quality score from each locality show a highly significant linear positive relationship ($r = 0.98$, $p < 0.001$). These relationships, in non-mathematical terms, indicate that the ranking—the order of the eight localities (best, 2nd, 3rd . . . 8th)—based on the regional scores are similar to the rank order based on the Archer national scores. At present these relationships cannot be explored outside Watsonian Yorkshire as regional statuses for other parts of England are not yet available.

The regional species quality score and regional quality score are higher for each locality than the Archer national species quality score and Archer national quality score (Table 8) because there are four, rather than three, statuses before the national scarce species (Tables 3 and 5).

The three most popular criteria for the evaluation of wildlife importance are diversity, rarity, and area (Usher, 1986). The current investigation measures diversity, rarity, and area (Usher, 1986). The current investigation measures diversity by species richness, or the number of species; rarity by the species quality scores, and the number of national scarce and rare species; and area by the area of each locality in hectares (Table 8). Quality scores combine diversity and rarity in one measurement.

There are some measurement problems in these criteria. It is difficult to know if the species list for a locality is complete. Rarity status is not a static parameter as the distributions and abundances of species change with time, sometimes in cycles. The area of a locality is not always easy to measure, particularly when its boundaries are not clear because the surrounding habitats are similar to those on the locality, e.g. as at Blaxton Common, and Risby Warren.

For each of the 11 locations in Table 8 the number of species shows a highly significant linear correlation with both the number of nationally scarce and rare species ($r = 0.94$, $p < 0.001$) and the Archer national quality scores ($r = 0.95$, $p < 0.001$). Thus, the larger the diversity the increased chance there is of finding nationally scarce and rare species. These relationships are probably a reflection of a species–area relationship when the number of species increases as area increases. A plot of number of species as a natural logarithm (\ln) versus area in hectares as a natural logarithm (\ln) gives a highly significant linear relationship ($r = 0.86$, $p < 0.001$). Removing the data for coniferized Allerthorpe Common, which is a damaged habitat (Archer, 1989), increases the significance of the species–area relationship ($r = 0.90$, $p < 0.001$), (Fig. 1) and gives the species–area regression equation. $\ln S = 3.87 + 0.11 \times \ln A$, where S = number of species and A = area in hectares. Thus the larger the area of the locality the more species are present.

The positive relationship between diversity and rarity on sandy heathland habitats is probably related to the thermophilic requirements of aculeate wasps and bees. Dry sandy habitats, particularly with sheltered banked open areas facing southwards, are able to warm up quickly in sunlight, and provide excellent nesting and foraging resources. With an increase in area of such sandy habitats, environmental heterogeneity will tend to increase so that more species will be able to find their specific resources which are more likely to persist from year to year. Disturbance of sandy habitats by rabbit burrowing, public pressure within limits or the digging of sand pits increases the habitat's suitability for aculeate wasps and bees.

Ball (1992) showed a negative relationship between diversity and rarity for lowland peat bog habitat. Peat bogs have low species richness but many of the species are restricted to peat bogs. Since peat bogs are a rare habitat the bog specialities are rare

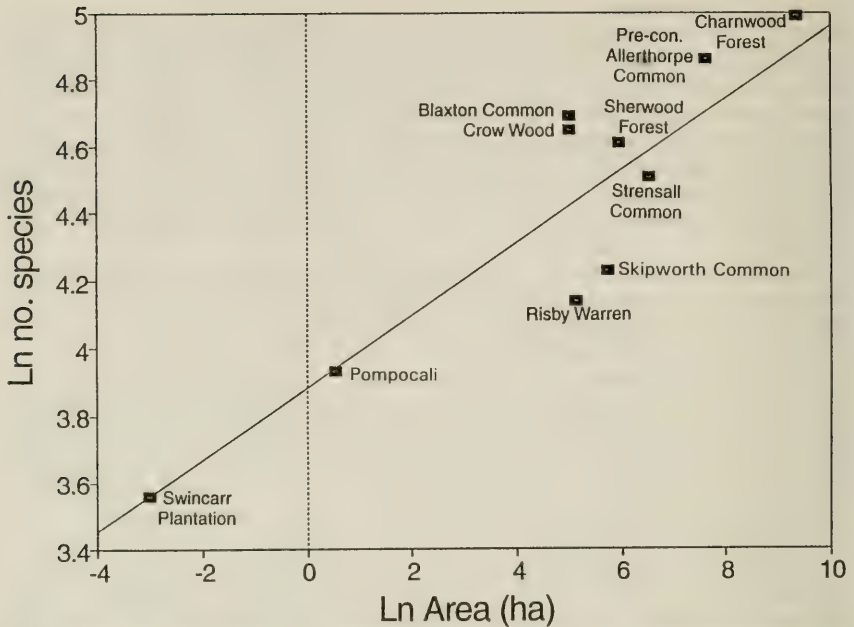


Fig. 1. The number of species as a natural logarithm (\ln) versus area (ha) as a natural logarithm (\ln) of the species of solitary wasps and bees recorded from sandy habitats in Watsonian Yorkshire and elsewhere in England. The regression line is given by $\ln S = 3.87 + 0.11 \times \ln A$, where S = number of species and A = area in hectares.

species. Disturbance of a peat bog by peat cutting or increasing drainage increases diversity, but the rare species tend to be lost.

Thus the relationship between diversity and rarity may be positive or negative. This observation has implications for the conservation of wildlife. The aim of increasing diversity within a particular habitat may or may not be suitable, depending on the type of habitat and group of organisms to be conserved.

CLEPTOPARASITIC LOAD

Wcislo (1987) showed that the amount of parasitic behaviour among aculeate Hymenoptera correlated with geographical latitude, being higher in the temperate compared with the tropical regions. If this is the case, since England and Wales occupy less than 6° of latitude then the CLs for localities in England and Wales should have similar values. Table 9 shows the CLs for the 11 data sets of sandy habitats. The CLs of the solitary wasps all have a similar value (range 13.2–20.0) as do the solitary bees (range 25.0–36.6). The higher CL for the solitary bees versus the solitary wasps is a function of the British fauna and is probably a consequence of food-chain relationships. Host solitary wasp species are the less numerous secondary consumers and thus less likely to support cleptoparasitic species, while the host solitary bee species are the more numerous primary consumers and thus more likely to support cleptoparasitic species.

Table 9. A comparison of the cleptoparasitic loads and nesting habits of the species of solitary wasps and bees of sandy habitats in Watsonian Yorkshire and elsewhere in England.

	Cleptoparasitic loads		Aerial nester frequency	
	Wasps	Bees	Wasps	Bees
Sherwood Forest	17.6	25.0	47.6	19.4
Pre-coniferized				
Allerthorpe Common	16.9	32.8	45.3	16.3
Charnwood Forest	18.1	27.0	71.2	22.2
Crow Wood	16.9	28.9	20.4	9.4
Strensall Common	18.0	35.0	41.5	19.2
Coniferized				
Allerthorpe Common	13.9	35.9	20.0	8.0
Pompocali	20.0	36.6	12.5	0.0
Blaxton Common	15.0	26.5	43.1	13.9
Risby Warren	17.2	29.4	12.5	8.3
Skipwith Common	13.2	35.5	42.4	30.0
Swincarr Plantation	16.7	34.8	0.0	6.7
British Isles	17.8	26.0	44.9	19.0

AERIAL NESTER FREQUENCY

The AFs of the species of solitary wasps (range 0.0–71.2) and solitary bees (0.0–30.0) from the 11 data sets are rather variable (Table 9). Much of the variation of AFs is dependent on the availability of aerial nesting sites (Archer, 1993b), but the higher solitary wasp aerial nester frequency of Charnwood Forest could be related to its higher altitude, where average temperatures and amounts of sunshine would be reduced. Under such weather conditions, aerial nesting sites are likely to warm up quicker and be warmer for a longer time than subterranean sites. Lomholdt (1975) showed that aerial nester frequency increased with increasing latitude for Sphecidae (28% in France and 79% in northern Norway) along a decreasing warmth gradient. It is unlikely that much of the variation of AFs is dependent on the availability of subterranean nesting sites because all localities under study are sandy habitats and personal investigation has shown that such habitats are very favourable to subterranean nesters.

The higher AFs for solitary wasps compared with solitary bees are a function of the British fauna and are probably a consequence of the cooler English climate. It is known that the activities of solitary wasps are more affected by weather conditions than those of solitary bees in England (Archer, 1990b) so that as explained by the altitude effect, solitary wasp species are more likely to be successful as aerial nesters.

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APPENDIX. ACULEATE WASP AND BEE SPECIES RECORDED FROM CROW WOOD

* Yorkshire rare species. ** Yorkshire local species.

Dryinidae. *Aphelopus melaleucus* (Dalman), *A. serratus* Richards, *Anteon arcuatum* (Kieffer), *A. brachycerum* (Dalman), *A. ephippiger* (Dalman), *A. flavicorne* (Dalman), *A. fulviventer* (Haliday), *A. gaulei* (Kieffer), *A. jurineanum* Lat., *A. pubicorne* (Dalman), *A. tripartitum* Kieffer, *Lonchodryinus ruficornis* (Dalman), *Gonatopus sepsoides* Westw., *Pseudogonatopus distinctus* (Kieffer).

Bethylidae. *Bethylus cephalotes* Förster, *B. fuscicornis* (Jurine).

Chrysididae. *Omalus auratus* (L.), *Chrysis angustula* Schenck, *C. ruddii* Shuck**, *C. impressa* Schenk, *Chrysis cyanea* (L.), *Hedychridium ardens* (Lat.)**, *Cleptes semiauratus* (L.)*.

Mutillidae. *Myrmosa atra* Panz.

Pompilidae. *Priocnemis exaltata* (F.), *P. perturbator* (Harris), *P. parvula* Dahlbom, *P. schioedtei* Haupt, *Pompilus cinereus* (F.)**, *Arachnospila anceps* (Wesm.), *A. trivalis* (Dahlbom), *A. spissa* (Schiødte), *Anoplius concinnus* (Dahlbom), *A. viaticus* (L.)**, *A. infuscatus* (V.d.Lind.)*, *Evagetes crassicornis* (Shuck.).

Eumenidae. *Ancistrocerus parietinus* (L.), *A. oiventris* (Wesm.), *A. scoticus* (Curt.), *Symmorphus mutinensis* (Baldini).

Vespidae. *Dolichovespula sylvestris* (Scop.), *Vespula austriaca* (Panz.), *V. rufa* (L.), *Paravespula germanica* (F.), *P. vulgaris* (L.).

Sphecidae. *Astata pinguis* (Dahlbom), *Tachysphex pompiliformis* (Panz.)**, *T. unicolor* (Panz.)*, *Trypoxylon attenuatum* Smith, F., *T. figulus* (L.), *Crabro cribrarius* (L.)**, *C. peltarius* (Schreb.)**, *Crossocerus elongatulus* (V.d.Lind.), *C. ovalis* Lepel. & Brullé, *C. palmipes* (L.)*,

C. tarsatus (Shuck.), *C. varus* Lepel. & Brullé, *C. wesmaeli* (V.d.Lind.), *C. nigrilus* (Lepel & Brullé), *C. quadrimaculatus* (F.), *Lindeni* *albilabris* (F.), *Entomognathus brevis* (V.d.Lind.), *Rhopalum coarctatum* (Scop.), *Oxybelus uniglumis* (L.)**, *Psen dahlbomi* (Wesm.), *P. bicolor* Jurine*, *P. equestris* (F.)**, *P. lutarius* (F.)*, *Pemphredon inornatus* Say, *Diodontus luperus* Shuck.*, *D. minutus* (F.)**, *D. tristis* (V.d.Lind.)**, *Passaloecus singularis* Dahlbom, *Ammophila sabulosa* (L.)**, *Mellinus arvensis* (L.)**, *Nysson spinosus* (Forster), *N. trimaculatus* (Rossius)*, *Gorytes quadrifasciatus* (F.), *G. tumidus* (Panz.), *Argogorytes mystaceus* (L.), *Cerceris arenaria* (L.)*.

Colletidae. *Colletes fodiens* (Geoff.), *Hylaeus communis* Nylander, *H. brevicornis* Nylander*.

Andrenidae. *Andrena clarkella* (Kirby)**, *A. fulva* (Müller), *A. jacobi* Perkins, *A. bicolor* F., *A. angustior* (Kirby), *A. nigroaenea* (Kirby), *A. haemorrhoea* (F.), *A. tibialis* (Kirby)*, *A. barbilabris* (Kirby)**, *A. chrysoseles* (Kirby), *A. humilis* Imhoff, *A. minutula* (Kirby), *A. saundersella* Perkins, *A. subopaca* Nylander, *A. ovatula* (Kirby)*, *A. wilkella* (Kirby), *Panurgus banksianus* (Kirby)*.

Halictidae. *Halictus rubicundus* (Christ), *H. tumulorum* (L.), *Lasioglossum leucozonium* (Schr.), *L. calceatum* (Scop.), *L. nitidiusculum* (Kirby), *L. punctatissimum* (Schenck), *L. rufitarse* (Zett.), *L. villosulum* (Kirby), *L. leucopum* (Kirby), *Sphecodes fasciatus* von Hagens, *S. gibbus* (L.), *S. monilicornis* (Kirby), *S. pellucidus* Smith**.

Megachilidae. *Osmia laeiana* (Kirby), *Megachile versicolor* Smith.

Anthophoridae. *Nomada fabriciana* (L.), *N. flavopicta* (Kirby)*, *N. fulvicornis* (F.)*, *N. goodeniana* (Kirby), *N. leucophthalma* (Kirby)**, *N. marshamella* (Kirby), *N. panzeri* Lepel., *N. striata* F., *Epeolus variegatus* (L.), *Anthophora furcata* (Panz.).

Apidae. *Bombus lucorum* (L.), *B. terrestris* (L.), *B. lapidarius* (L.), *B. pratorum* (L.), *B. hortorum* (L.), *B. pascuorum* (Scop.), *Psithyrus bohemicus* (Seidl), *P. vestalis* (Geoff.), *Apis mellifera* L.

BOOK REVIEWS

The insects: an outline of entomology by P. J. Gullan and P. S. Cranston. Chapman & Hall, London, 1994, xiv + 491 pages, £24.99, paperback.—The history of entomology has been one of increasing fragmentation and specialization. General texts, like this one, serve primarily to inform students; but also they provide a means by which specialists can update themselves by access to a modern framework for insect science. The writers have succeeded in compiling a well-integrated book, attractively presented and very reasonably priced.

The volume is divided into 15 chapters. After an introduction on the importance and diversity of insects, which incorporates a table with brief characterizations of the 29 orders recognized, there follow seven chapters dealing, broadly speaking, with structure, function and development. External anatomy is reviewed briefly in chapter 2, followed (chapter 3) by a treatment of internal anatomy and related physiological function. Sensory systems and the main components of insect behaviour are described in chapter 4. Reproduction is the subject of a chapter (5) to itself and incorporates the relevant aspects of behaviour, morphology, physiology and the diversity of modes of reproduction (e.g., parthenogenesis, neoteny, polyembryony). It is followed, logically enough, by insect development and life histories (chapter 6), which considers not only the expected topics such as ontogeny, voltinism and polymorphism, but also examines how an understanding of certain environmental factors affecting development can be applied to model predictively insect abundance and distribution.

Chapter 7, on insect systematics, phylogeny and evolution, is followed by eight chapters, shifting the course of the book to somewhat broader entomological themes. The first two of these chapters (8 and 9) deal with aspects of insect biology in particular habitats—the soil (including also litter, carrion and dung) and water. Chapter 10 is

about insects and plants, 11 addresses insect societies, 12 concerns predation and parasitism, and 13 examines insect defence. In the final chapters, the writers turn their attention to insects of medical and veterinary importance (14) and to pest management (15).

Two underlying aspects of this book are particularly attractive. One is the way in which the writers bring to the fore the *dynamics* of insect biology. Wherever possible technical detail, which is abundant, is portrayed in the light of the 'problems' that insects face and the 'solutions' to those problems. The other is the very evident enthusiasm Gullan and Cranston have for communication, a quality apparent in the thoughtful planning of the structure of the book, the care that has gone into selecting the illustrations (drawn by Karina Hansen McInnes), the use of boxes for special topics, and the clarity of the prose. The writers, rightly, have no inhibition about making extensive use of Latin and Greek-based terminology; rather they demonstrate, by the use of pithy definitions in the text supported by an effective glossary, just how succinct and elegant technical language can be—giving the lie to that trite generalization that scientists cannot write.

Although both writers are systematists, they deliberately avoid treating the insects order by order. Their taxonomic background has, however, been used to great effect in structuring whole-organism entomology into a lucid text and in illustrating the biological concepts with which they deal by a wide variety of insectan examples.

Potential buyers may wonder, not unreasonably, how this book compares with another volume from Australia-based entomologists *Systematic and applied entomology* (1994, edited by I. D. Naumann), which is an abridged version of the second edition of *Insects of Australia*. They may be reassured. Although, inevitably, there is some overlap, the works differ significantly in content, balance and approach. The greater part of *The insects* is theme-based, and the style more analytical than descriptive. *Systematic and applied entomology* is a multi-author work that takes a more taxon-based line and will probably have a more specialized readership.

MALCOLM J. SCOBLE

Insects: life cycles and the seasons by John Brackenbury. Blandford, 1994, 192 pages, £19.99, hardback.—The five chapters of this book cover various aspects of the lives and behaviour of insects. Each chapter has a short introductory section but most of the text is in the form of descriptive captions to the 215 colour illustrations. Three of the pictures are incorrectly identified. No. 22 primrose, *Primula farinosa*, is cowslip, *P. veris* L., No. 171 a click beetle is the wasp nest beetle, *Metoecus paradoxus* (L.), and No. 26 shows the larvae of a bibionid fly rather than a crane fly. The text contains some personal observations on insect behaviour made by the author but this is a book primarily for enjoying the photographs rather than for reading.

Apart from a few habitat photographs, the illustrations are close-up views of a wide range of insects and a few spiders. They are shown feeding, mating, overwintering and in motion. Those showing insects leaping or in flight are particularly impressive. Ladybirds and other shiny insects have, however, caused the author some problems by showing a reflection of the ring flash used to illustrate the subject.

A. J. HALSTEAD

THE MOTHS AT CARLYON BAY, CORNWALL RECORDED 1989-1993

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INTRODUCTION

Carlyon Bay is the name given to a complex of beaches south-east of St Austell, Cornwall. There are three beaches called (from west to east) Crinnis, Shorthorn and Polgaver beach. Crinnis Beach is heavily used by holidaymakers, attracted to the site by the presence of Cornwall Colliseum, a leisure park with facilities for adults and children. Fewer people use Shorthorn Beach, which is further from car parking facilities. The long walk required to reach Polgaver Beach means that the site is only sparsely used (it is now a designated nudist beach). In past years, a small train took passengers across Shorthorn Beach to the western edge of Polgaver beach, but this train stopped running in 1992 following major storm damage to the track.

Crinnis Beach consists of a narrow strip of sand backed by a large car park, behind which rise tall cliffs which contain interesting plant communities. Shorthorn Beach is a wilder place. At the western end is a wide flat area above the beach with many kinds of grasses and low-growing plants such as *Potentilla reptans* L., *P. anserina* L. and *Senecio jacobaea* L. Just above the beach to the east of this area there is a small area of dune dominated by *Ammophila arenaria* (L.) Link, backed by a narrow belt of trees (mainly *Salix cinerea* L. and *Betula pubescens* Ehrh.) with abundant *Rubus* sp. and *Crocoshmia x crocosmiflora* (Lemoine ex Burb & Dean). A small adit flanked by *Alnus glutinosa* (L.) Gaertner runs to the sea. The tracks of the railway enscribe a large circle round a hollow with *Salix cinerea* growing in places in standing water. Between this woodland and the faulted shales of the cliff lies a small heathy area with some *Calluna vulgaris* (L.) Hull, *Erica cinerea* L., *Ulex europaeus* L. and *Pteridium aquilinum* (L.) Kuhn.

Polgaver Beach is similar in many ways to Shorthorn Beach, although the dunes are higher with more *Ammophila arenaria*. The garden introduction *Rosa rugosa* Thunb. ex Murray is abundant here (first recorded here in 1922). On the inland edge of the dunes grow *Salix cinerea* and some *Alnus glutinosa*, leading down into a dune slack with wetland plants such as *Iris pseudacorus* L. Behind a large seasonal pond (often dry in summer) is more willow growing on grassy ground rising up to the high cliffs here. These coastal habitats are rare on the south-east coast of Cornwall.

THE HISTORY OF CARLYON BAY BEACH

The St Austell area is well known for its associations with the china clay industry. North of the town lies the lunar landscape of the china clay tips, white conical hills composed of the waste quartz-sand and undecayed granite, left over after the extraction of kaolin (china clay). 100 years after the foundation of the china clay industry, china clay operations were established on four sites north of Carlyon Bay around 1865. For the next 80 years or so the fine sand and mica residue was carried away from the open mine areas by a system of leats and natural streams, all flowing eventually into a single stream crossing what is now the golf course and then into an adit which discharged this residue onto Shorthorn Beach (Grigg, pers. comm.). In the late 1950s, some of the mine residue was contained on site, but discharges continued from some sites until the mid-1970s. Today, the stream still has a milky appearance. The

deposition of this residue has built up the beach, which is largely composed of coarse grains of quartz. The sand is too coarse for *Ammophila arenaria*, which just sits on top in the areas of finer sand. The areas behind these dunes have been built up by the deposition of china clay waste dredged up from the sea bed near Par Harbour (Lees, pers. comm.). These areas retain moisture even in the driest summer.

Although these beaches are of recent industrial origin, they have become rich in wildlife. There has been much recent interest in the colonization by nature of industrial sites (see Box, 1993, 1994). In Cornwall ECC International Ltd are running an on-going land reclamation programme (Wardell Armstrong, 1993). The importance of the site for wildlife was recognized by South West Water who in 1992 constructed a new sewage pipe across Polgaver Beach into the sea. Although much of the habitat was destroyed during the construction work, restoration work has now taken place to reinstate the dunes and the willow carr. Unfortunately, no account was taken of the moths of the site during this work.

METHODS

The collecting and recording was done by several people (particularly Bill Kittle and Phil Boggis) over a 4-year period, especially in 1992 and 1993. Records were also contributed by Abigail and Simon Boggis, Clarence Brind, David Evans, John Gregory, Paul Siddons, Lee Slaughter and myself. Bill Kittle has had a long association with the site and it was he who first drew my attention to its excellence for moths. Surveying was mainly carried out by lamping and torchlight searching for larvae. Some larvae were bred through by Bill for later identification. Critical species were examined by Paul Siddons and myself.

RESULTS

A detailed list of the species recorded at Carlyon Bay 1989–1993 is given in the Appendix; 331 species were recorded.

Seventeen nationally notable species (see Ball, 1986, updated by Waring, 1993) were recorded, comprising three notable A species, 13 notable B species and one notable

Table 1. Nationally important species found at Shorthorn and Polgaver Beach 1989–1993.

Name	Classification	Habitat
<i>Agrotis ripae</i> Hübn.	Notable B	sand-dune
<i>Agrotis trux</i> Hübn.	Notable B	cliff
<i>Bembecia muscaeformis</i> Esp.	Notable B	rocks/cliff
<i>Catarhoe rubidata</i> D.&S.	Notable B	cliff
<i>Conistra rubiginea</i> D.&S.	Notable B	woodland
<i>Earias clorana</i> L.	Notable B	damp woods
<i>Eilema caniola</i> Hübn.	Notable B	cliffs
<i>Eupithecia distinctaria</i> H.-S.	Notable B	coastal areas
<i>Hadena luteago barrettii</i> Doubl.	Notable A	cliffs
<i>Mecyna asinalis</i> Hübn.	Notable B	cliffs
<i>Meganola albula</i> D.&S.	Notable B	coastal areas
<i>Mythimna litoralis</i> Curt.	Notable B	sand-dunes
<i>Mythimna l-album</i> L.	Notable B	coastal areas
<i>Mythimna putrescens</i> Hübn.	Notable A	cliffs
<i>Polymixis xanthomista</i> Hübn.	Notable A	cliffs
<i>Phycitodes maritima</i> Tengst.	Notable	cliffs/beach
<i>Schrankia taenialis</i> Hübn.	Notable B	damp woodland

Table 2. All species recorded at Carlyon Bay classified according to habitat (excluding migrant species).

Habitat	Species numbers
Dry woodland	40
Sand-dune	32
Cliff	30
Scrub	24
Wet woodland	22
Wetland	10
Conifer woodland	7
Generalist species	153
Total	318

Table 3. Migrant species found at Shorthorn and Polgaver Beach 1989-1993.

<i>Agrotis ipsilon</i> Hufn.	dark sword-grass
<i>Autographa gamma</i> L.	silver Y
<i>Earias clorana</i> L.	cream-bordered green pea
<i>Heliothis armigera</i> Hübn.	scarce bordered straw
<i>Mythimna albipuncta</i> D.&S.	white-point
<i>Mythimna l-album</i> L.	L-album wainscot
<i>Mythimna loreyi</i> Dup.	the cosmopolitan
<i>Mythimna vitellina</i> Hübn.	the delicate
<i>Nomophila noctuella</i> D.&S.	rush veneer
<i>Orthonama obstipata</i> F.	the gem
<i>Peridroma saucia</i> Hübn.	pearly underwing
<i>Rhometra sacraria</i> L.	the vestal
<i>Udea ferrugalis</i> Hübn.	

species (Table 1). The mix of notable species comprises an interesting collection of cliff (nine species), sand-dune (two species) and woodland (three species) species. In fact, out of the total 331 species recorded, I have calculated that 30 were cliff species, 32 were sand-dune species, 62 were woodland species (including 22 wet woodland species), 24 were scrubland species and 10 were wetland species (Table 2).

The status of *Phycitodes maritima* has recently been revised by Parsons (1993) and is now provisionally classed as notable (a downward revision from notable status B), i.e. its distribution is insufficiently known for detailed classification.

Bill Kittle found signs of larvae of *Sesia bembeciformis* Hübn. feeding in willow on Polgaver Beach, but there was heavy predation by green woodpeckers and this moth may no longer be present here.

The beach has proved to be of exceptional value for migrants during this period, when 13 migrant species were recorded (Table 3).

DISCUSSION

Migrants

We did well for migrants at the site. Although moths may arrive at the site at random, they are likely to stay at Carlyon Bay where there are nectar sources and hiding places, thus increasing the chance of encounters by visiting entomologists. They can only leave the site by flying out to sea or upwards over the steep cliff. Some

migrants may breed here. For example, *Mythimna l-album* is probably a temporary resident here; although most specimens were recorded in September and October, the single found here on 19.vi.1992 may well have been a first-brood specimen.

A single specimen of *Earias clorana* was caught by Bill Kittle at mercury vapour light at Shorthorn Beach on 13.vi.92. It was an unusually marked form, subsequently determined by Barry Goater as ab *flavimargo* de Joannis. *E. clorana* is unknown from Cornwall and generally rare in the south-west. (A single *clorana* caught near Exeter by A.H. Dobson on 26.vi.92 was thought to be a migrant). It was therefore at first thought that this specimen was *Earias insulana* (Boisd.) (the Egyptian bollworm), the third British (and first Cornish) record of this rare migrant. It was exhibited as this species (Skinner, 1993), at the 1992 B.E.N.H.S. Annual Exhibition.

Work by Roy McCormick has shown that *E. clorana* occurs commonly on at least one coastal site in Devon. It is therefore possible that this species is breeding at Carlyon Bay, where the damp willow woodland provides a suitable habitat. However, Goater (1994) writes that the British populations of *E. clorana* are apparently invariable apart from size, and Martin Honey (pers. comm.) suggests that ab *flavimargo* has not apparently been recorded in Britain within breeding populations. Examples of ab *flavimargo* such as that taken on 25.vi.1992 by S.A. Knill-Jones on the Isle of Wight (and exhibited at the 1994 B.E.N.H.S. Annual Exhibition (Knill-Jones, 1995) are certainly migrants. Ab *flavimargo* has been recorded from Brittany and it is therefore likely that the singleton recorded at Carlyon Bay was a migrant from France.

Habitats and national importance

Table 2 classifies moths according to habitats which can be found at Carlyon Bay. All the species recorded at Carlyon Bay can fly and therefore may have come from neighbouring areas, but I consider this site to be largely a closed community (apart from migrants) surrounded as it is by cliffs on one side and the sea on the other.

Carlyon Bay is of some importance in national terms (Tables 1 and 4), but no red Data Book species were recorded there. Emmet (1991) allocated species to the principal habitats in which they are commonly found. He divided maritime habitats into five subsections (salt-marsh, sand-dune, cliff and undercliff, shingle beach and 'other maritime situations'). I have calculated from this list that there are a total of 358 maritime species (excluding all butterflies and migrant species) found in Britain and Ireland, not counting those generalist species that can be found anywhere. Several of these species can be found in more than one of these habitats, so that adding up the number of species in each of these habitats gives a total of 451 species. A small proportion (average 13%) of these have been recorded at Carlyon Bay (Table 4). It

Table 4. Numbers of moth species found in maritime habitats.

Habitat type	Britain & Ireland nos*	Carlyon Bay nos	% of total for Britain & Ireland
Salt-marsh	57	4	7
Sand-dune	133	23	17
Cliff and undercliff	119	23	19
Shingle beach	50	5	10
Other maritime situations	92	10	11
Totals	451	64	average 13

*According to Emmet & Heath (1991) habitat classification.

would be useful to compare the proportion of maritime species here with those at other coastal sites. This would allow us to build up a picture of the relative importance in national terms of coastal sites for moths.

Some of the moths recorded here (e.g. *Cucullia chamomillae* and *Malacosoma neustria*) have no close association with maritime habitats according to Emmet & Heath (1991), although all can be found regularly in coastal situations in Cornwall. This shows how regional variations in habitat preference can modify the overall picture (and also explains why the species totals in Table 2 differ from those in Table 4).

Local importance

The interest of the site lies mainly in the juxtaposition of widely different habitats and the moths that live there. I estimate that there are 32 resident macro-moths found in Cornwall which are restricted to coastal areas (Table 5). Of these 18 (56%) have been recorded at Carlyon Bay, making it a very important coastal site for Lepidoptera in local terms.

Table 5. Resident Macro-moths in Cornwall with a distribution largely restricted to the coast.

Species name	Recorded at Carlyon Bay? (Y = yes N = no)
<i>Agrotis ripae</i> Hübn.	Y
<i>Agrotis trux</i> Hübn.	Y
<i>Agrotis vestigialis</i> Hufn.	Y
<i>Aporophyla australis</i> Boisd.	N
<i>Aspitates ochrearia</i> Rossi	N
<i>Bembecia muscaeformis</i> Esp.	Y
<i>Catarhoe rubidata</i> D.&S.	Y
<i>Cucullia chamomillae</i> D.&S.	Y
<i>Dasytoplia templi</i> Thunb.	N
<i>Eilema complana</i> L.	N
<i>Eilema caniola</i> Hübn.	Y
<i>Epirrhoe galiata</i> D.&S.	Y
<i>Eupithecia denotata jasioneata</i> Crewe	N
<i>Eupithecia distinctaria</i> H.-S.	Y
<i>Eupithecia simpliciatata</i> Haw.	Y
<i>Euxoa nigricans</i> L.	N
<i>Euxoa obelisca</i> D.&S.	N
<i>Euxoa tritici</i> L.	Y
<i>Gnophos obscurata</i> D.&S.	N
<i>Hadena luteago barrettii</i> Doubl.	Y
<i>Hadena perplexa</i> D.&S.	Y
<i>Hyloicus pinastri</i> L.	N
<i>Leucochlaena oditis</i> Hübn.	N
<i>Luperina nickerlii leechi</i> Goater	N
<i>Lygephila cracca</i> D.&S.	N
<i>Meganola albula</i> D.&S.	Y
<i>Mythimna l-album</i> L.	Y
<i>Mythimna litoralis</i> Curt.	Y
<i>Mythimna putrescens</i> Hübn.	Y
<i>Nudaria mundana</i> L.	N
<i>Polymixis xanthomista</i> Hübn.	Y
<i>Standfussiana lucerneae</i> L.	N

Meganola albula D.&S. (Kent black arches)

Paul Siddons and I found two specimens (one male and one female) of *Meganola albula* at mercury vapour light at Shorthorn beach on 10.vii.92. This is the only site so far in Cornwall for this species. I had been hoping for some time to find this nationally scarce species on the Cornish coast as it has been recorded both sides of Cornwall on the Isles of Scilly and in Devon (Heath & Emmet, 1979). In fact, the records for Scilly are all pre-1980 (Waring, 1992). The only records I can find for Scilly were in 1956, 1957 and 1959 from Tresco, Bryher and St Agnes (per the Cornish Biological Records Unit). Nevertheless, the discovery (although accidental) of *M. albula* here shows that distribution maps can be used to provide clues to where species may be found.

In Britain, *Meganola albula* is a southern species largely confined to the coast but occasionally found inland in woodland clearings. The open woodland habitat here looks ideal. The main foodplant in Britain is considered to be *Rubus caesius* L. (Skinner, 1984), but I could find no trace of this plant here (although Lousley (1971) states that there are several records for the Isles of Scilly). The moth is also known to feed on *Potentilla* and *Fragaria*, but Bill Kittle and I found no sign of larvae on these plants during spring 1993. In fact, we saw no adults in 1993 despite extensive trapping on the site. Unfortunately, a large part of the site had been bulldozed to make a road for construction vehicles and it may be that *M. albula* no longer occurs here (Spalding, in press).

Foodplants

The list of larval foodplants associated with the species recorded at Carlyon Bay. (Table 6) shows the plant species that are likely to occur here. New (1991) suggests

Table 6. Number of moth species (excluding migrants) associated with particular foodplants at Carlyon Bay.

<i>Pulicaria dysenterica</i> (L.) Bernh.	1
<i>Lonicera periclymenum</i> L.	1
<i>Oenanthe crocata</i> L.	1
<i>Typha</i> spp.	1
<i>Betula</i> spp.	2
<i>Thymus polytrichus</i> A. Kerner ex Borbas (= <i>T. praecox</i>)	2
<i>Phragmites</i>	2
<i>Tripleurospermum maritimum</i> (L.) Koch	2
<i>Armeria maritima</i> (Miller) Willd.	3
<i>Calluna vulgaris</i> (L.) Hull	4
<i>Silene uniflora</i> Roth (= <i>S. maritima</i>)	4
<i>Atriplex/Chenopodium</i>	4
Lichen spp.	7
Conifer spp.	7
<i>Quercus</i> spp.	8
<i>Salix</i> spp.	21
Gramineae	33
General polyphagous species	20
Polyphagous on herbaceous plants	48
Polyphagous on trees and shrubs	48
Others	98
[Hymenoptera nests	1]
Total	318

that there may be a complicated relationship between butterflies and hostplant diversity and this is likely to be true of moths. Plant diversity is high at Carlyon Bay because of the number of different habitats and their associated plants, the early successional stage of the dune vegetation which is constantly changing and the recent disturbance of the area which has led to colonization by so-called 'weed' species.

However, some moths have occurred at Carlyon Bay despite the apparent absence of their foodplant. I could find no sign of *Phragmites australis* (Cav.) Trin. ex Steudel in Carlyon Bay, although two moths (*Archanara geminipuncta* and *Rhizedra lutosa*) associated with this foodplant were recorded there. It is well known that *Rhizedra lutosa* can be found at some distance from its foodplant (Skinner, 1984), but *Archanara geminipuncta* is generally considered to be less mobile. In fact, *Phragmites* probably occurred here in previous years near the adit (D. Gibbon, pers. comm.).

The abundance of a foodplant at a site has no apparent bearing on the number of moth species that feed on it. *Armeria maritima* (Miller) Willd. is abundant here but only three moth species feed on it. Conifer trees are scarce, yet seven moth species with conifer-feeding larvae were present on the site, including *Bupalus piniaria* which is particularly rare in east Cornwall.

The community of sand-dune moths at Carlyon Bay

I have calculated from foodplant associations and other factors that there are 32 species associated with the sand-dunes at Carlyon Bay (Table 7), excluding generalist species found in a wide variety of situations. (The figure of 32 differs from Emmet's 23 out of 133 (Table 4) because it is based on local knowledge). These species form a maritime community of moths, apparently a random assemblage of species but probably linked together by a variety of factors such as the structural diversity, historical continuity and maritime aspect of the site, as well as the presence of shared food resources. (e.g. seven species feed on grasses). No attempt was made to assess the abundance of species on this site.

The ecology of most (perhaps all) of the species found here is so poorly understood that we cannot say with certainty which (if any) factors are common to all or most of the species. Several of these species form guilds sharing a common foodplant (e.g. three species feed on *Atriplex* and two on *Taraxacum*), but may utilize different parts of the foodplant at different times of year. The foodplant resource at this site is probably sufficient for the guilds of moths here so that interspecific competition for food is unlikely. (Porter et al (1992) says that there is no clear-cut case of competitive exclusion among British butterflies, but it is possible that competitive exclusion is more common among British moths because there are so many more species on a site such as this.) The moths are here partly because their larval foodplants are present. Their national distributions may be linked to the distribution of the foodplants, but there are other limiting factors such as the prevalence of parasites etc. Moths such as *Mythimna l-album* are probably confined as breeding populations to the frost-free areas on the warm southern cliffs. In Cornwall, *Cucullia chamomillae* is largely confined to the coast, despite the fact that its foodplant (*Tripleurospermum maritimum*) is widespread throughout the county. For these species, the restricted coastal distribution implies that factors other than the availability of foodplant limit their distribution.

Numbers of species

The total of 331 species represents the results of several nights trapping; 83 Geometridae and 118 Noctuidae were recorded. However, some families such as the

Table 7. Sand-dune moths at Carlyon Bay.

Species name	Moth		Foodplant	
	Close coastal association?	Species	Close coastal association?	
<i>Agriphila geniculea</i> Haw.	Y	grasses	N	
<i>Agrotis clavis</i> Hufn.	Y	herb. plants	N	
<i>Agrotis ripae</i> Hübn.	Y	dune plants	Y	
<i>Agrotis vestigiatis</i> Hufn.	Y	grasses etc	N	
<i>Amphipoea oculea</i> L.	Y	grasses	N	
<i>Caradrina clavipalpis</i> Scop.	N	grasses	N	
<i>Celypha striana</i> D.&S.	N	<i>Taraxacum</i>	N	
<i>Cucullia chamomillae</i> D.&S.	Y	<i>Tripleurospermum</i>	N	
<i>Discestra trifolii</i> Hufn.	N	<i>Atriplex</i> etc.	N	
<i>Endotricha flammealis</i> D.&S.	N	polyphagous	N	
<i>Epirrhoe galiata</i> D.&S.	Y	<i>Galium</i>	N	
<i>Eumichtis lichenea</i> Hübn.	N	polyphagous	N	
<i>Eupithecia absinthiata</i> Cl.	N	polyphagous	N	
<i>Eupithecia simpliciat</i> a Haw.	Y	<i>Atriplex</i> etc.	N	
<i>Eupithecia virgaureata</i> Doubl.	N	<i>Senecio</i> etc.	N	
<i>Euxoa tritici</i> L.	Y	polyphagous	N	
<i>Idaea subsericeata</i> Haw.	N	<i>Taraxacum</i>	N	
<i>Hadena luteago barrettii</i> Doubl.	Y	<i>Silene uniflora</i>	Y	
<i>Lacanobia oleracea</i> L.	Y	<i>Atriplex</i> etc.	N	
<i>Luperina testacea</i> D.&S.	Y	grasses	N	
<i>Meganola albula</i> D.&S.	Y	<i>Rubus</i> etc.	N	
<i>Mesoligia furuncula</i> D.&S.	Y	grasses	N	
<i>Mythimna l-album</i> L.	Y	grasses	N	
<i>Mythimna litoralis</i> Curt.	Y	<i>Ammophila</i>	Y	
<i>Paradiarsia glareosa</i> Esp.	N	polyphagous	N	
<i>Perizoma alchemillata</i> L.	N	<i>Galeopsis</i>	N	
<i>Perizoma flavofasciata</i> Thunb.	Y	<i>Silene</i> spp.	N	
<i>Phycitodes maritima</i> Tengst.	Y	<i>Achillea</i> etc.	N	
<i>Phycitodes saxicola</i> Vaugh.	Y	<i>Anthemis</i> etc.	N	
<i>Scotopteryx chenopodiata</i> L.	Y	<i>Vicia</i> etc.	N	
<i>Semiothisa alternaria</i> Hübn.	N	<i>Salix</i> etc.	N	
<i>Teleiopsis diffinis</i> Haw.	N	<i>Rumex acetosella</i>	N	

Giracillariidae, Coleophoridae and Elachistidae (one species each) were under-recorded, indicating an over-reliance on the attractiveness of light to moths on our part. It is likely that there are many more species still to be found on the site.

SUMMARY

The national importance of a site such as Carlyon Bay for moths may be evaluated according to the number of nationally notable species present. However, this method concentrates on a small proportion of the total number of species and ignores the communities of moths present. An alternative method is to calculate the proportion of species present which are representative of the types of habitat available to the moths. Emmet's classification of all British species allows us to do this on a national scale. On this basis, Carlyon Bay has 13% of the maritime species of Britain. Carlyon Bay also has 56% of the Cornish maritime macro-moths, making it important in local terms. Taking one habitat (sand-dune), this site has 17% of the sand-dune species

nationally, but with local knowledge we can list 32 species with close links to this habitat. Many species are here partly because their larval foodplants are present, but the disparity between the distribution of foodplants and of moths indicates that factors other than the availability of foodplant limit the distribution of these sand-dune moths.

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I wish to thank all the people who accompanied me on the moth collecting trips in Carlyon Bay as well as those who provided additional moth records, especially Bill Kittle and Phil Boggis. Dave Gibbon and Steven Lees of Wildlife Woodlands provided information about the history of the site, as did Mr Grigg of ECC International Ltd. I also thank Frank Smith for preparing the genitalia slide of *Earias clorana* and Barry Goater, Martin Honey and Roy McCormick for valuable information on this species and others within the *Earias* genus.

CLARENCE BRIND

11.vii.92 was the night we made the first capture of *Meganola albula* for Cornwall. Clarence Brind shared this moment with us. It was unfortunately the last moth trip I went on with Clarence, who died on 8.ii.93. Clarence was well known in Cornwall and beyond as a real enthusiast for all kinds of wildlife. During the course of his life, he built up a huge collection of insects from around the world stored in several hundred large display boxes. Unfortunately, I never knew Clarence as well as I would have wished, but I was privileged to accompany him on several nocturnal mothing trips and will always remember his sense of humour, his knowledge and above all his keen appreciation of the beauty of all living things.

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APPENDIX. LIST OF SPECIES RECORDED FROM THE STUDY AREA

- Hepialidae. *Hepialus humuli* L.
- Incurvariidae. *Nematopogon swammerdamella* L., *Nemophora degeerella* L.
- Gracillariidae. *Parornix anglicella* Stt.
- Sesiidae. *Sesia bembeciformis* Hübn., *Bembecia muscaeformis* Esp.
- Yponomeutidae. *Argyresthia brockeella* Hübn., *Argyresthia retinella* Zell., *Yponomeuta padella* L., *Paraswammerdamia albicapitella* Scharf., *Ypsolopha parenthesella* L., *Ypsolopha ustella* Cl., *Plutella xylostella* L.
- Coleophoridae. *Coleophora albicosta* Haw.
- Elachistidae. *Elachista canapennella* Hübn.
- Oecophoridae. *Hofmannophila pseudospretella* Stt., *Carcina quercana* F., *Depressaria daucella* D.&S., *Agonopterix heracliana* L., *Agonopterix subpropinquella* Stt., *Agonopterix arenella* D.&S., *Agonopterix ocellana* F., *Agonopterix assimilella* Treit., *Agonopterix nervosa* Haw.
- Gelechiidae. *Aristotelia ericinella* Zell., *Teleiopsis diffinis* Haw., *Scrobipalpa costella* Humph. & Westw., *Caryocolum blandella* Dougl., *Anarsia spartiella* Schr., *Hypatima rhomboidella* L., *Brachmia blandella* F.
- Tortricidae. *Phtheochroa inopiana* Haw., *Cochylimorpha straminea* Haw., *Agapeta hamana* L., *Agapeta zoegana* L., *Eupoecilia angustana* Hübn., *Pandemis cerasana* Hübn., *Pandemis heparana* D.&S., *Archips podana* Scop., *Clepsis consimilana* Hübn., *Epiphyas postvittana* Walk., *Lozotaenia forsterana* F., *Titula angustiorana* Haw., *Cnephasia stephensiana* Doubl., *Cnephasia asseclana* D.&S., *Acleris variegana* D.&S., *Acleris hastiana* L., *Acleris emargana* F., *Celypha striana* D.&S., *Olethreutes lacunana* D.&S., *Olethreutes bifasciana* Haw., *Hedya pruniana* Hübn., *Hedya dimidioalba* Retz., *Endothenia marginana* Haw., *Lobesia littoralis* Humph. & Westw., *Bactra lancealana* Hübn., *Epinotia immundana* F.v.R., *Epinotia nisella* Cl., *Rhopobota myrtilana* Humph. & Westw., *Epiblema uddmanniana* L., *Epiblema rosaeolana* Doubl., *Eucosma cana* Haw., *Spilonota ocellana* D.&S., *Pammene argyrana* Hübn., *Cydia succedana* D.&S., *Cydia splendana* Hübn.
- Alucitidae. *Alucita hexadactyla* L.
- Pyralidae. *Chrysoteuchia culmella* L., *Crambus perlella* Scop., *Agriphila straminella* D.&S., *Agriphila tristella* D.&S., *Agriphila geniculea* Haw., *Catoptria pinella* L., *Platytes cerussella* D.&S., *Scoparia ambigua* Treit., *Dipleurina lacustrata* Panz., *Eudonia angustea* Curt., *Eudonia mercurella* L., *Eurrhypara hortulata* L., *Perinephela lancealis* D.&S., *Phlyctaenia coronata* Hufn., *Ebulea crocealis* Hübn., *Udea olivialis* D.&S., *Udea ferrugalis* Hübn., *Mecyna asinalis* Hübn., *Nomophila noctuella* D.&S., *Pleuroptya ruralis* Scop., *Hypsopygia costalis* F., *Endotricha flammealis* D.&S., *Aphomia sociella* L., *Numonia advenella* Zinck., *Phycita roborella* D.&S., *Pempelella diluta* Haw., *Homoeosoma sinuella* F., *Phycitodes saxicola* Vaugh., *Phycitodes maritima* Tengst.
- Pterophoridae. *Pterophorus pentadactyla* L.
- Lasiocampidae. *Malacosoma neustria* L., *Lasiocampa quercus* L., *Macrothylacia rubi* L., *Philudoria potatoria* L.
- Drepanidae. *Drepana falcataria* L., *Cilix glaucata* Scop.
- Thyatriridae. *Thyatira batis* L., *Habrosyne pyrroides* Hufn., *Ochropacha duplaris* L.
- Geometridae. *Alsophila aescularia* D.&S., *Hemithoa aestivaria* Hübn., *Timandra griseata* Peters. *Scopula imitaria* Hübn., *Scopula immutata* Linn., *Scopula floslactata* Haw., *Idaea biselata* Hufn., *Idaea fuscovenosa* Goetze, *Idaea dimidiata* Hufn., *Idaea subsericeata* Haw., *Idaea aversata* L., *Rhodometra sacraria* L., *Orthonama obstipata* F., *Xanthorhoe spadicearia* D.&S., *Xanthorhoe ferrugata* Cl., *Xanthorhoe montanata* D.&S., *Xanthorhoe fluctuata* L., *Scotopteryx chenopodiata* L., *Catarhoe rubidata* D.&S., *Catarhoe cuculata* Hufn., *Epirrhoe alternata* Müll., *Epirrhoe galiata* D.&S., *Campptogramma bilineata* L., *Anticlea badiata* D.&S., *Anticlea derivata* D.&S., *Lampropteryx suffumata* D.&S., *Cosmorhoe ocellata* L., *Ecliptopera silaceata* D.&S.,

Chloroclysta truncata Hufn., *Cidaria fulvata* Forst., *Thera firmata* Hübn., *Thera obeliscata* Hübn., *Thera britannica* Turn., *Electrophaes corylata* Thunb., *Colostygia pectinataria* Knoch, *Hydriomena furcata* Thunb., *Perizoma affinitata* Steph., *Perizoma alchemillata* L., *Perizoma flavofasciata* Thunb., *Eupithecia tenuitata* Hübn., *Eupithecia pulchellata* Steph., *Eupithecia venosata* F., *Eupithecia centaureata* D.&S., *Eupithecia absinthiata* Cl., *Eupithecia vulgata* Haw., *Eupithecia subfuscata* Haw., *Eupithecia simpliciatata* Haw., *Eupithecia distinctaria* H.-S., *Eupithecia nanata* Hübn., *Eupithecia virgaureata* Doubl., *Eupithecia abbreviata* Steph., *Eupithecia dodoneata* Guen., *Chloroclystis v-ata* Haw., *Chloroclystis rectangularata* L., *Gymnoscelis rufifasciata* Haw., *Euchoeca nebulata* Scop., *Asthena albulata* Hufn., *Trichopteryx carpinata* Borkh., *Pterapherapteryx sexalata* Retz., *Acasis viretata* Hübn., *Abraxas grossulariata* L., *Lomaspilis marginata* L., *Semiothisa alternaria* Hübn., *Petrophora chlorosata* Scop., *Eupisthographis luteolata* L., *Epione repandaria* Hufn., *Apeira syringaria* L., *Ennomos alniaria* L., *Selenia dentaria* F., *Odontopera bidentata* Cl., *Crocallis elinguarina* L., *Ourapteryx sambucaria* L., *Biston betularia* L., *Peribatodes rhomboidaria* D.&S., *Alcis repandata* L., *Cleorodes lichenaria* Hufn., *Ectropis crepuscularia* D.&S., *Bupalus piniaria* L., *Cabera pusaria* L., *Cabera exanthemata* Scop., *Lomographa temerata* D.&S., *Campaea margaritata* L., *Hyalaea fasciaria* L.

Sphingidae. *Sphinx ligustri* L., *Laothoe populi* L., *Deilephila elpenor* L., *Deilephila porcellus* L.

Notodontidae. *Phalera bucephala* L., *Cerura vinula* L., *Notodonta dromedarius* L., *Eligmodonta ziczac* L., *Pheosia gnoma* F., *Pheosia tremula* Cl., *Ptilodon capucina* L., *Pterostoma palpina* Cl., *Drymonia ruficornis* Hufn.

Lymantridae. *Dasychira pudibunda* L., *Lymantria monacha* L.

Arctiidae. *Miltochrista miniata* Forst., *Eilema griseola* Hübn., *Eilema caniola* Hübn., *Eilema lurideola* Zinck., *Spilosoma lubricipeda* L., *Spilosoma luteum* Hufn., *Phragmatobia fuliginosa* L.

Nolidae. *Meganola albula* D.&S., *Nola confusalis* H.-S.

Noctuidae. *Euxoa tritici* L., *Agrotis vestigialis* Hufn., *Agrotis segetum* D.&S., *Agrotis clavus* Hufn., *Agrotis exclamationis* L., *Agrotis trux* Hübn., *Agrotis ipsilon* Hufn., *Agrotis puta* Hübn., *Agrotis ripae* Hübn., *Axylia putris* L., *Ochropleura plecta* L., *Noctua pronuba* L., *Noctua comes* Hübn., *Noctua janthina* D.&S., *Noctua interjecta* Hübn., *Paradiarsia glareosa* Esp., *Lycophotia porphyrea* D.&S., *Peridroma saucia* Hübn., *Diarsia mendica* F., *Diarsia rubi* View., *Xestia c-nigrum* L., *Xestia triangulum* Hufn., *Xestia xanthographa* D.&S., *Xestia agathina* Dup., *Naenia typica* L., *Anaplectoides prasina* D.&S., *Cerastis rubricosa* D.&S., *Discestra trifolii* Hufn., *Polia nebulosa* Hufn., *Mamestra brassicae* L., *Melanchnra persicariae* L., *Lacanobia oleracea* L., *Hecatera bicolorata* Hufn., *Hadena perplexa* D.&S., *Hadena luteago barrettii* Doubl., *Hadena confusa* Hufn., *Hadena bicurvis* Hufn., *Tholera decimalis* Poda, *Panolis flammea* D.&S., *Orthosia cerasi* F., *Orthosia incerta* Hufn., *Orthosia gothica* L., *Mythimna ferrago* F., *Mythimna albipuncta* D.&S., *Mythimna vitellina* Hübn., *Mythimna impura* Hübn., *Mythimna pallens* L., *Mythimna litoralis* Curt., *Mythimna l-album* L., *Mythimna comma* L., *Mythimna putrescens* Hübn., *Mythimna loreyi* Dup., *Cucullia chamomillae* D.&S., *Apophylla nigra* Haw., *Xylocampa areola* Esp., *Dichonia aprilina* L., *Polymixis flavicincta* D.&S., *Polymixis xanthomista* Hübn., *Eumichtis lichenea* Hübn., *Conistra vaccinii* L., *Conistra rubiginosa* D.&S., *Agrochola lota* Cl., *Xanthia togata* Esp., *Acrionicta megacephala* D.&S., *Acrionicta leporina* L., *Acrionicta alni* L., *Acrionicta psi* L., *Acrionicta rumicis* L., *Craniophora ligustri* D.&S., *Cryphia muralis* Forst., *Amphipyra pyramidea* L., *Mormo maura* L., *Rusina ferruginea* Esp., *Euplexia lucipara* L., *Phlogophora meticulosa* L., *Cosmia trapezina* L., *Apamea monoglypha* Hufn., *Apamea lithoxyloae* D.&S., *Apamea crenata* Hufn., *Apamea remissa* Hübn., *Apamea scolopacina* Esp., *Oligia strigilis* L., *Oligia versicolor* Borkh., *Oligia latruncula* D.&S., *Oligia fasciuncula* Haw., *Mesoligia furuncula* D.&S., *Mesoligia litorosa* Haw., *Mesapamea secalis* L., *Luperina testacea* D.&S., *Amphipoea oculatea* L., *Hydraecia micacea* Esp., *Gortyna flavago* D.&S., *Nonagria typhae* Thunb., *Archanara geminipuncta* Haw., *Rhizedra lutosa* Hübn., *Charanyca trigrammica* Hufn., *Hoplodrina alsines* Brahm, *Hoplodrina blanda* D.&S., *Caradrina morpheus* Hufn., *Caradrina clavipalpis* Scop., *Heliothis armigera* Hübn., *Protodeltote pygarga* Hufn., *Earias clorana* L., *Pseudoips fagana* F., *Nycteola revayana* Scop., *Colocasia coryli* L., *Diachrysis chrysitis* L., *Autographa gamma* L., *Autographa pulchrina* Haw., *Autographa jota* L., *Abrostola trigemina* Werneb., *Abrostola triplasia* L., *Scoliopteryx libatrix* L., *Rivula sericealis* Scop., *Hypena proboscidalis* L., *Schrankia taenialis* Hübn., *Herminia tarsipennalis* Treit., *Herminia grisealis* D.&S.

ANNOUNCEMENTS

BENHS Expedition—This Society is contemplating organizing an 'expedition' to Belize, Central America. As members will realize, this is the first time such an ambitious project has been raised and it is very much a pilot scheme. If successful, however, the intention is for further projects in the future.

The BENHS is already active throughout the British Isles, and has even arranged exchange field meetings with entomologists in Europe. Why then go to the Carribean? Belize is a former British dependent territory and despite its now independent status, it maintains strong links with the United Kingdom, for example the Natural History Museum is at present establishing a field research station there.

The aims of the BENHS enterprise are: to raise the profile of the Society so that it is seen to be actively involved in current entomological issues (in this case conservation and sustainable management of tropical rainforest); to establish links with other national and local groups; to form working partnerships in an international framework, and to provide members with opportunities to contribute and develop their skills in developing nations where conservation issues are pressing, but local expertise and funds are lacking.

The expedition will seek to investigate the macro-lepidopterous fauna of a sympathetically managed tropical fruit enterprise and compare it with adjacent undisturbed forest.

At present it is envisaged that four members will take part in the expedition, for two weeks of fieldwork and travel, some time between October 1995 and February 1996.

If anyone is interested in taking part, they should contact the field meetings secretary, Paul Waring, with particulars, to include: means of financing individual expenses (flight, accommodation etc), experience and expertise in the Lepidoptera, physical fitness and health, evidence of a commitment to spend often long months working up material and publishing results.—Paul Waring, 1366 Lincoln Road, Werrington, Peterborough, Cambridgeshire PE4 6LS.

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 Tephritidae and Agromyzidae
- (c) Lepidoptera, particularly Microlepidoptera
- (d) general entomology

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

Awards may be made to assist travelling and other expenses necessary to fieldwork, for the study of collections, for attendance at conferences, or, exceptionally, for the cost of publication of finished work. In total they are unlikely to exceed £600 in 1995/96.

Applicants should send six copies, if possible, of a statement of their qualifications, of their plan of work, and of the precise objects and amount for which an award is sought, to Dr M. J. Scoble, Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5BD, as soon as possible and not later than 30 September 1995.

Applications are also invited from persons wishing to borrow the Wild M3 stereo-microscope and fibre optics illuminator bequeathed to the Fund by the late Edward Pelham-Clinton, 10th Duke of Newcastle. Loan of this equipment will be made for a period of up to 6 months in the first instance.

SHORT COMMUNICATIONS

Observations of *Bombus terrestris* (L.) (Hymenoptera: Apidae) feeding on honeydew—The foraging of bumblebees for nectar and pollen from flowers is well documented (Alford, 1975; Betts *et al.*, 1986; Prÿs-Jones & Corbet, 1987) particularly in relation to foraging strategies (Prÿs-Jones & Corbet, 1987). The foraging of bumblebees is not restricted to flowers but has been reported from extra-floral nectaries on certain plants such as the field bean and the sunflower (Alford, 1975). Bumblebees have also very occasionally been observed visiting aphids and some other plant-sucking insects; this was particularly notable for the species *Bombus lucorum* (L.) and *Bombus terrestris* (L.) (Alford, 1975; Free & Butler, 1959). The following observations detail an occurrence of aphid honeydew foraging.

On the 16.vi.1991 in the Tonbridge area of Kent, several individuals of *Bombus terrestris* were observed patrolling the leaves of a beech tree (*Fagus sylvatica* L.). Each bumblebee was observed until it passed out of sight. A total of eight individuals active around the beech tree were observed in detail. The behaviour of the bumblebees was consistent between individuals. The following is a description of the typical behaviour of the foraging bumblebees.

The beech tree was approached rapidly and purposefully by the bumblebees. Nearing the tree they slowed and hovered around patches of leaves. This hovering would centre on anything from a couple of leaves to as many as several dozen. Close examination revealed the majority of these leaves to be curled and distorted in the manner typical of aphid damage. A fair proportion of these leaves were infested with aphids. Particular leaves were targeted by the bumblebees and they were investigated more closely by the bee.

The close investigation took the form of a slower hovering flight around the leaf during which the antennae brushed the air close to the leaf surface. A few seconds later the bee would land on the underside of the leaf and touch the leaf surface with its antennae. After this it was usual for the bee to extend its proboscis and feed off the leaf surface. The period of feeding varied from less than 10 seconds to in excess of 1 minute. The leaf patches fed on always possessed honeydew and frequently had resident aphids. The extent of honeydew being taken directly from the aphids was doubtful but feeding took place within millimetres of individual aphids on several occasions. The bumblebees appeared to spend more time feeding on the leaves that held active colonies of aphids.

Deserting the leaf of feeding the bees would hover slowly, carefully inspecting the surrounding leaves. This search of narrow radius would continue until an adjacent leaf was landed on or the bee lost interest. The bumblebees' interest would, however, not be totally lost as they would resume a rapid searching flight close to the tree, frequently closing in on patches of leaves and repeating the detailed searching behaviour and occasionally to resume feeding on honeydew. The bumblebees would always leave the tree with the same rapid flight with which they approached. The beech tree, about 5 metres tall, regularly had several *B. terrestris* patrolling simultaneously.—Clive Turner, 19 Pew Tor Close, Tavistock, Devon PL19 8QJ.

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 Free, J. B. & Butler, C. G. 1959. *Bumblebees*. Collins, London.
 Prÿs-Jones, O. E. & Corbet, S. A. 1987. *Bumblebees*. Naturalists' Handbooks 6. Cambridge University Press.

Two species of Agromyzidae (Diptera) new to the British fauna—Preparatory to publishing a report on the Diptera of the Kenfig National Nature Reserve, Glamorgan, I wish to formally record two species as yet unrecorded from the British Isles. Material is deposited in the collections of this museum, which will be publishing the full report in early 1995.

Agromyza prespans Spencer.

Described (Spencer, 1957: 35) from Macedonia. Spencer (1976: 136), in recording it from Sweden, cited its known distribution as being 'widespread in Europe from Macedonia (type series) through Austria to northern Germany (Berlin) but uncommon and local' and commented on its immature stages and biology as a leaf-miner of wheat, *Triticum aestivum* L. I collected a single male by sweeping on coastal dunes at the Kenfig N. N. R. on 11–13.vi.1990.

Phytomyza erigerophila Hering.

Described (Hering, 1927: 174) from Germany. Spencer (1976: 412) placed *Phytomyza archhieracii* Hering 1927: 173, also from Germany, as a junior synonym of it, commenting that 'although *archhieracii* has page priority over *erigerophila*, the latter name has been more widely used and I therefore treat *archhieracii* as junior synonym'. Spencer (1976: 412–413) further recorded this species from Denmark, Norway, Finland and near Grenoble, S. France, giving rearing records as being from leaf-mines on blue fleabane *Erigeron acer* L. and *E. uniflorum* L. in Norway and the latter host in S. France. Dr Spencer and I swept a large series of both sexes, mainly from *Clematis*, on the Merthyr Mawr dunes, Glamorgan on 16.vii.1986. I obtained a further male by sweeping a solitary pine tree, to which it might have been attracted by aphid honeydew, on the central dune area of the Kenfig N. N. R. on 16.ix.1993. It should be pointed out that *Erigeron canadensis* L., which has now been transferred to the genus *Conyza*, occurs widely in South Wales as an alien and is there becoming a common species. I must thank Dr Spencer for identifying the Merthyr Mawr material.—J. C. Deeming, Department of Zoology, National Museum of Wales, Cathays Park, Cardiff CF1 3NP.

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- Hering, M. 1927. Beiträge zur Kenntnis der Ökologie und Systematik blattminierender Insekten (Minenstudien VIII). *Zool. Angew. Ent.* **13**: 156–198.
 Spencer, K. A. 1957. Two new European species of Agromyzidae (Dipt.) *Entomologist's Mon. Mag.* **93**: 35–36.
 Spencer, K. A. 1976. The Agromyzidae (Diptera) of Fennoscandia and Denmark. *Fauna Ent. Scand.* **5**: 1–606 (pp. 1–304 separately bound under Part 1, pp. 305–606 under Part 2).

An interesting saproxylic fauna at Snelsmore Common, Berkshire.—Snelsmore Common is best known as Berkshire's largest and finest remaining area of heathland, but, as with so many old commons, there is also an old pasture-woodland interest associated with old trees around its fringes. This was well demonstrated during a brief visit on 9.vii.1994 when a number of interesting insects were found in association with the older trees along the lanes and droves approaching from the south.

The most interesting find was the nationally scarce moth *Morophaga choragella* D. & S. (Lepidoptera: Tineidae). Large numbers of empty pupal cases were found attached to pieces of *Inonotus dryadeus* (Pers. ex Fr.) Murr. bracket fungi which had been broken off from the base of an old oak at about SU 456703. Suspecting this moth, some of the fragments were retained to see if further moths would emerge,

which duly did a few days later. There are a few previous records from the county for this species, but this is a new locality (B. R. Baker, pers.comm). Remarkably, it is not known from Windsor Forest and Great Park, although occurs close by at Silwood Park.

There is a concentration of large old field oaks immediately to the north-west of Donnington Castle (SU 460693) and these were also inspected for insects. The largest tree held a population of the dermestid beetle *Ctesias serra* (F.) beneath loose bark on its trunk, and a single specimen of the scarce anobiid beetle *Dorcatoma chrysomelina* Sturm was found crawling over cuboidal red-rot exposed in the heartwood of another overmature tree alongside Castle Wood. These two species are of restricted occurrence nationally due to their requirement for large old trees, and the *Dorcatoma* is otherwise only known in the county from Windsor. Fallen oak branches contained the beetles *Scolytus intricatus* (Ratz.) and *Cylindrinotus laevioctostriatus* (Goeze) and the spider *Nuctenea umbratica* (Clerck).

My thanks to J. M. Chalmers-Hunt and B. R. Baker for information about the moth, and to A. P. Foster for confirming its identity.—K. N. A. Alexander, 14 Partridge Way, Cirencester, Gloucestershire GL7 1BQ.

***Ephemera lineata* Eaton (Ephemeroptera: Ephemeridae) at Reading, Berkshire.**—In August 1953 when operating a makeshift light trap at Tilehurst, just to the west of Reading, I trapped two large ephemerids and, thinking August rather late to see mayflies, both were kept for future reference. The insects were added to the meagre collection of Ephemeroptera at Reading Museum and given no further thought until 1958. Early that year, a keen young freshwater biologist, G. Harrison, a pupil at Leighton Park School, came to us and asked to see the Ephemeroptera collection. The drawer had an immediate effect upon our visitor who could not restrain himself from executing several jumps of delight! It appeared that the Tilehurst specimens were *Ephemera lineata* Eaton, known previously from the River Thames near Reading, Laleham, Teddington and Weybridge, but not recorded since 1901. Kimmins's FBA key (1954) added 'scarce in collections'. We decided to try and discover *lineata* nymphs and on 29.v hired a boat from the Tilehurst stretch of the Thames and, with the aid of a grab borrowed from Reading University, sampled the silty shoals for most of the afternoon. This proved totally unsuccessful. On 31.vii.1958 by arrangement with the then Thames Conservancy, a plug-in was obtained at Mapledurham Lock, about three miles upstream from Reading, and a Robinson trap operated there for three nights. This was again unsuccessful as far as *E. lineata* was concerned. Soon afterwards Harrison went off to Cambridge but maintained his interest in Ephemeroptera and I learned later that he had discovered *E. lineata* somewhere near his parents' home on the River Wye. This is reflected by Macan's comment in his 1961 key to ephemerid nymphs when referring to *E. lineata*: 'Rare. R. Wye and R. Thames'. By 1974 I had moved to my present address at Caversham Heights, less than half a mile north of the Thames, and on the humid night of 9.vii.1981 (minimum temperature 16 degrees centigrade) was delighted to trap a further specimen. Another was trapped on 13.vii.1987. My wife Heather noted another on our window on 23.vii.1991 and on 11.viii.1991, as we were walking home over Caversham Bridge just before midnight we noted many sub-imagines (50 plus) sitting nearby on a brightly lit shop window. Most recently, 12.vii.1994 another very humid night, a similarly large number of *E. lineata*, duns and spinners, were attracted to a mercury vapour lit sheet operated on our back lawn.

I do not know whether one can read into this series of events an improved water quality of the River Thames at Reading, but can say with certainty that there has been a marked rise in the status of *E. lineata* there.—B. R. Baker, 25 Matlock Road, Caversham, Reading, Berkshire RG4 7BP.

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 Macan, T. T. 1961. *A key to the nymphs of British Ephemeroptera*. FBA Scientific Publication No. 20.

***Armadillidium pictum* Brandt (Isopoda: Armadillidiidae) new to Gloucestershire.**—The finding of a number of pill woodlice (*Armadillidium* sp.) which appeared to be the Red Data Book *A. pictum* was mentioned in the field meeting report for Symonds Yat and Wye Gorge, 13 September 1992 (Alexander, 1993). Their identity has now been confirmed by David Bilton.

This pretty woodlouse is otherwise known from two distinct areas of the British Isles: north-west England (north Lancashire, Westmorland, mid-west Yorkshire) and central Wales (Breconshire and Radnorshire). The Gloucestershire specimens were found beneath loose bark on a fallen dead branch, probably beech, above The Slaughter. The branch was tangled up amongst other foliage, etc, and the woodlice were actually found at about 1 m above ground level. This situation is very similar to that described for one of the Welsh localities and in mainland Europe, and unlike the rocky terrain favoured by the species in the north-west (Bratton, 1991; Harding & Sutton, 1985).—K. N. A. Alexander, 14 Partridge Way, Cirencester, Glos. GL7 1BQ.

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 Bratton, J. 1991. *Armadillidium pictum* In: Bratton, J. (Ed.). *British red data books: 3. Invertebrates other than insects*. Joint Nature Conservation Committee, pp. 113–114.
 Harding, P. T. & Sutton, S. L. 1985. *Woodlice in Britain and Ireland: distribution and habitat*. Institute of Terrestrial Ecology, Huntingdon.

BOOK REVIEWS

Rarity, by K. J. Gaston. *Population and community biology series 13*. Chapman & Hall, London, 1994, 205 pages, £17.99, hardback.—The *Population and community biology series* aims to explore many facets of population biology and the processes that determine the structure and dynamics of communities. This volume aims to review and provide a synthesis of the diverse topic of rarity. As stated on the back cover of this book 'Population and community biology [books] have been based largely on studies of abundant and widespread species. Most species are neither.' Despite this, the volume, which has obviously been well-researched, has been able to draw on a large selection of published references.

The topic is covered by eight chapters. The first of these examines what is meant by rarity, including extracts of definitions from the *Shorter Oxford English Dictionary* (1983), criteria that have been utilized by a range of studies to delineate rare species,

and a selection of categories from schemes classifying species on the basis of threat. The next two chapters discuss abundance and range size and are liberally illustrated with relevant graphs and scatter diagrams. Spacial dynamics, temporal dynamics and the causes of rarity are covered in the following chapters, with topics such as geographic range structure, rarity and persistence over time and colonization ability all being discussed. However, it is the next chapter, covering conservation and rarity, that is probably the most immediately relevant to many members of this society. This is followed by a concluding chapter which asks 'Where next?' covering how the study of rarity can be improved and the main issues which remain to be resolved.

Except for some minor errors in proof-reading, e.g. an inverted map on page 111, this book has been well produced, is well printed and has a clear format. The text includes many examples of entomological and non-entomological studies. Most chapters end with concluding remarks, although I feel it would also have been useful to provide a concise summary. As a volume, it would seem primarily aimed at, and written for, the ecologist rather than the field naturalist. However, this summary of the topic has many aspects which are widely relevant as well as thought-provoking, and could prove useful source material for those wishing to take their field studies further.

MARK PARSONS

Die Käfer Mitteleuropas, volume 14, (supplement volume 3), edited by G. A. Lohse and W. H. Lucht, Krefeld, Goeke & Evers, 1994, 404 pages, hardback, DM182 (about £75).—In theory, this third supplemental volume finishes the series, but for the fact that a *Schlussband* (concluding volume) is in preparation for 1995, and a whole series of spin-offs on larvae and ecology are also now being produced. However, this current volume concludes the supplemental analysis of the beetles covered in volumes 9 to 11—the *Phytophaga*. There is little new on on the *Cerambycidae* (8 pp), apart from a long list of generic name changes affecting the previously large genera *Leptura*, *Strangalia* etc. In the *Chrysomelidae* (126 pp) there are numerous additions and changes, in particular long new keys for *Chrysolina* and *Longitarsus* with numerous aedeagus figures of *Longitarsus* and other flea beetles. In the *Apionidae* (62 pp), a new key raises previous *Apion* subgenera to full generic status. Other families covered are *Bruchidae* (8 pp), *Urodonidae* (2 pp), *Anthribidae* (1 p), *Scolytidae* (27 pp), *Platypodidae* (2 pp), *Cimberidae* (1 p), *Nemonychidae* (1 p), *Rhynchitidae* (1 p), *Attelabidae* (1 p) and *Curculionidae* (53 pp).

RICHARD A. JONES

Invertebrate zoology, by E. E. Ruppert and R. D. Barnes, 6th edition, Orlando, Saunders College Publishing (Harcourt Brace), 1994, 1114 pages, paperback, £17.50.—This standard work on invertebrates continues to represent excellent value and an excellent introduction to all those creepy crawlies which are not insects. Arranged taxonomically, from protozoa to insects, echinoderms and protochordates, each chapter begins with brief review essays on particularly relevant topics introduced by each phylum or class as it is brought up. The coverage is international and although brief for each group, gives a clear and well-illustrated introduction to the wider study of invertebrates.

RICHARD A. JONES

BENHS INDOOR MEETINGS

14 June 1994

The President, Dr P. WARING announced the death of Mr R. I. Lorimer, an Orkney lepidopterist who had been a member since 1948.

Dr Waring showed a specimen of the southern chestnut *Agrochola haematidea* (Lepidoptera: Noctuidae) which had been raised from the egg stage. This was first discovered breeding in Sussex by Mr G. Haggett in 1990. It is possibly an overlooked resident species as there are no records of it being taken as a migrant. Dr Waring also showed some colour transparencies taken at the recent well-attended Dinton Pastures workshop on clearwing moths, and at the light trapping evening.

Mr A. J. HALSTEAD showed some live specimens of the juniper shield bug *Cryphostethus tristriatus* (F.) (Hemiptera: Acanthosomatidae). They were found feeding in some numbers on the developing female cones on a tall hedge of Lawson's cypress, *Chamaecyparis lawsoniana* (Murray) Parl., at the RHS Garden, Wisley, Surrey. At one time this bug was thought to feed on juniper only but a number of records have been made of it feeding on garden conifers, including *Chamaecyparis* and *Thuja*.

Mr Halstead also showed three live specimens of the leaf beetle *Chrysolina americana* L. (Coleoptera: Chrysomelidae). They were found separately on 12 and 20.v.1994 and 1.vi.1994 on some pot-grown plants of rosemary, *Rosmarinus officinalis* L., at the RHS Garden, Wisley, Surrey. These plants had been propagated from cuttings taken from Wisley plants in October 1992 and had been standing in the open near a glasshouse since spring 1993. This beetle is a native of southern Europe and north Africa. The finding of three specimens over a period of 3 weeks suggests this beetle may have successfully bred on the plants during the previous summer.

Mr G. BOYD showed a live female buttoned snout, *Hypena rostralis* (L.) (Lepidoptera: Noctuidae) taken in his Cambridge garden on the 13.vi.1994. The larvae feed on hops but the exhibitor was not aware of this plant near his garden. This appears to be an unusually northern record for this moth. The President noted that it seems to have declined since its distribution was shown in *Moths of Great Britain and Ireland* and it is now found mainly in the London area and coastal regions.

Mr M. PARSONS showed a specimen of the very local plume moth *Pselnophorus heterodactyla* (Müller) (Lepidoptera: Pterophoridae). It was found as a larva on wall lettuce in dark woodland near a beech trunk at Cronham Wood, Glos. A search of Chadworth Woods failed to find it. Beirne (1952) in *British pyralid and plume moths* describes it as an 'exceedingly local species in the Cotswolds of Gloucestershire'. Occasional specimens have been recorded in Norfolk, Perthshire and Cumberland.

Mr A. J. HALSTEAD said he had taken a female sawfly *Tenthredo arcuata* Forster on an ox-eye daisy in the wild flower meadow at Highgrove House, near Tetbury, Glos., on 7.vi.1994.

Dr P. WARING noted that light trapping for moths had generally been poor due to low temperatures. He thought it was the worst year since 1987. Mr R. UFFEN said it has also been a poor year for Diptera.

Dr Waring displayed some literature produced by Butterfly Conservation as part of their woodlands campaign. He drew attention to a 'mothathon' being conducted by Dominic Couzens who will light trap at various places in Surrey between 14 and 21.vii.1994. Mr Couzens was seeking sponsorship for the Surrey Wildlife Trust.

Concern has been expressed recently about the proposed release of a genetically engineered virus which incorporates genes from a scorpion. The virus has affected over 50% of the moth species tested. It seems likely that approval for the virus's

experimental use on cabbages will be given; further details of this matter can be obtained from Dr Waring.

The main business of the evening took the form of a discussion on a national review of the scarcer British microlepidoptera. The discussion was introduced by MARK PARSONS, who outlined the various category statuses ranging from RDB1 (endangered) to nationally notable (scarce). He also described the objectives of the Invertebrate Site Register scheme and the processes that go into producing a species group review. This involves producing annotated species lists, consulting specialists, collating their comments to produce an updated annotated list, collating information on species identified as scarce, compiling data sheets on these species, sending the data sheets to specialists for their comments, and finally publishing the revised data sheets. The starting point for assessing scarcity are sources such as Victoria vice-county history lists, English Nature records, Scottish Insect Record Index, literature sources, museum collections, amateur records and national and local record centres. Mr Parsons described some microlepidoptera whose status has changed since the 1970s. He queried whether recording by vice-counties was appropriate and whether habitat association and species assemblages might be better. The review does not cover immigrant species and the question of when a temporary resident becomes a long-term resident needs to be resolved.

Opening the discussion, Dr Waring commended the recently published review of the scarcer pyralid moths which updates the information given in Barry Goater's 1986 book *British pyralid moths*. Dr Waring noted that books such as this tend to stimulate people to take up insects they would previously not have bothered with. The surge of new recording activity can exceed that of earlier workers and may give a misleading impression that some species are becoming more common. Mr Parsons replied that the pyralids had been reasonably well recorded in the past. Dr Waring noted that there were no distribution maps in the pyralid review and wondered if they could be included in future reviews. Mr Parsons thought this would be possible although some records were too vague to be placed accurately on a map. Dr Waring suggested that species associated with quality habitats should also be incorporated into the review, even if they were themselves below notable status. It is possible that these common species may show changes in abundance which may also occur with scarcer species.

Mr R. SOFTLY noted that dots on maps showed where a species occurs but give little other information. A dot may represent anything from a single moth to thriving breeding colonies. Dr S. BALL said that it was possible to produce maps with a variety of symbols which would indicate the quality and quantity of the records. Mr Softly said that dot maps are sometimes in reality a distribution map of recording activity, with distortions in the apparent distributions being the result of particularly keen recorders operating in some localities. He queried whether the current recording level was good enough to offer support in site evaluations.

Dr Waring stressed the need for a locally important category for species that are uncommon in some parts of the country but too widespread elsewhere to fit into any of the existing status categories. He believed that dot maps based on 10-km squares are important for showing distributions and that they stimulated further recording activity. Much of the distribution data has and is being supplied by amateur entomologists who should press for the information to be published.

Dr I. F. G. MCLEAN said there was a need to revitalize moth recording following the ending of the national scheme. The scheme operated by Dr Waring is restricted to a relatively small number of the scarcer species. It would be necessary to spread the work load produced by a wider scheme. Computer programs such as the Recorder package could help with this. Computer systems need to be compatible so that information can be transferred.

Dr S. BALL noted that a national review of the scarcer microlepidoptera was just one of several projects that were in the pipeline. Others include a new 'red data book' with revised categories, and national reviews for sawflies and some Diptera families. These projects are all competing for a limited amount of finance and staff time.

The discussion closed with some suggestions as to how the recording of microlepidoptera could be encouraged. It was agreed that there is a need for an organized microlepidoptera recording scheme. To support this there should be a newsletter for the exchange of information and to carry items that would assist in identifications, as is done with the Diptera Recording Schemes. The BENHS could help by publicizing the names and addresses of county or taxa recorders. It could hold workshops at Dinton Pastures or at field study centres to help newcomers to the subject. Through its journal it could publish articles to keep up the recording momentum, possibly with a review of the year featuring notable microlepidoptera records. It could also publicize lists of material wanted/help offered as is done by dipterists. Existing local recorders should be incorporated into a national scheme. Persons to act as coordinators will be required. Council should consider obtaining a computer with the Recorder program.

12 July 1994

The Vice-President, Dr M. SCOBLE, in the chair.

Mr R. A. JONES showed six specimens of the leaf beetle *Orsodacne cerasi* (L.). These were var. *chlorotica* Lat. which is all testaceous, var. *lineola* Lac. which has head, thorax and suture darker and var. *glabrata* F. which is entirely dark. This beetle, extremely variable in size and colour, was very common on cow parsley, *Anthriscus sylvestris* (L.) Hoffm., at Leigh Woods, Bristol, on 2.vi.1994. Over 50 individuals were counted in a few minutes as they 'swarmed' on the umbels. Previously, this beetle was considered rare. However, it is now regarded as the more common of the two British *Orsodacne* species, hence it is not accorded the 'notable B' status of its congener *O. lineola* (Panz.) which is not gregarious. The flower beetle *Mordellochroa abdominalis* (F.) was also common on the flowers, over 35 being counted.

He also showed an unidentified ichneumon cocoon beaten from an oak tree in Nunhead Cemetery, 30.vi.1994. The remains of the host caterpillar were still attached, the head capsule standing proud on top of the mottled grey cocoon. This was subsequently identified as probably *Hyposoter clausus* (Brischke) (Ichneumonoidea: Campopleginae) on its usual host *Agriopsis aurantiaria* (Hüb.) by Dr M. R. Shaw.

Mr A. J. HALSTEAD showed a copy of the June 1994 Health and Safety Commission Newsletter which contains a distribution map of ticks infected with *Borrelia burgdorferi*, the bacterium that causes Lyme disease in humans. The map shows that infected ticks are widespread throughout England, Wales and Scotland.

The following persons have been approved as members by Council: Michael Guye, Nicholas Steven Gordon, Gordon B. Corbet, Gareth Matthes and David Graham Maund.

Dr IAN KITCHING spoke on the use of computer programs to map biodiversity and identify priority areas for conservation. He discussed the reasons for conserving biodiversity and the problems involved in deciding how to achieve this. Staff at the Natural History Museum in London have developed a world map computer program to help in analysing data. Dr Kitching showed how this could be used to assess the conservation needs of owls, tiger beetles and hawk-moths in Thailand. These groups of animals were chosen as their status and distribution in Thailand is reasonably well known. The computer program can select the richest site and identify other complementary areas. These other sites are not necessarily the next most species-rich sites as these may largely duplicate what is found at the best site. By 'removing' species

common to the best and other sites, the program shows which areas are needed to conserve the greatest range of species. In this way Thailand's 18 species of owls could be protected by conserving six sites, its 178 hawk moths in 14 sites and its 103 species of tiger beetles in 30 sites.

If the program is to be of value, it needs to be based on good quality recording. This is lacking in many parts of the world, where recording may be heavily biased towards known good sites in the more accessible areas.

13 September 1994

The Vice-President, Mr A. J. HALSTEAD, in the chair. The chairman welcomed members of the LNHS; 34 members and friends attended.

The Vice-President announced the deaths of Mr J. Newton and Mr I. G. Farwell.

Mr A. J. HALSTEAD showed a mystery object: a bone, 21 cm long, 43 mm wide at the middle and 74 mm at the widest end, found lying on a flower bed at the RHS Garden, Wisley, Surrey. It was presumably from a mammal, possibly a pig, and is likely to have come to the Garden with some farmyard manure used as mulch.

The bone appeared to have been flattened on one side and at the broadest end a hole 7 mm in diameter had been drilled through it. The same end had a 22 mm deep, 6 mm wide groove apparently cut into it, the base of which was about 15 mm from the centre of the hole cut into it.

Dr D. S. HACKETT exhibited two larvae of the holly blue *Celastrina argiolus* (L.) from Hearne Road, Kew, Middlesex (TQ193779), both found on ivy flower buds. This butterfly is not uncommon, even in central London, but the larva can be hard to see as it is green and slug-shaped and, in the second generation, occurs on ivy flowers which may be high up on a tree or a wall. When small the larva also hides amongst the buds. The feeding damage often gives it away as the larva eats into a bud and hollows it out, then moves away, leaving a neat round hole. Also present was an egg and egg shell remnants of the same butterfly.

Dr Hackett also showed a female Chinese mitten crab, *Eriocheir sinensis*, and exuvia. It was found on the foreshore at Kew, Middlesex (TQ194777). A fresh-water crab originally from China, it was first reported in the Thames in 1936 (it is also found in the Humber). It is recognized by its squarish body and four marginal teeth and, in larger specimens, by its 'furry' claws. Ingle (1986; *London Naturalist* 65: 101-105) described it as a contentious immigrant, possibly arriving as larvae in ships' ballast water. However, as small and large individuals can be found at low water, Dr Hackett suggests that it is breeding successfully. It is a burrowing crab alleged to undermine river banks and has been reported to reach plague proportions in Europe.

The following persons have been approved as ordinary members of the society by Council: Gerald Michael Tonks, Wendy Monica Jupe, John Robert Gerald Storer, Peter R. Howell and Simon Hodge. Mr N. Sawyer signed the obligations book and was welcomed to the Society by the Vice-President.

The first part of the lecture was given by RACHEL QUINN and covered the topic 'biodiversity in Britain—where is it?' This part of the lecture covered what is meant by biodiversity and touched upon the history of the Biological Records Centre and the type of information held by that organization. National and regional species patterns for butterflies and Odonata showed that there were few species in the north-west of Great Britain with more species in the south-east. Conversely, the pattern for liverworts was the reverse. This was probably because of the climate requirements of these groups. A graph was shown illustrating the fact that the diversity of butterflies and Odonata

generally decreased from Dorset to East Anglia with some variation in counties in between. This could largely be explained by the regional differences in available habitats.

It was asked if the biodiversity of some groups of insect, such as butterflies, could be used as indicator groups of species for a range of other species in Great Britain. It was shown that there was a 40% coincidence between butterfly and Odonata 'hotspots'. For larger groups of insects all the biodiversity 'hotspots' contained scarcer species. There was a small number of scarcer species absent from these 'hotspots'; these were either species which occurred in just one or two 10-km squares or were northern species. Past and future changes in patterns of biodiversity were also briefly discussed.

Dr I. F. G. McLEAN took the next section of the lecture: 'biodiversity—how do we keep it?' Dr McLean briefly covered the history of the UK's approach to conservation from the 'put a fence round it' approach, through the use of science and fortress SSSIs, to the 1981 Wildlife and Countryside Act and the trend in the 1990s towards positive management. The main points of the Biodiversity Action plan were covered and what this means in Great Britain. The membership of the steering group of this plan was shown to comprise a wide range of organizations. The different sorts of countryside designation were mentioned including SSSIs. This latter grouping was often fragmented parts of habitat which were effectively islands. Dr McLean described a new conservation approach, the 'prime biodiversity areas', which looks at clusters of the range of designated sites. Also covered by this part of the lecture was the role of natural history societies in conservation.

A keen and useful discussion followed for about an hour after the lectures. This discussion covered most of the topics of the lectures and even touched upon world population levels!

10 October 1994

Dr S. HOY showed a small captive nest of the ant *Leptothorax nylanderii* (Förster).

The President, Dr P. M. WARING, showed slides of a recent trip to the Scottish uplands in search of the slender-striped rufous, *Coenocalpe lapidata* Hübn., and to discover its foodplant in the wild. He visited two sites at Trinafour and Lairg. Adults were found at dusk resting on *Juncus* stems and could possibly have been associated with either *Ranunculus acris* L. or *Potentilla erecta* (L.) Raeusch. Two freshly emerged adults were found in a single clump of *Juncus*, with only *R. acris* below, but no females were seen egg-laying. The larval foodplant remains unconfirmed but a list of candidate species has been compiled.

Mr R. A. JONES showed four interesting insects from the Gordano Valley NNR, Avon, (VC 6, North Somerset), taken on 6.vii.1994. These were: *Eledona agricola* (Herbst) (Coleoptera: Tenebrionidae), several hundred of which were found in an old powder-dry fungus on oak; *Dacne bipustulata* (Thunb.) (Coleoptera: Erotylidae), a single specimen in the same fungus; *Silis ruficollis* (F.) (Coleoptera: Cantharidae), a male swept from dyke-side vegetation, once considered very local but now more widespread; and *Xiphydria prolongata* (Geoff. in Fourc.) (Hymenoptera: Xiphydriidae), a single specimen with damaged wings crawling up a willow trunk.

Two new members were announced: John L. R. Ledbury and Derek H. Howton. Mr Kent Lee of Hong Kong was welcomed to the meeting.

The President reminded members that as Field Meetings Secretary he would like to be approached with ideas for the 1995/1996 field season, particularly for localities away from the well-served south. He also reported that the A.E.S. had just published a facsimile reprint of Tutt's *Practical hints for the field lepidopterist*. He also showed the latest issue of the children's newsletter of the Bug Club and

announced that the national pyralid moth recording scheme had just issued its first newsletter.

Several members had seen late butterflies, including commas, red admirals and holly blues. Other insects recently seen on the wing were hornets and the dragonfly *Sympetrum striolatum* (Charp.).

The main portion of the evening was given over to two short lectures.

Dr S. HOY reviewed the different 'Ants in Britain', starting with the generalization that they were simply wasps without wings. Once given their own superfamily, they are now grouped in a single family, the Formicidae, within the Vespoidea. Worldwide there are between 9000 and 10 000 species described, with 15 000 to 20 000 anticipated. On the British mainland there are 46 species recorded with four more from the Channel Islands. Considering that there are 300–400 species in Europe, Britain's fauna is rather depleted, indeed 47 ant species have been recorded from a single South American tree. British ants are a reasonably 'easy' and compact group to study though they do show wide diversity of biology, behaviour and ecology.

Ants are characterized by the possession of an alitrunk; this is not a true thorax and contains the first segment of the abdomen. Thus the gaster is not a true abdomen. All have a node or petiole between the alitrunk and gaster, with either one or two segments.

Dr Hoy went on to describe and comment on various ant species. The common black pavement ant, *Lasius niger* (L.), has recently been 'split', two species being identified in Germany and the status of the species in Britain remains to be determined.

Semisocial parasitism is shown in 16 British ant species; a queen enters a host nest, takes over the egg laying and eventually only the 'parasite' occurs. *Lasius fuliginosus* (Lat.) exhibits hyperparasitism, parasitizing other parasites.

The large mounds of the wood ant, *Formica rufa* L., are well known and sometimes combine to form 'supercolonies' with trackways between several nests.

Dr Hoy finished with some slides of ants swarming and lecking around him in a cloud and used these images as a metaphor for the abundance and widespread occurrence of ants and to encourage further study of them.

Before Dr M. E. ARCHER gave his lecture he briefly illustrated the invasions by *Dolichovespula media* (Retz.) and *D. saxonica* F. into Britain. Since its first discovery in Sussex in 1980, *D. media* has spread to S. Devon and N. Yorks. Since 1987, *D. saxonica* has expanded in two patches, one in Surrey the other in Norfolk, suggesting either two invasions or two recording groups. These recent immigrations were possibly linked with the re-expansion of the hornet, *Vespa crabro* L., to its previous range north into the Midlands. Scandinavian research has suggested that this might reflect a change in the July isotherm.

Dr Archer then considered the use of quality scoring of aculeate Hymenoptera to determine the relative importance of natural history sites. By assigning a score to individual species, high scores for rare species and low scores for common species, and summing these scores it was possible to construct a final quality score for individual localities. By dividing this score by the number of species an index of quality could be achieved which took into account the amount of recording done at a site and the completeness of the species list.

Six rarity statuses were commonly given: 'common', 'local', 'regionally notable', 'notable A', 'notable B' and 'red data book'. Of these, the most problematical was 'regionally notable', because no strict definitions or criteria have been published. Dr Archer suggested replacing the three lower statuses with 'universal' (i.e. throughout Britain and common), 'widespread' (i.e. throughout Britain but uncommon) and 'restricted' (i.e. only found in a narrow region).

These were still rather subjective, but he had tried out the two scoring schemes at selected Yorkshire sites and they had given the same ranking for the sites regardless of scoring system.

Other indices of natural history interest particularly relevant for the aculeates were 'cleptoparasite load' and 'aerial nester frequency'. Cleptoparasitism ranged from 15.5 to 20% in solitary wasps and 25 to 36.6% in bees. It was higher in temperate regions than in the tropics, possibly because host/cleptoparasite life cycles were more closely synchronized in a more seasonal climate. Aerial nester frequency, ranging from 0 to 92.9% in wasps and 0 to 36.7% in bees, was linked to availability of dead wood and stems, and increases if sandy soil is absent and subterranean nesting becomes difficult. At higher altitudes, temperatures are lower and sunshine is less; aerial nests warm quicker than underground nests, but this appears to affect only wasps since furry bees seem to be less sensitive to local weather and temperature conditions.

7 November 1994

The President, Dr P. M. WARING, showed some pinned examples of the Tunbridge Wells gem, *Chrysodeixis acuta* (Walker), and the golden twin-spot, *C. chalcites* (Esper) (Lepidoptera: Noctuidae) he had collected in Africa. These infrequent migrants to Britain are difficult to separate and the President drew attention to the dark curved line at the fore wing tip that is a feature of *acuta*. It was noted that both illustrations in Bernard Skinner's book, *Moths of the British Isles*, are of *chalcites* as this species also has black anal tufts in the male*.

Mr A. J. HALSTEAD showed some live specimens of the New Zealand flatworm, *Artioposthia triangulata* (Dendy) collected from farmland near Dunoon, Argyllshire. This soil-dwelling planarian was first recorded in Britain in 1963 (northern Ireland) and 1965 (Scotland). It is now widespread in those regions and has spread to England, but not apparently to Wales yet. Initially it was regarded as a curiosity but is now causing great concern. The flatworm is a voracious predator of earthworms and in some parts of northern Ireland and western Scotland it has virtually wiped out the earthworm population. This will have long-term adverse effects on soil drainage, aeration and the incorporation of organic matter into the soil. It will also affect animals such as badgers, foxes, moles, shrews and many birds which include earthworms as an important part of their diet. The demise of earthworms will also affect many insects and other invertebrates that depend on them for food.

The flatworm will become widespread and it is likely to be distributed by the trade in garden plants. It will not necessarily be a major problem throughout Britain. In its native New Zealand it is confined to ancient woodland at the southern end of South Island (i.e. the coolest area of New Zealand). The heaviest infestations in Britain are in the cooler, high rainfall areas. Elsewhere earthworms are surviving even though the flatworm has been present for many years.

Dr D. HACKETT showed some live specimens of slugs believed to be *Limax flavus* L. (Stylommatophora: Limacidae) which he regularly finds near a compost heap at his Crouch End, London N8, home. This is a synanthropic but local species.

Mr S. MEREDITH showed a specimen of the soldier fly *Sargus bipunctatus* (Scop.) (Dip: Stratiomyidae) collected in Northampton on 1.xi.94 when it had alighted on his coat.

*During a discussion of these points at the meeting of 13 December 1994. Mr C. W. Plant drew attention to his own observations on these species (*Br. J. Ent. Nat. Hist.* 1991; 4: 59-60) suggesting that genitalia dissection was necessary to ensure accurate identification.

The President passed on the thanks of his wife Rachel for the flowers presented to her at the Exhibition Dinner.

He then drew attention to the fact that a member of the Society had fallen foul of the authorities in the Aragon region of Spain while moth trapping. He had set up his light on a piece of open land but was soon interrupted by the police, who confiscated his four boxed specimens and released the 50 other moths and hundreds of chironomid midges in the trap. Although he had fully cooperated with the police, this member heard via the British Consulate after his return to Britain that he was liable to be fined for causing distress to insects. It seems that new laws have recently been enacted in Spain that make life difficult for entomologists. A letter has been sent to the Spanish authorities asking for details of the legislation. The President has also written a reference for the member, who is a responsible person who actively records moths and provides lists for interested parties. Similar restrictive regulations occur in Germany and there are proposals for restrictions on collecting in France. Such legislation has no real benefits for conservation and discourages recording work.

The President said that the field meetings exhibit shown at the Annual Exhibition had also been taken to meetings organized by Butterfly Conservation and Derbyshire Entomologists and would also be shown elsewhere. He wished to give the Society's field meetings a higher profile and wanted to encourage recording at sites which may be under threat. Suggestions of suitable meeting places and leaders should be passed to Dr Waring.

Mr S. MILES reported that the Joint Council for the Conservation of British Invertebrates is to have a new format. At some meetings the constituent bodies would report on their activities and interests; other meetings would deal with matters arising from these reports. He made available for inspection some reports presented at a recent general meeting. These included details of the quinquennial review of Schedule 5 invertebrates protected under the Wildlife and Countryside Act. Any comments on additions or deletions should be passed to Mr Miles.

Several members reported insects seen in the recent mild weather. Dr Waring noted a small tortoiseshell in his garden at Werrington, Cambs., on 5.xi and light trapping at Mucklens Wood had yielded 20 moths including four juniper carpets, *Thera juniperata* (L.). This once nationally scarce moth is now widespread on garden junipers. An 8-year-old boy, Will Bloodworth, had brought a swallowtail moth, *Ourapteryx sambucaria* (L.), to Dr Waring for identification on 3.xi. Mr. R. Softly reported that a speckled wood butterfly had been seen at the Gunnersbury Triangle, London, on 3.xi. Mr N. A. CALLOW had seen a peacock on 4.xi and Dr D. HACKETT a red admiral on 6.xi.

Mr A. HALSTEAD said that a fresh male specimen of the yellow-tail moth, *Euproctix similis* (Fues.), had been taken in a Rothamsted trap at RHS Garden, Wisley, Surrey, on 3/4.xi. He also referred to the mystery bone he had exhibited at the 13.ix.94 meeting. Colin Plant had shown the bone to a colleague in the Newham Museum Service. It has been identified as the metatarsal bone of a cow. The smoothing of the bone and the drilled hole indicate it may have been used in conjunction with rope or leather work, perhaps with a harness. Worn bone is very smooth and provides a largely frictionless surface. It was apparently common practice to use bones to ease the movement of ropes etc. over sharp corners up to about 100 years ago.

Members then reviewed the Annual Exhibition and Dinner. The exhibition and dinner organizer was unable to attend the meeting. The consensus of those present was that the exhibition has gone with its usual smoothness. The numbers attending and the numbers of exhibits were slightly down; the dinner attendance was slightly up. Mr P. CHANDLER reported on the Diptera exhibits. Dr Waring took the

opportunity to thank him for the work he has done in collating the invertebrate records at Dinton Pastures and for his recent article on the subject. Mr Halstead reported on the Hymenoptera and other orders exhibits. He noted that while our exhibition is well supported compared with members' exhibits at the AES exhibition, there are still members who do not exhibit because 'they have not taken anything worthwhile'. People should be encouraged to show exhibits for their educational side rather than concentrating on scarce species. Dr Waring said that some of the Lepidoptera exhibits showed forms of common moths or collections of locally interesting moths which are not necessarily uncommon in a national context.

Some discussion took place on alternative venues where parking and access might be easier. The AES venue at Kempton Park racecourse would suit some people but poor lighting and heating would be problems in late October. Mr R. HAWKINS noted that no name badges were available at the Exhibition. The provision of stick-on labels would be an easy and cheap means of allowing members to find the owners of interesting exhibits. Mr R. JONES noted that some exhibitors fail to put their names on their exhibits. Some are non-members and may also fail to provide any notes for publication with their exhibits. The meeting gave a vote of thanks to Mr M. Simmons for organizing the Exhibition and Dinner. There then followed a slide evening.

Mr R. A. JONES showed slides of various animals seen during a recent visit to Sri Lanka. These included gecko lizards, frogs, snails with the mantle growing over their shells, harvestman spiders in abundance on tree trunks in Kandy Botanic Garden and various flies, bugs, spiders and aculeate hymenoptera.

Dr D. HACKETT showed slides of various moths and butterflies photographed mainly in north London and Cornwall. These included a painted lady larva feeding on common mallow. Also shown were the leaf beetle *Chrysolina banksi* (F.), the larvae of the therevid fly, *Thereva nobilitata* (F.), found under oak bark, a web of the spider *Segestria florentina* (Rossi) and a view of its head end showing its distinctive bottle-green fangs.

Mr H. SAWYER showed slides of various adults and larvae of lepidoptera he had photographed in Turkey and Greece.

Mr R. SOFTLY showed slides taken in early summer on the Macedonian coast of Greece. These included the pandora fritillary butterfly and a solitary wasp, *Scolia* sp., on flowers of thistles, and an *Eresus* sp. spider.

Dr J. MUGGLETON showed some slides taken in September in Southern France. These included a pair of mating praying mantids. A series of pictures showed the female trying to strike at the male, while the male kept out of danger by pressing its body closely against the female's abdomen. This suggests that reports of the female's cannibalistic tendencies are not just the result of abnormal behaviour patterns observed with captive mantids. Also shown were pictures of large soldier-fly maggots in a shallow muddy pool, and of a drainage channel before and after a heavy storm.

Mr S. MREDDITH showed a series of pictures of a shield bug nymph, possibly *Troilus luridus* (F.), feeding on a caterpillar in late July. At Bentley Woods, Wilts, he had photographed a female sawfly, *Abia* sp., and a purple emperor butterfly. The latter was feeding on a cypress and presumably getting honeydew from aphids.

Dr P. WARING showed a site in Aberdeenshire he had surveyed to assess the status of the dark bordered beauty moth, *Epione paratellaria* (D. & S.). This was found in good numbers in 1994 at a site where it seemed to be associated with regenerating coppiced aspen. At another site where it had been recorded in the 1950s and where only mature aspen now occurs, the moth was not found. He also showed pictures of the Wye Valley, Glos., and the scarce hook tip moth, *Sabra harpagula* (Esp.) that has its stronghold in the woods there. The Forestry Commission will be extracting

conifers from the woods this winter but intend to leave most of the small-leaved lime, which is the larval food plant.

Mr N. A. CALLOW showed a very diverse range of subjects taken in Britain and overseas. Some of these were close-up shots of subjects such as the claw of a stag beetle, a bluebottle's face and an anthocorid bug biting the photographer's skin. Some of Mr Callow's insects had been photographed in his compost heap or on rotting apples he had set out to attract suitable subjects. Some of his slides showed examples of insect behaviour, including an ant dragging a dead hoverfly, *Episyrphus balteatus* (Deg.), a parasitic wasp laying eggs in a yellow composite flower, and a solitary bee occupying its tunnel in a drilled piece of wood and facing a nearby cleptoparasitic fly.

OBITUARY

Ian Guy Farwell

The death is announced of Ian Guy Farwell on 26th August 1994 at the age of seventy-four. Ian became a member of our society in 1947, and although he was not often able to attend ordinary meetings he was a devotee of the Annual Exhibition, forming part of a group of members from the Lymington area of Hampshire who looked forward to the annual pilgrimage by train, when a carriage would be taken over and filled with bug talk and the faint ambrosial aroma of naphthalene.

Ian was most interested in butterflies and the larger moths and in his younger days collected varieties keenly. His fieldcraft was rewarded with several outstanding butterflies of which the most notable were probably two halved gynandromorph *Argynnis paphia* (L.) taken in the New Forest in 1939, and a male and female var. *ocellata* of the same butterfly in 1941. He also took a wonderful *Lysandra bellargus* (Rott.) at Hod Hill, a favourite collecting ground. This specimen is figured by Russwurm on plate 15 of the 'new' South. As time went on, Ian turned to photography as a way of recording the butterflies and moths which he found, building up a large collection of slides over the years, although he never abandoned the net completely.

In addition to the Lepidoptera, Ian was a general naturalist of the old school with a particular interest in, and knowledge of birds. For many years he was a stalwart of the Lymington Natural History Society, leading many field trips to the local marshes, the Isle of Wight, and his beloved New Forest. He communicated his enthusiasm to many and took a particular delight in introducing newcomers to the New Forest; friendly evenings at his home listening to his anecdotes and swapping bug stories will long remain in my memory.

His interests were varied, and included a love of classical music and an involvement with local parish activities and work for such organizations as the scouting movement. Ian lived all his life in and around Lymington and was a printer working for the local firm of Kings Booksellers for most of his life. He served with the Royal Hampshire Regiment during the War, seeing action in North Africa and Italy and bringing back stories of exotic insects and animals in unlikely situations.

Ian is survived by his wife Hazel, son Peter and daughter Avis to whom we extend our sympathy.

A. J. PICKLES

BENHS FIELD MEETINGS

Tadnoll Heath, Dorset, 23 May 1993

Leader: **Mick Parker**. Six members turned up for this meeting on a Dorset Trust for Nature Conservation Reserve. The conditions were fine and sunny but rather windy. The assembled group took the main path through the reserve which is mainly dry heath, leading to a small copse of birch, *Betula pendula* Roth, and gorse *Ulex europaeus* L., scrub which afforded some shelter from the wind. Here large numbers of green hairstreak, *Callophrys rubi* (L.), congregated. Further down the track we entered meadowland with cuckoo flower, *Cardamine pratensis* L., and meadow buttercup, *Ranunculus acris* L. being dominant with attendant orange tips. *Anthocharis cardamines* (L.) and green-veined whites, *Pieris napi* (L.). Unfortunately the wind was too strong to note anything on the swaying flowers. Sweeping became the order of the day but resulted in a rather disappointing list. The hoverfly list reached 16 species, all common. The meeting ended with members dispersing to sheltered areas of the reserve, but no worthwhile species were taken as a result.

Mount Caburn NNR, Glynde, Sussex, 19 June 1993

Leader: **David C. Lees**. A small but diverse assemblage of members (see Fig. 1) turned up for the field meeting at the NNR of Mount Caburn, near Glynde, E. Sussex, greeted by good sunny daytime weather. This site has been monitored for butterflies for the last 9 years but other insects are less well known, and so it was good to have a mixture of beetle, moth and fly expertise. The night meeting for light trapping attracted just one member (Derek Coleman) in addition to the leader. The light was not visible from Glynde so no local interest in the goings-on on



Fig. 1. Three members and a visitor perch on the precipitous forget-me-not covered slopes of Mount Caburn. Left to right: A. W. Jones, D. C. Lees, P. J. Hodge and R. A. Jones.

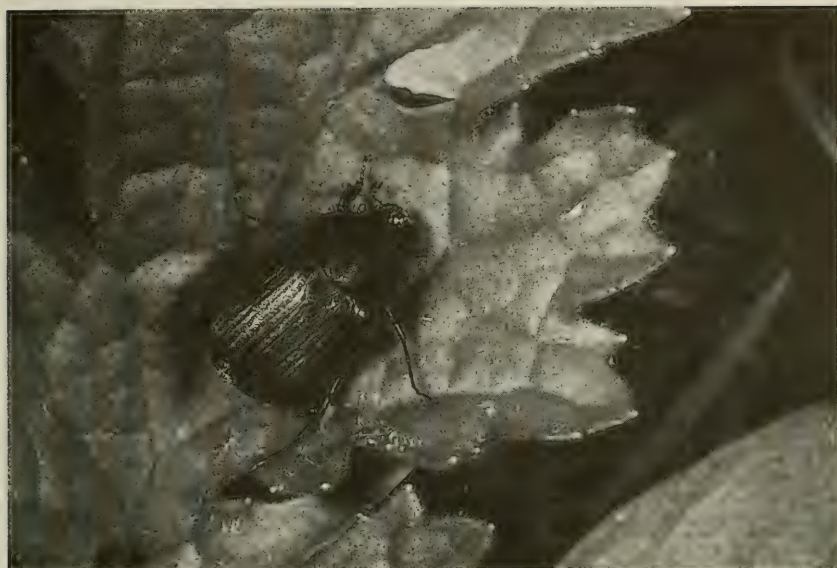


Fig. 2. *Omaloplia ruricola*, one of several of these small chafers found flying across the turf. This specimen is of the dark form, without the paler discs of the elytra. Photo: R. A. Jones.

this iron age hill fort was stirred up, in marked contrast to a memorable evening in 1992 (when 'Did aliens land on Mount Caburn?' subsequently appeared on a *Sussex Express* placard).

It was pleasing to turn up nine scarce or notable beetles, plus one RDB3 beetle, *Smicronyx reichi* (Gyll.), and one notable empid fly. The mordellid beetle *Tomoxia bucephala* Costa was neatly netted by Richard Jones as we returned to the cars just outside the reserve next to a house which had a quantity of felled timber. Mount Caburn was confirmed as one of the few Sussex sites for the phycitine pyralid *Pempelia obductella* (Zell.) spinnings being locally common among marjoram. The night was clear and temperatures dropped quite rapidly, only 55 species in 11 families being observed. The highlight of the night meeting was the seldom observed nocturnal flight, unique among British zygaenids, of males of the scarce forester moth just after 11 p.m. (Jackson, R. A. 1959. Some observations on *Adscita globulariae* (Hb.), the scarce forester: Lepidoptera (Zygaenidae), *Entomologist* 92: 111-115).

Total species recorded were: Coleoptera 53 spp. in 16 families; Diptera 28 spp. in 8 families; Hemiptera 10 spp. in 4 families, and Lepidoptera 58 spp. in 12 families.

In the list that follows, more interesting or notable species only are given. Conservation status ratings are given as appropriate.

Coleoptera. Carabidae: *Lebia chlorocephala* (Hoffmannsegg) Nb. Scarabaeidae: *Euheptaulacus villosus* (Gyll.) Na, *Omaloplia ruricola* (F.) Nb (Fig. 2). Coccinellidae. *Scymnus schmidti* Fürsch Nb. Chysomelidae: *Cryptocephalus aureolus* Suff. Nb, *C. bilineatus* (L.) Nb, *Epitrix atropae* Foud. Nb. Curculionidae: *Trachyphloeus alternans* Gyll. Nb, *Smicronyx reichi* (Gyll.) RDB3.

Diptera. Empididae: *Platypalpus leucothrix* (Strobl) N. Syrphidae: *Cheilosia impressa* Loew. Conopidae: *Thecophora atra* (F.).

Hemiptera. Cydnidae: *Sehirus luctuosus* Muls. & Rey (on forget-me-not), *Thyreocoris scarabaeoides* (L.). Tingidae: *Agramma laeta* (Fall.) (on sedges).

Lepidoptera. Zygaenidae: *Adscita globulariae* (Hübner). Na. Epermeniidae: *Epermenia insecurella* (Stt.). Coleophoridae: *Coleophora lixella* Zell. Pyralidae: *Phycitodes binaevella* (Hübner.), *Pempelia obductella* (Zell.) (larvae on *Origanum vulgare* L.), *Hypochalcia ahenella* ([D. & S.]), *Opsibotys fuscalis* ([D. & S.]). Pterophoridae: *Marasmarcha lunaedactyla* (Haw.) (larva on *Ononis spinosa* L.). Geometridae: *Catarhoe cuculata* (Hufn.) (1), *Epirrhoe galiata* ([D. & S.]), *Perizoma flavofasciata* (Thunb.), *P. albulata* ([D. & S.]), *Eupithecia subumbrata* ([D. & S.]). Noctuidae: *Pyrrhia umbra* (Hufn.), *Cucullia verbasci* (L.) (larvae on *Verbascum thapsus* L.), *Apamea sublustris* (Esp.).

Dinton Pastures Country Park, Berkshire, 23 April 1994

Leaders: **Paul Waring** and **David Young**. The first field meeting of the year was held at Dinton Pastures in the late afternoon and evening of 23 April. The leaders were joined by 15 members and friends, most of whom stayed on from Brian Baker's very successful clearwing workshop, which was attended by over 40 people. We started with a walk round the park, during which trees and shrubs were beaten for larvae, before we retired for a most enjoyable meal in the local pub, the Jolly Farmer, just half a mile up the road from the entrance to Dinton Pastures. Afterwards the park staff provided a pick-up truck which greatly assisted us in reaching the less accessible parts of the park with light-traps, generators and other equipment. We were also supplied with walkie-talkie



Fig. 1 Dinton Pastures nocturnal session, 23 April 1994. Left to right: Martin Harvey and Martin Townsend examining beating tray by light of Robinson trap, with David Gibbs onlooking, Paul Waring with radio and Peter Chandler pooting from light trap.

radios so that the various mothing groups could be kept informed as the moths arrived. The moon clouded over and the temperature at dusk was 9 °C, after a dry day but at 21.50 hours there was a clap of thunder and the rain began. We kept on trapping until the increasingly heavy rain forced us to pack up. As in many places at this date in 1994, numbers of moths were low, with light trap catches struggling to get into double figures. Only nine species of larger moths were recorded at light but ten more were added as larvae. Moth species recorded as adults included, in order of appearance, the lunar marbled brown *Drymonia ruficornis* (Hufn.), common Quaker *Orthosia cerasi* (F.), Hebrew character *Orthosia gothica* (L.), early thorn *Selenia dentaria* (F.), frosted green *Polyphloca ridens* (F.) scorched carpet *Ligdia adustata* (D. & S.), brindled pug *Eupithecia abbreviata* Steph., oak-tree pug *Eupithecia dodoneata* Guen., and small Quaker *Orthosia cruda* (D. & S.).

Species recorded as larvae included the winter moth *Operophtera brumata* (L.), green pug *Chloroclystis rectangulata* (L.) and early moth *Theria primaria* (Haw.) from blackthorn *Prunus spinosa* L., the common emerald *Hemithea aestivaria* (Hübner) mottled umber *Erannia defoliaria* (Cl.), pale brindled beauty *Apocheima pilosaria* and short-cloaked *Nola cucullatella* (L.) from common hawthorn *Crataegus monogyna* Jacq., the light emerald *Campaea margaritata* (L.) from field maple *Acer campestre* L., the sallow *Xanthia icteritia* (Hufn.) from grey willow *Salix cinerea* L. agg. and a larva of the square-spot rustic *Xestia xanthographa* (D. & S.) was found on an unidentified grass-stem after dark.

Peter Chandler collected some Diptera from the light traps and these are being added to the records for the site (see *Br. J. Ent. Nat. Hist.* 7: 118–126). Two ground-hoppers *Tetrix undulata* (Sow.) jumped onto Gavin Boyd's sheet and one was retained and later identified by him.

Aldbury Common, Hertfordshire, 11 June 1994

Leaders: **Keith Alexander** and **Andy Foster**. A group of nine members and friends spent the morning on Aldbury Common and moved across to Frithsden Beeches for the afternoon. The day was memorable for the large numbers of the hoverfly *Brachyopa pilosa* Coll. present, particularly at Frithsden, and even *Brachypalpus laphriformis* (Fall.) was plentiful at Aldbury. These are nationally scarce relict old forest species and amply rewarded the selection of these areas of the National Trust's Ashridge Estate as sites of considerable potential for such insects. The uncommon deadwood-breeding craneflies *Ctenophora pectinicornis* (L.) and *Dictenidia bimaculata* (L.) were also noted in both areas.

The large old beeches and oaks of Aldbury Common also produced a good range of nationally scarce beetles associated with decaying timber, including *Tillus elongatus* (L.) on a standing dead beech which had lost most of its bark, *Eledona agricola* (Herbst) in the remains of the bracket fungus *Laetiporus sulphureus* (Bull. ex Fr.) on a live ancient oak, *Xyleborus dryographus* (Ratz.) in galleries within the bark of felled beech trunks, exit holes of *Agrilus pannonicus* (Pill. & Mitt.) in the bark of a further old oak, and a single *Ernoporus fagi* (F.) which was caught in a sweep net. Foliage-feeding beetles included the scarce *Zeugophora subspinoso* (F.) and *Phytodecta decemnotata* (Marsh.) on aspen. The most interesting soldier beetle of the day was *Podabrus alpinus* (Payk.) which appears to be the first modern record for the county. Other orders were not totally neglected and included brown tree ant *Lasius brunneus* (Latr.) and the sub-cortical bug *Xylocoris cursitans* (Fall.).

Diptera were very much the feature of Frithsden Beeches, with other orders making a poorer showing. In addition to the *Brachyopa pilosa*, Mycetophilidae were also

particularly well-represented. Beetles did however include the uncommon *Rhizophagus nitidulus* (F.) as well as *Xyleborus dryographus*.

We would like to thank the National Trust Countryside Manager Graeme Cannon for stimulating the visit and the Area Warden Don Otter for his company on the day.

Nunhead Cemetery, London SE15, 9 July 1994

Leader **R. A. Jones**. Two members and one visitor joined the leader on a warm and sunny day when ten species of common butterfly were on the wing and visiting flowers. Nunhead Cemetery is on the very edge of 'Surrey', VC 17, in the central tetrad 'M' of the 10-km square TQ37 and ironically several of these records were new! These included the large skipper, holly blue, green-veined white and red admiral. Roger Hawkins was similarly looking for new Orthoptera records and both the oak bush cricket, *Meconema thalassinum* (De Geer) and speckled bush cricket, *Leptophyes punctatissima* (Bosc) were found. Buddleja bushes attracted the large hoverfly *Volucella zonaria* (Poda) and males of *V. pellucens* (L.) hovered above the party.

A small *Prunus* tree in a clearing seemed to be attracting a number of specimens of *Chrysotoxum festivum* (L.) to its leaves where they rested a short time, darting out and back again as if examining passing insects. The few specimens captured were males, suggesting, perhaps, that they were waiting for females. An unusual find was *Cheilosia soror* (Zett.) a scarce chalk downland species, the larvae of which have been reported from truffles. Nunhead's claim to fame, the Colydiid beetle *Cicones undata* Guér.-Mén., associated with the sooty bark disease fungus on dead and dying sycamores, was present at a number of sites. Some interesting beetles found



Fig 1. Posing in front of some overgrown Victorian monuments in Nunhead Cemetery, left to right: R. A. Jones, A. J. Halstead, A. W. Jones and R. D. Hawkins.



Fig. 2. The summer chafer *Amphimallon solstitialis* found roosting at a path edge on overhanging vegetation. Photo: R. A. Jones.

included the longhorns *Strangalia maculata* (Poda) and *Clytus arietis* (L.), the click beetle *Athous campyloides* Newman and the summer chafer, *Amphimallon solstitialis* (L.). The Cemetery's first rubytail wasp record was for *Omalus auratus* (L.) and Andrew Halstead recorded 13 species of sawfly.

Richmond Park, Surrey, 6 August 1994

Leaders: **Mark Parsons** and **Graham Collins**. This meeting was the third annual meeting at Richmond Park and proved to be popular, with ten members and guests attending. Our intention was to attempt to relocate the crimson underwings (*Catocala* spp.) last recorded from the park at the end of the previous century. Large quantities of sugar were applied and many light traps run but, needless to say, there was no sign of even *Catocala nupta* L. (red underwing). The moths provided a few additions to the park list and included the migrant *Rhodometra sacraria* L. (vestal); *Parascotia fuliginaria* L. (waved black), still increasing its range in Surrey; *Coenobia rufa* Haw. (small rufous); and *Cerapteryx graminis* L. (antler), in rather greater numbers than is usual in the south-east of England. More interesting species amongst the microlepidoptera were: *Pediasia contaminella* Hübn., *Psoricoptera gibbosella* Zell., and *Caloptilia populetorum* Zell. Probably the most spectacular catch of the evening were two specimens of the huge longhorn beetle *Prionus coriarius* L., a species only recorded from the park on one previous occasion this century, that last year. Other interesting beetles included: *Tomoxia bucephala* Costa, *Metoecus paradoxus* L., and *Mordellistena neuwaldeggiana* Panz.; the latter probably new to vice-county 17, Surrey. We would like to thank the park authorities for their assistance in holding this meeting.

Abernethy Forest RSPB reserve, Inverness-shire, 13 August 1994

Leader: **Paul Waring**. This was a joint meeting with Butterfly Conservation, as part of their Landrover-sponsored Woodland Campaign, and also included the Highland Biological Recording Group. This meeting was hosted by the RSPB, whom the BENHS assisted in the purchase of this reserve. The meeting provided an opportunity for BENHS members to explore the Caledonian pine forest, birch woodland and heather moorland which this reserve now protects.

During the afternoon the party of 14 explored Tulloch Moor on the southern edge of the forest (NH9616, altitude 200 m). The twin-spot carpet *Perizoma didymata* (L.) was numerous amongst the heathers, freshly emerged Manchester treble-bars *Carsia sororiated* (Hüb.) and worn July belle *Scotopteryx luridata plumbaria* (F.) were seen. Three nearly full grown larvae of the light knotgrass *Acronicta menyanthidis* (Esp.) were found basking on the ling heather *Calluna vulgaris* (L.) Hull. A full-grown emperor moth larva *Pavonia pavonia* (L.), of the pink-warted rather than yellow-warted form, was seen and several larvae of the northern oak eggar *Lasiocampa quercus callunae* Palmer, two of which had died of a virus disease. Some stands of bilberry *Vaccinium myrtillus* L. amongst the pines *Pinus sylvestris* L. were searched for adults of the Rannoch looper *Semiothisa brunneata* (Thunb.), which had been plentiful two weeks previously, but the only moths seen in the search were numerous northern spinach *Eulithis populata* L. and July highflyer *Hydriomena furcata* (Thunb.), the larvae of which also feed on bilberry. In addition larvae of the broom-tip moth *Chesias rufata* (F.) were found by Mike Britton, on broom *Cytisus scoparius* (L.) Link growing between Nethy Bridge and the Loch Garten Osprey Centre.



Fig. 1. The afternoon group at Abernethy Forest, 13 August 1994. Left to right: Steve Moran, Gordon Ramel, Stewart and Ruth Taylor, Mike Britton, Robert Hoare, Mr & Mrs Rich Austin, Jimmy McKellar, Gus Jones, Dr MacBean and Gary Roberts (Paul Waring behind camera).

Micro-lepidoptera seen during the day included mines of *Stigmella lapponica* (Wocke) and *S. confusella* (Wood) (Nepticulidae) which were abundant on the birch trees on Tulloch Moor. The Yponomeutid *Argyresthia goedartella* (L.) was beaten in numbers from the birches. Two or three of the plume moth *Stenoptilia pterodactyla* (L.) were encountered by the car-park at Tulloch Moor along with the pyrale *Agriphila tristella* (D. & S.). The Tortricoid *Olethreutes palustrana* (Lien. & Zell.), very much a northern species, was seen on the Moor.

A single *Cedestis subfasciella* (Steph.) (Yponomeutidae) was disturbed from a pine tree in Abernethy Forest, several *Epinotia ramella* (L.) were flushed from birches and *Agriphila straminella* (L.) was seen amongst the trees.

A number of beetles (Coleoptera) and bugs (Hemiptera) were recorded on the Moor, of which the more noteworthy were the green tiger beetle *Cicindela campestris* L. and the Carabids *Carabus glabratus* Payk. and *Notiophilus aquaticus* (L.) the first two as dead remains. Fourteen species of Hemiptera were recorded including the local mirid *Globiceps dispar* (Boh.). The common lizard *Lacerta vivipara* Jacq. was seen and a predated egg-shell of the capercaillie *Tetrao urogallus* L. was found amongst the heathers (det. Stewart Taylor).

In the grounds of Abernethy Forest Lodge (NJ020160, altitude 300 m) at the end of the afternoon, the local mirid bug *Bothynotus pilosus* (Boh.) was amongst ten species of Hemiptera recorded and two pupae of the silphid beetle *Necrodes littoralis* (L.) were found by Steve Moran under a brick in a small dumping area. The pupae were reared and an adult emerged on 19.viii.1994. The common rhagionid fly *Rhagio lineola* F. was on the wing.

At dusk the party was swelled by another two guests and a Robinson trap and two Heath traps were set up in the edge of the pine forest at Rynettin, (NJ015143, altitude



Fig. 2. Exploring Tulloch Moor, 13 August 1994.

320 m) where scattered silver birch *Betula pendula* Roth. and bilberry were present among the heathers. The main objective was to see if the cousin german *Paradiarsia sobrina* (Dup.) occurs in this part of the site. Four of these moths were recorded, all at the Robinson trap, even though it was a cold night (5 °C at dusk and 3 °C when we packed up at midnight). Several grey mountain carpet *Entephria caesiata* (D. & S.), juniper pug *Eupithecia pusillata* (D. & S.) and neglected rustic *Xestia castanea* (Esp.) and singletons of the red carpet *Xanthorhoe munitata* (Hübner) and suspected *Parastichtis suspecta* (Hübner) were noted amongst other moths in the traps but the only moth to food bait was a single barred red *Hylaea fasciaria* (L.) on one of the wine ropes. The discovery of the cousin german among scattered old birch is of interest because the species is thought by some authorities to prefer areas of young regrowth, which was not so much in evidence here.

Several specimens of the tortricoids *Eana osseana* (Scop.) and *Rhopobota naevana* (Hübner) were seen flying at dusk and coming to the light traps and the latter was also common on Tulloch Moor. The Scotch argus butterfly *Erebia aethiops* (Esp.) was present in some numbers over a wide area, especially on the edges of the forest adjacent to moorland, as at Rynettin.

About 30 species from the other invertebrate orders were recorded at Rynettin, ranging from common ones such as the common earwig *Forficula auricularia* L. and the lacewing *Wesmaelius betulinus* (Ström) to the somewhat local crane-fly *Pedicia rivosa* (L.) and mirid bug *Polymerus unifasciatus* (F.)

Acknowledgements. I would like to thank Stewart Taylor, site manager for the RSPB, and Steve Moran of the Highland Biological Recording Group for their help in organizing this field meeting. It was part of the Butterfly Conservation Woodland Campaign which was sponsored by Landrover who provided a vehicle for Gary Roberts, one of BC's press officers, to attend the meeting and assist with local transport. Landrover are also sponsoring the RSPB. The meeting was featured in a short advance piece in the Highland and Moray edition of the *Press and Journal* of 9 August 1994.

I would like to thank everyone who supported this meeting and made it such an enjoyable one. Robert Hoare determined the micro-lepidoptera, Gordon Ramel the hoverflies (Syrphidae) and ants (Formicidae), and Steve Moran the other invertebrates.

The records of this meeting have been sent to: Stewart Taylor, RSPB, Abernethy Forest Lodge, Nethy Bridge, Inverness-shire PH25 3EF; Steve Moran and Jimmy McKellar, Highland Biological Recording Group, Inverness Museum and Art Gallery, Castle Wynd, Inverness IV2 3ED; James Stewart, local Lepidoptera recorder, 15 Strathspey Drive, Grantown-on-Spey PH26 3EY, and Gordon Ramel, The Bug Club, 24 East John Walk, Exeter EX1 2EW.

ANNOUNCEMENT

The J. V. Blachford collection of Coleoptera.—Readers of the *British Journal of Entomology and Natural History* may like to know that the ownership of this collection has changed. Because the University of Bath has found it difficult in recent years to find the resources to care properly for the Blachford Collection, the decision was taken earlier this year to pass the collection on to the Bristol City Museum.

For those interested, the appropriate contact there is: Mr R. J. Barnett, City of Bristol Museum and Art Gallery, Queen's Road, Bristol BS8 1RL.

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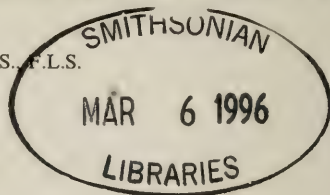
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The Society maintains a library, and collections at its headquarters in Dinton Pastures, which are open to members on various advertised days each month, telephone 01734-321402 for the latest meeting news.

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Cover illustration: A male white admiral, *Ladoga camilla* (L.). Photo: Richard Revels.

The Society has learned of the recent sad deaths of Mrs F. M. Murphy, past Secretary and President and Mr E. S. Bradford an Honorary Member of the Society. Obituaries will be published in forthcoming issues of the journal.

A BREEDING EXPERIMENT WITH THE SMALL COPPER BUTTERFLY, *LYCAENA PHLAEAS* (L.) (LEPIDOPTERA: LYCAENIDAE)

T. S. ROBERTSON

348a Nine Mile Ride, Wokingham, Berkshire RG11 3NJ.

In his classic book on butterflies, Ford (1945) discussed a hypothetical case in which the aberration *obsoleta* (a known recessive) and the aberration *alba* (which he considered also probably a recessive) were mated together and then inbred to give, in the F₂ generation, wild-type, *obsoleta*, *alba* and the double recessive *obsoleta* + *alba* in a 9 : 3 : 3 : 1 ratio.

So far as I am aware, no-one has been able to perform such an experiment. In 1989 and again in 1991, I was able to carry out some small-scale breeding experiments that bear some resemblance to Ford's case, using wild females caught in the Wokingham area of Berkshire.

In two small-scale breeding experiments on *Lycaena phlaeas*, the aberration *obsoleta* appeared to act as an incomplete recessive to the wild type. The aberration *radiata* appeared to be distinct from *obsoleta*, although their heterozygotes, appearing dissimilar, are both referable to *partimauroradiata*. The double recessive *pallidula* + *radiata* was obtained.

NOMENCLATURE

Since the strict rules on priority in zoological nomenclature are no longer enforced at the level of subspecific aberrations, some names that are commonly used and which are reasonably descriptive of the aberrations are used. These are as follows:

ab. *obsoleta* Tutt—with the hind-wing copper band absent (although some traces can usually be detected in the interneural spaces between the veins).

ab. *radiata* Tutt—with the hind-wing copper band replaced by thin lines on the nervures.

ab. *partimauroradiata*—with the hind-wing copper band broken up, but not as extreme as *radiata*.

ab. *alba* Tutt—with the copper colour of the fore and hind wings replaced with silver.

ab. *pallidula* Leeds—with the copper colour of the fore and hind wings replaced by a brassy or cream colour.

ab. *subradiata* Tutt—with fine copper-coloured rays extending along the nervures inwards from the hind-wing copper band.

ab. *auronitens* Schultz—with a copper suffusion on that part of the hind wing which is normally dark brown, sometimes incorporating the ab. *subradiata*.

METHODS

The 1989 experiment

A female ab. *partimauroradiata* (as in Plate I, Figure 1) was captured at Wokingham, Berks., in May 1989, and when she had laid about 50 eggs in captivity she was released at the point of capture. An F₁, but no F₂, was raised (Robertson, 1990).

The 1991 experiment

A female showing, rather weakly, the characters *partimauroradiata*, *subradiata* and *auronitens* was captured, in rather worn condition, at Finchampstead, Berks., in June 1991 (Plate I, Figure 1). She laid a small number of eggs and died a few days later. An F₁ of seven adults was reared and one mating followed. An F₂ was reared, and the numbers of the different forms of adults were recorded. No matings were obtained in this generation (Robertson, 1992).

RESULTS

The 1989 experiment

The 39 F₁ adult offspring reared from the captured female *partimauroradiata* showed a range of variation from wild-type (with fully developed hind-wing bands) to *obsoleta* (Plate I, Figures 2–4). Twenty were referable to *obsoleta*, but all had traces of copper remaining on the hind wings. However, this was in the interneural spaces rather than on the nervures, which distinguishes it from *ab. radiata*. Most of the remaining 19 butterflies showed more or less reduction or breaking up of the bands (*ab. partimauroradiata*); a few showed wild-type markings.

The 1991 experiment

The F₁ from the P₁ female *partimauroradiata* + *subradiata* + *auronitens* consisted of 4 male and 3 female wild-type adults. The F₂ from the single mating consisted of 37 butterflies, none of which showed the *subradiata* or *auronitens* characters that were present in the P₁ female. However, two forms which had not been detected in the P₁ or F₁ occurred, separately and in combination. These were *radiata* (Plate I, Figure 8) and *pallidula* (Plate I, Figures 9–12). Forms with hind-wing bands varied from wild-type through *partimauroradiata* and could not be classified as such with certainty, so were scored as 'with bands'. Although variable, *pallidula* and normal copper colour were reasonably distinguishable and were scored accordingly. The *radiata* form was clearly distinguishable and differed from the *obsoleta* forms of the 1989 experiment in that it did not have any interneural traces of copper. Males and females were in about equal numbers and occurred in both varietal forms. The results of the 1991 experiment are summarized in Table 1.

Table 1. The phenotypes of the F₂ of the 1991 experiment with *Lycaena phlaeas*

	Ground colour		Total
	Copper	Brassy	
Hindwing band			
with bands	20	8	28
bands replaced by rays	6	3	9
Total	26	11	37

The ratio 20 : 8 : 6 : 3 is achieved. This concurs with the predicted ratio of 9 : 3 : 3 : 1 (as 8.65 : 3.46 : 2.59 : 1.30). There is no statistical difference, χ^2 (3 degrees of freedom) = 0.52, 0.95 > P > 0.8.

DISCUSSION

Taken together, the two experiments suggest that *obsoleta* and *radiata* are distinct from one another. In their heterozygous state, both are incomplete recessives and are referable to *partimauroradiata* but still differ (Plate I, Figures 1 and 7), so this name can represent two different mutations.

The 1989 experiment gave an almost exact 1 : 1 ratio for *obsoleta* to 'with bands' (*partimauroradiata* + wild-type) suggesting that the expression of *obsoleta* in the heterozygote is variable, and that the P₁ female was heterozygous for *obsoleta* and had mated in the wild with a homozygous male *obsoleta*. The P₁ cross would be represented by:

$$Oo \times oo$$

The F₁ would then be 50% Oo and 50% oo, conforming to the result obtained.

An alternative explanation for the F₁ in the 1989 experiment is that not one but two gene complexes were involved, with *obsoleta* dominant to *radiata* and both recessive to the wild-type. The cross to lead to the F₁ would be:

$$RrOo \times RRoo$$

The F₁ would have the following genetic make-up:

$$\begin{array}{cccc} RROo & RROo & RrOo & RrOo \\ RRoo & RRoo & Roo & Roo \end{array}$$

The gene combinations shown in the upper line would give wild-type and *partimauroradiata*, and those of the lower line *obsoleta* (o being dominant over r), again a 1 : 1 ratio as obtained in the experiment.

As neither *obsoleta* nor *radiata* are common, their occurrence together is not particularly likely, and the single-gene mechanism is perhaps the more probable one.

The 1991 experiment resembles that of Ford (1945) in some respects, except that it involves *pallidula* and *radiata* rather than the more extreme *alba* and *obsoleta* which Ford discussed.

To get the results obtained, the cross to give the F₁ must have been: RrPp × RRPP or RrPP × RRpp.

The following genetic make-ups, for example, could be present in the F₁: RrPP RrPp RRPp RRPP

In whatever combinations of R and P, the result would still produce all wild-type (apart perhaps for some *partimauroradiata*) and to get the result obtained in the F₂ generation the F₁ cross would be: RrPp × RrPp. It was fortunate that with only seven butterflies in the F₁ this mating must have taken place.

The complete genetic make-up of the F₂ would be as follows:

$$\begin{array}{cccc} RRPP & RrPP & RrPP & rrPP \\ RRPp & RrPp & RrPp & rrPp \\ RRPp & RrPp & RrPp & rrPp \\ RRpp & Rrpp & Rrpp & rrpp \end{array}$$

Examination of this make-up reveals a 9 : 3 : 3 : 1 ratio for wild-type: *pallidula* : *radiata* : *pallidula* + *radiata*.

It has been shown that both *obsoleta* and *radiata* are incomplete recessives, and that even in the heterozygous condition remain distinct. The brassy coloured *pallidula* is a complete recessive and is probably not the heterozygote of the silvery *alba*. The double recessive of *radiata* with *pallidula* indicates that these are non-linked genetically.

The forms *auronitens* and *subradiata*, present rather weakly in the P₁ of the 1991 experiment, did not appear in the F₁ or F₂, and either are not controlled in a simple Mendelian fashion, or, more probably, were lost when only one mating was obtained from the very small F₁ reared.

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REVIEW

Entomological bygones or historical entomological collecting equipment and associated memorabilia by J. M. Chalmers-Hunt. *Arch. Nat. Hist.* 1994; 21: 357–378—Being asked to review for this journal a paper appearing in another journal, particularly one which was essentially a catalogue of items, has presented quite a reasonable challenge. Nevertheless, the equipment and other memorabilia associated with field entomology is a much neglected subject and, were it not for the genuine passions of gentlemen such as my friend Michael Chalmers-Hunt, important historical material such as this may well be lost for ever, save within the pages of ancient, dusty entomological books. One wonders how many of today's entomologists have actually heard of a forceps net, let alone know what one looks like or how to use it. And who today could afford, or would even wish to use, a hand-crafted mahogany and brass killing bottle?

The paper catalogues some 200 items of entomological memorabilia in the Chalmers-Hunt collection. They range from nets and beating trays to pooters, collecting boxes, setting boards and even curious light sources for attracting moths on dark nights. Who in his right mind would, today, wander around the local woods with a "bull's-eye oil-burning lantern" and seriously hope for a large "bag" of moths? Ah . . . those were the days (so they tell me!).

Chalmers-Hunt is one of a diminishing breed of true collectors. Not only does he amass the objects of his desire, but also books, journals, manuscript catalogues, diaries and notebooks, equipment and, indeed, absolutely anything else that is in any way associated with his chosen entomological subject. In the Chalmers-Hunt collection, now housed at the British Museum (Natural History) [which name I shall continue to use until it is formally altered by Act of Parliament] we have, probably, the most comprehensive collection of entomological equipment. Chalmers-Hunt is to be congratulated not only for accumulating the material that goes to form his collection, but also for cataloguing it and having the good sense to ensure its survival by gifting it to a national, rather than a local, museum.



PLATE I

A BREEDING EXPERIMENT WITH THE SMALL COPPER BUTTERFLY, *LYCAENA PHLAEAS* (L.) (LEPIDOPTERA: LYCAENIDAE). T.S. ROBERTSON

Figs 1–4 *Lycaena phlaeas*, Berks., 1989.

Figs 5–12 *Lycaena phlaeas*, Berks., 1991.

1 F ₁ female <i>partimauroradiata</i>	2 F ₁ female <i>obsoleta</i>	3 F ₁ male <i>obsoleta</i>	4 F ₁ female <i>obsoleta</i>
5 P ₁ female <i>partimauroradiata</i> + <i>auronitens</i>	6 F ₂ female wild type	7 F ₂ male <i>partimauroradiata</i>	8 F ₂ female <i>radiata</i>
9 F ₂ female <i>pallidula</i>	10 F ₂ female <i>pallidula</i>	11 F ₂ male <i>pallidula</i> + <i>radiata</i>	12 F ₂ male <i>pallidula</i> + <i>radiata</i>

UNDERSTANDING SIZE AND PATTERN VARIATION IN MAINLAND BRITAIN *PARARGE AEGERIA* L. (LEPIDOPTERA: SATYRIDAE). L. WINOKUR

Figs 13–17 *Pararge aegeria tircis*.

Figs 18–21 *Pararge aegeria oblita*.

13 Low-altitude F ₁ female <i>mesoventro-s2/s5 biocellata</i> 14°C and 16 h daylength	16 High-altitude F ₁ male <i>cockaynei</i>	19 F ₁ female ex-diapause pupa
14 High-altitude F ₂ male <i>mesoventro-s2/s5 biocellata</i>	17 Low-altitude F ₂ female <i>cockaynei</i> 14°C and 16 h daylength	20 F ₁ female ex-direct developing pupa 14°C and 16 h daylength
15 High-altitude F ₂ female <i>mesoventro-s2/s5 biocellata</i> + <i>cockaynei</i> , room temp. and winter daylength	18 F ₁ male <i>cockaynei</i>	21 F ₁ female showing pattern modification 20°C and 16 h daylength

UNDERSTANDING SIZE AND PATTERN VARIATION IN MAINLAND BRITAIN *PARARGE AEGERIA* L. (LEPIDOPTERA: SATYRIDAE)

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The Speckled Wood butterfly, *Pararge aegeria* L., is represented in England, Wales and N.E. Scotland by subspecies *tircis* Butler, and in N.W. Scotland by subspecies *oblita* Harrison (Thomson, 1980). Adult *P. a. oblita* are larger than *P. a. tircis* (Thomson, 1980; Brakefield & Shreeve, 1992), but latitudinal size variation within mainland Britain has not been extensively examined. Thompson (1952) reported an altitudinal cline in Snowdonia, culminating at high altitude in large, prominently marked specimens and designated form *drumensis*, but no further investigation into the form has been conducted.

The present paper examines latitudinal and altitudinal size variation in the species within mainland Britain, comparing cohorts from S. England, low and high altitude in N. Wales, and N.W. Scotland, at 14°, 17° and 20°C under 16 hours (16 h) daylength. The environmental and hereditary factors underlying the clines, and the adaptive significance of the size variation, are considered. A new eyespot aberrant from N. Wales is characterized and the gene frequency at each altitude is estimated. The occurrence of ab. *cockaynei* Goodson (Russwurm, 1978) and 'spring brood' forms (Robertson, 1980a) among N. Wales *P. a. tircis* and *P. a. oblita* undergoing pupal diapause at 14°C is discussed, and an explanation of form *drumensis* is proposed. The present findings represent a more extensive account of *P. aegeria* specimens presented at the 1993 BENHS Annual Exhibition, and complement a study into clinal variation in life history traits (Sibly *et al.*, in prep.).

MATERIALS AND METHODS

Adult *P. aegeria* were collected from the Isle of Appin, Scotland (56° 32' N, 5° 24' W) on 14.viii.1992, at 50–60 m above mean sea level (amsl) (Gorswen, 53° 13' N, 3° 51' W) and 200–220 m amsl (Hafod-y-cae, 53° 13' N, 3° 54' W), from the S.E. face of Tal-y-fan mountain, N. Wales, between 17–21.viii.1992, and from the west of Salisbury Plain, S. England (51° 13' N, 1° 39' W) on 4.ix.1992. They were transferred to the laboratory 9 days after capture (Scotland), 2–6 days (Wales) or 1 day after capture (England).

Pairs were maintained in 2½" diameter card tubs lined with untreated tissue and covered with fine-mesh netting secured with elastic. Adults were fed 5% vol/vol unmodified honey solution from cotton pads placed on the netting. Pads were replaced daily. When females started ovipositing on the netting and tissue, the males were killed. Oviposition was continued in the laboratory at 20°C.

Ova from each female were collected daily and divided between 14°, 17° and 20°C constant temperature regimes under 16 hours light : 8 hours dark photoperiod provided by fluorescent lighting of spectral composition approximating daylight. Egg samples from a given female were held in 3" × 2" × 1" transparent perspex boxes until hatched. Ten larvae per female per temperature (30 per female) were segregated (i.e. one larva per box) to similar boxes containing excess cultivated cock's-foot grass, *Dactylis glomerata* L. The 30 larvae per female were randomly collected to ensure that they reflected the genetic make-up of the total egg batch; the excess larvae were

dispersed elsewhere. Boxes containing pupating larvae were cleared of food and oriented so that the prepupae hung vertically. Representative adults were killed and preserved.

LATITUDINAL VARIATION

At all three temperatures, adults of *P. a. oblita* were the largest and S. England *P. a. tircis* the smallest, indicating a progressive increase in size with distance north. Within each stock, adults were noticeably larger at 17° than 20°C, following the general tendency of ectotherms to attain greater mature weights at lower temperatures, and probably related to slower growth under cold (Atkinson, 1994). However, adults were slightly smaller at 14° than 17°C, especially in S. England *tircis* but this difference became less marked with latitude.

In *P. aegeria*, the photoperiodic cue governing developmental strategy comprises the interval sunrise to sunset, and possibly also morning and evening twilights, during the first and final larval instars (Nylin *et al.*, in press). At the latitudes compared here, daylengths of 16 h or more prevail through May to July, when the collected animals would have been larvae (Goddard, 1962). Mean daily temperature in 1992 declined by ~1°C per degree increment in latitude (Table 1). Given the temperature gradient alone, field-collected adults would be expected to be larger at the more northerly sampling sites, as found by Brakefield & Shreeve (1992). However, the persistence at each culture temperature of a latitudinal size cline in the adult form predicted on the basis of a latitudinal gradient in field temperature, suggests that developmental strategies originally governed by temperature alone have become genetically determined. This suggests that selection could act on individuals whose size is 'adaptive' in the respective environment, to build up a genetic pattern in which individuals attain similar sizes even when 'transplanted' to alternative environments, a process Waddington (1961) termed 'genetic assimilation' and defined as 'an increase in the importance of heredity in the extent to which a character is determined by heredity and by the environment'.

The speckled wood basks in sunshine to raise body temperature to levels enabling flight (Shreeve, 1986). In N.W. Scotland where air temperatures are cooler (Table 1) and cloud cover is more prevalent (Thomson, 1980), large specimens would retain

Table 1. Periods in 1992 comprising daylengths (sunrise to sunset, and including morning and evening civil twilights) or 16 h or more at the three sampling sites, and mean (\pm SD) daily temperatures (°C) at proximal weather stations over the corresponding periods.

	S. England Salisbury Plain	N. Wales Tal-y-fan Mountain	N.W. Scotland Isle of Appin
≥ 16 h day:	24.v-18.vii	18.v-25.vii	9.v-3.viii
≥ 16 h day + twilights:	30.iv-12.viii	26.iv-16.viii	20.iv-22.viii
	Middle Wallop 51° 9' N, 1° 34' W 90 m amsl	Colwyn Bay 53° 17' N, 3° 43' W 36 m amsl	Greenock MRCC 55° 58' N, 4° 48' 5 m amsl
Temperature (°C) April:	—	10.0±3.4	9.1±2.9
May:	14.0±6.8 ¹	13.5±5.9	12.6±5.3
June:	15.9±6.5	14.6±4.2	15.2±4.1
July:	17.0±4.6	15.7±3.7	14.9±3.9
August:	18.1±5.1	15.6±3.2	14.3±3.1

¹Includes data for 30.iv.1992.

body heat for longer thereby maximizing oviposition and mate locating activity; larger males may also be better at defending territories (Davies, 1978). The smaller size of Hampshire specimens may result from their faster larval growth (Sibly *et al*, in prep.), not only facilitated by warmer summer temperatures, but possibly adaptive in minimizing their period of exposure to predation, parasitism and disease (Smith *et al*, 1987), and in enabling rapid population recovery following losses through drought (Thomas & Webb, 1984); *P. aegeria* is at least bivoltine throughout its British range (Goddard, 1962; Thomson, 1980).

The smaller sizes of adult *P. aegeria* attained at 14° than 17°C, especially in the case of S. England *P. a. tircis*, would appear to violate the expected increase in size with cooling temperature (Atkinson, 1994). A tentative explanation is that larvae are less efficient at utilizing food at 14°C than 17°C. In S. England, as the season progresses, daylengths of 16 h or more prevail and air temperatures rise (Table 1), and incident sunlight enables the larvae to utilize metabolic resources efficiently. In N.W. Scotland, where temperatures are cooler and cloud cover is more prevalent, larval physiology in *P. a. oblita* may be adjusted to utilize metabolic resources more efficiently at cooler temperatures. In the present study where daylight was simulated by a cold light source, the metabolic efficiency of *P. a. tircis* at 14°C (compared to that at 17°C) may have been considerably more compromised in the absence of supplementary radiant heat. Indeed the smaller size attained by *P. a. tircis* at 14° than at 17°C despite larval growth being the more protracted at 14°C (Sibly *et al*, in prep.), would concur with this hypothesis.

Nylin & Svärd (1991), in a study of museum specimens, found that *P. a. tircis* in Sweden, showed a decrease in size with distance north; they also found a decrease in size northwards from central Europe. Although contradicting the findings of Brakefield & Shreeve (1992), Nylin & Svärd (1991) argue that at more southerly latitudes, specimens should be larger because of the greater prevalence over the year of air temperatures above a critical temperature for larval growth, and hence a longer growing season.

However, one might expect growth to be faster under the higher temperatures, resulting in smaller adults but more annual generations. Moreover, under hot regimes (and especially in central Europe where a more 'continental' climate prevails than further west), larvae may aestivate to survive food stress during drought, with protracted larval durations but less time spent growing. Since a number of low altitude N. Wales male *P. a. tircis* at 20°C showed larval periods of 9–10 weeks (compared to the norm of 4–5 weeks) yet if anything emerged lighter in weight (Sibly *et al*, in prep.), their protracted development may represent such a strategy. Although corresponding larval durations were undergone at 20°C by a number of female *P. a. oblita*, such 'slow' individuals emerged heavier than the faster growing ones (Sibly *et al*, in prep.) indicating a different strategy and suggesting that even under hot summers *P. a. oblita* would continue to emerge larger than English *P. a. tircis*.

Latitudinal size trends in *P. aegeria* are further complicated by shifts in voltinism (Nylin & Svärd, 1991), and where the species is multivoltine, by seasonal differences in climate (Robertson, 1980a). The author proposes that rather than the butterfly showing a simple latitudinal cline, the smallest adults result where conditions are most extreme. Accordingly one would expect smaller adults under Continental and 'Arctic' than oceanic conditions. By way of example N.W. Scotland *P. a. oblita* enjoy an 'oceanic' climate with cool summers and largely frost-free winters (Thomson, 1980). In N. Sweden *P. a. tircis* suffers more extreme conditions. It experiences cooler summers and winter temperatures that rarely rise to levels allowing larval growth

(Nylin & Svård, 1991). Here, the species is univoltine, the larvae aestivating when summer temperatures are cool (rather than the adult emerging the same season) and pupating in the autumn (Wiklund *et al.*, 1983). Swedish univoltine populations lie at the northern limit of the species range (Brakefield & Shreeve, 1992), where aestivation may help the larva cope with less efficient nutrient utilization, and the early autumn pupation may enable the animal to withstand winter frosts. Under the Continental conditions of central Europe where there are extremes of heat, and especially where associated with drought, aestivation may enable larvae to survive food shortages. With more oceanic regimes such as in N.W. Scotland, hot summers may be less prone to drought, and hence larval diapause less critical to survival. Indeed, the protracted development and heavier weight of 'slow' *P. a. oblita* at 20°C (compared to 'fast' *P. a. tircis*) (Sibly *et al.*, in prep.), accords with this hypothesis. Detailed examination of the temperature ranges over which temperature, larval period and adult size show direct correlation (in the present study between 17° and 20°C), of individual instar durations and dimensions, and of larval growth curves, would further clarify the factors determining latitudinal size trends in non-migratory species such as *P. aegeria*.

ALTITUDINAL COMPARISONS

There was no obvious difference in adult size between low and high altitude N. Wales *P. a. tircis* at any of the study temperatures. Sibly *et al.* (in prep.) similarly found no significant differences in body weight (nor in other components of life history), suggesting that the larger size (and more extensive pale markings) of the high altitude 'drumensis' forms described by Thompson (1952), may have been simply a consequence of their having developed under cooler temperatures than their low altitude counterparts (Geiger, 1965; Table 1). Some features of the present N. Wales samples are now considered to determine further the nature of any altitudinal effects.

Spot-pattern aberration

Two of the 21 wild high-altitude females and one of the 21 wild low-altitude females originally taken between 17 and 21.viii.1992 displayed an eyespot or ocellus element (Schwanwitsch, 1935) in ventral forewing space 2 additional to that in space 5. The phenotype does not appear to have been previously documented. Since the forewings correspond to the mesothoracic segment (Sibatani, 1980), it is suggested that the phenotype be designated *mesoventro-s2/s5 biocellata* ab. nov. (Plate I, Figs. 13–15). The phenotype appeared at all three temperatures among the F₁ of both stocks and in both sexes, indicating that the allele is autosomal (i.e. not carried on the sex chromosomes), and since the low-altitude ab. *mesoventro-s2/s5 biocellata* female #9 yielded all wild-type F₁ (12 in all), also recessive; a dominant allele would predict at least 50% *biocellata* phenotypes among the F₁ (Falconer, 1981).

GENOTYPE FREQUENCIES, LOW ALTITUDE. Calling the wild-type allele 'W' and the recessive *biocellata* allele 'b', low-altitude female #9 was probably *bb* and the male most likely *WW*. Low-altitude wild-type female #5, however, yielded 9 out of the 30 F₁ of which 3 (33%) were aberrant; low altitude female #5 was probably *Wb*, and the male most likely *Wb* (a *bb* male would predict a 1 : 1 ratio of aberrant to wild-type). Of the 19 remaining low-altitude females, only 9 yielded an F₁ generation. These were wild-type and yielded all wild-type offspring. If these females were *Wb* they would necessarily have paired with *WW* males, while if *WW* they could have

paired with *WW*, *Wb* or *bb* males. Minimum and maximum estimates of *biocellata* allele frequency within the low-altitude parent sample can be estimated using the F_1 results of these 11 females. Based on the assumption of 9 $WW \times WW$ pairings (lower estimate) and 9 $WW \times bb$ (upper estimate) and taking into account females #5 ($Wb \times Wb$) and #9 ($bb \times WW$), the following can be expected.

Lower estimate. The lower estimate assumes 9 $WW \times WW$, 1 $Wb \times Wb$ and 1 $bb \times WW$ pairings, involving $(1 \times bb) + (2 \times Wb) + (19 \times WW)$ genotypes comprising 4 'b' and 40 'W' alleles, and hence a *biocellata* gene frequency of 4/44 (9.1%) with 3/22 (13.6%) of individuals carrying the gene.

Upper estimate. The upper estimate assumes 9 $WW \times bb$, 1 $Wb \times Wb$ and 1 $bb \times Wb$ pairings, involving $(10 \times bb) + (2 \times Wb) + (10 \times WW)$ genotypes comprising 22 'b' and 22 'W' alleles, and hence a *biocellata* gene frequency of 22/44 (50%) with 12/22 (54.5%) of individuals carrying the gene.

GENOTYPE FREQUENCIES, HIGH ALTITUDE. High altitude *mesoventro-s2/s5 biocellata* females #1 and #5 were most likely *bb*. Both yielded aberrant F_1 (3 out of 15 individuals (20%) and 11 out of 26 (42%) respectively), the male parents therefore having been most likely *Wb* (*bb* would predict an all aberrant F_1 and *WW* an all wild-type F_1). The lower than expected frequency of *biocellata* phenotypes predicted from a $bb \times Wb$ cross may indicate a greater mortality among *bb* genotypes. The 13 remaining females to yield F_1 were wild-type and yielded all wild-type offspring.

Lower estimate. The lower estimate of *biocellata* gene frequency in the high-altitude population assumes 13 $WW \times WW$ and 2 $bb \times Wb$ pairings, involving $(2 \times bb) + (2 \times Wb) + (26 \times WW)$ genotypes comprising 6 'b' and 54 'W' alleles, and hence a *biocellata* gene frequency of 6/60 (10%) with 4/30 (13.3%) of individuals carrying the gene.

Upper estimate. The upper estimate of *biocellata* gene frequency in the high altitude population assumes 13 $WW \times bb$ and 2 $bb \times Wb$ pairings, involving $(15 \times bb) + (2 \times Wb) + (13 \times WW)$ genotypes comprising 32 'b' and 28 'W' alleles, i.e. a *biocellata* gene frequency of 32/60 (53.3%) with 17/30 (56.7%) of individuals carrying the gene.

Population structure and gene flow

Since the field collected males from both altitudes displayed wild-type pattern when the *biocellata* gene is autosomal (i.e. not sex-linked), the actual gene and genotype frequencies in the wild populations probably lie nearer the lower estimates. However, the occurrence in samples from both altitudes of similar lower and upper estimates, suggests that individuals along the altitudinal gradient function as a single population. Although the sampling sites represented separate woodlands, each woodland was contiguous between 30 and 200 m amsl. Furthermore, maximum separation between these woodlands was ~400 m, yet female *P. aegeria* can disperse up to 600 m and traverse open terrain (Davies, 1978). Thus, while genetic assimilation has been implicated in the evolution of high-altitude forms elsewhere (Shapiro, 1976), gene flow between low- and high-altitude *P. a. tircis* in N. Wales may limit such altitudinal differentiation here.

Pupal diapause

Among the high altitude stock at 14°C, 6 of 87 F_1 individuals (7%) underwent pupal durations greater than 28 days indicative of diapause (Lees & Tilley, 1980). Of these 6 high-altitude diapause pupae, 3 males and 1 female (67%) emerged as ab.

cockaynei Goodson, in which the dark underside wing areas tend to merge and appear more uniform, contrasting vividly with the remaining pale markings and eyespot pupils (Russwurm, 1978: Plate 32) (Plate I, Figs 16–17). Diapause pupae appeared in the low altitude stock however, only after two generations at 14°C (2 diapause pupae, total of direct developing pupae not ascertained).

An earlier study using S. England *P. a. tircis* under 16 h daylength (Winokur, 1992), had found that the offspring of individuals reared at 18°C yielded only direct developing pupae at both 14° and 18°C, but that if the parents were briefly chilled as pupae to -2°C, then some of the offspring reared at 14° (but not 18°C) underwent diapause to emerge as ab. *cockaynei*. Since British *P. a. tircis* typically form diapause pupae only under daylengths of 11 h or less irrespective of temperature (Lees & Tilley, 1980), it was concluded that pupal diapause and pattern modification at 14°C with 16 h daylength depended on the parents having experienced pupal frost, thereby implicating some parental effect. Considering again the N. Wales low altitude *P. a. tircis*, it is proposed that diapause in the F₂ at 14°C with 16 h could similarly have been conditioned by the parents too having developed at 14°C. While Colwyn Bay meteorological station (36 m amsl) recorded a July mean of 15.7°C (Table 1), higher altitudes would be expected to be cooler (Geiger, 1965), hence a number of the high-altitude parental sample (collected at 200–220 m amsl) might have developed at 14°C (or cooler). Higher altitudes would also be expected to suffer more prevalent winter frosts (Geiger, 1965), and while this would be of more direct consequence to individuals of generation 1, sporadic summer frosts at high altitude cannot be ruled out.

P. a. tircis mesoventro-s2/s5 biocellata. F₂ from a high altitude F₁ *mesoventro-s2/s5 biocellata* female reared at 20°C (female #1.4), were cultured indoors from 11.x.1992 in 5" diameter translucent perspex tubs, under natural daylength but away from direct sunlight, and replenished with cut foodplant at two-day intervals. Room temperature was not recorded but might be expected to be warmer than in the field. Only three pupae diapaused, yielding two 'early spring' form males (Plate I, Fig. 14); and a *cockaynei* female (Plate I, Fig. 15) which may have been 'forced' by indoor temperature.

Diapause comparisons with subspecies oblita

Of the *P. a. oblita* F₁ at 14°C, 36 of 52 pupae (70%) diapaused, but of 24 diapause adults preserved only 3 males and 1 female (17%) were ab. *cockaynei* (Plate I, Fig. 18); the remainder were typical 'early spring' forms (Plate I, Fig. 19). Direct developing *P. a. oblita* were of the late spring/summer form that typify the 2nd brood (Plate I, Fig. 20; Robertson, 1980a), suggesting that 'early spring' phenotype in *P. aegeria* is linked to pupal diapause; linking of vernal phenotype to diapause is known in other species (Shapiro, 1976).

Aberrant pattern in North Wales (and S. England) *P. a. tircis*, may have resulted from the 16 h daylength being atypical of times in their season when prevailing temperature is 14°C or less (Table 1). Hence the atypically long photoperiod may have 'forced' pupae that at 14°C or less would normally have been diapausing under shorter associated daylengths.

At the latitude occupied by *P. a. oblita* on the other hand, daylengths of 16 h or more persist later into the season, when concomitant temperatures would be cooler than further south (Table 1) thereby leaving less time for the animals to complete the life cycle before winter. Hence in *P. a. oblita*, one might expect the critical photoperiod for pupal diapause to be shifted to longer daylengths than for more southern *P. a. tircis* (cf. Nylin *et al*, in press); with 16 h daylength therefore being

closer to the normal photoperiodic cue for diapause in *P. a. oblita* and so less likely to result in aberrant wing pattern.

UNDERSTANDING AB. *COCKAYNEI* AND '*DRUMENSIS*' FORMS

The incidence of ab. *cockaynei* among the respective cohorts points against chance genetic mutation, and suggests that development of the phenotype does not depend on a particular genotype *per se*, but rather is a structured response of the wing developmental physiology to a variety of atypical cytogenetic-environmental interactions. Several examples of *cockaynei* are known e.g. Rothschild-Cockayne-Kettlewell collection, British Museum (Natural History), and it may represent a 'recurrent' aberration (cf. Shapiro, 1975). *P. aegeria* larvae often pupate in exposed locations and show little inclination to seek shelter (Cole, 1962), and *cockaynei* individuals may represent the progeny of animals subjected to frost as young pupae. The parental frost exposure might result in the progeny larva undergoing protracted growth, but nevertheless reaching the final instar under daylengths of 16 h or more. While 16 h daylength would normally cue direct pupal development, the parental history could result in the individual undergoing atypical diapause, the adult possibly emerging in late autumn if temperatures permit but otherwise perishing as a pupa; the specimen figured by Russwurm (1978) was taken in November.

Should the progeny larva not reach the final instar until later in the autumn, the shorter daylength itself would cue pupal diapause and associated 'early spring' phenotype. The parental history may further protract the diapause, so that the 'early spring' form thus emerges later than the usual April-May of generation 1 part *i* (Goddard, 1962) as with '*drumensis*' which Thompson (1952) reported as flying above the tree line in June.

In the present study, diapause individuals from high altitude *P. a. tircis* and Scottish *P. a. oblita*, also grew more slowly as larvae and produced heavier adults (Sibly *et al*, in prep.). Thus protracted larval development in putative '*drumensis*' (*P. a. tircis*) individuals could account for their larger size. Indeed, Thompson's specimens may have resembled vernal *P. a. oblita* (Plate I, Fig. 19), for N. Wales *P. a. tircis* and *P. a. oblita* diapause animals showed similar pupal durations and male weights (Sibly *et al*, in prep.).

Alternatively, *drumensis* may simply have constituted an unusually late generation 1 part *ii*, which flies in late May/June (Goddard, 1962) and typically comprises the largest adults of all the broods (Robertson, 1980a). Such *drumensis* may have resembled somewhat 'late spring' *P. a. oblita* specimens (Plate I, Fig. 20), though without Thompson's specimens for comparison further field work is required to reliably characterize the form. Reasons for the absence of subsequent reports include the failure to conduct any further planned studies, and it is therefore important not to discount *a priori* the natural occurrence of '*drumensis*'. Second, since its occurrence would appear to depend on prevailing climate, fluctuations in the prevailing weather between years (Shreeve, 1986) may result some years in the form being absent. Third, being described from atypical habitat (open grassland/moor, pers. obs.) where recorders are unlikely to be monitoring the species, it is liable to be overlooked. Finally, its June flight period means that collectors in search of fresh voucher specimens, and breeders in search of gravid females, would likely have completed their activities.

Whether an individual undergoes a '*cockaynei*' or '*drumensis*'-type life cycle, may also depend on the emergence (part *i* or *ii*) from which it derived and hence the time

available to complete larval development, and on underlying genetic differences in growth rate (Robertson, 1980b). Similar considerations would apply to the offspring of second generation individuals developing under cool summers.

EVOLUTIONARY CONSIDERATIONS

P. aegeria probably reached Britain from Europe when the ice retreated after the Loch Lomond readvance of *c.* 10 000 B.P. (Dennis, 1977), though the history of subspecies *oblita* is not firmly established since the species can undergo dramatic changes in distribution over much briefer time scales, as within the present century (Barbour, 1986). However, while winter frost is rare in N.W. Scotland (Thomson, 1980), populations colonizing the region from the south would experience cooler and shorter summers and correspondingly longer daylengths, possibly resulting in a proportion of the progeny undergoing 'cockaynei' and 'drumensis' life cycles. Individuals undergoing the normal strategy would be likely to emerge too late in the season to breed, but those undergoing the 'drumensis' strategy could yield progeny the following spring that in turn develop under a cool summer. Under such recurrent seasons, a strategy initially conditioned by parental effect might come to be intrinsically determined, and under the prevailing seasonal daylengths, show a concomitant shift in the critical photoperiod for pupal diapause to longer daylengths; although the precise mechanism by which such shifts in the 'norm of reaction' come about is a matter for investigation. In Scotland, *P. a. tircis* appears to be extending its range down the Great Glen from deciduous forest in the north-east to cooler pine forests more south-west. An examination of responses along the cline to particular climatic regimes could help us understand whether there is a rapid adaptation in the species to minor climatic shifts (Barbour, 1986).

One of Waddington's (1961) experiments selected for 'bithorax' flies (where the metathorax develops wings in place of halteres) produced by exposing the eggs to ether, but Ho *et al* (1983) obtained similar increases in the incidence of *bithorax* using highly inbred lines of negligible genetic variability and without applying selection; moreover, despite reduced fecundity and survival in *bithorax*. These findings appear to involve progressive changes in maternally imposed organization of the egg surface cytoplasm, which may further condition changes in nuclear gene expression (Ho *et al*, 1983). Since a study on pupal chilling in *P. aegeria* had shown more extreme development of 'cockaynei' features among the F₁ at 14°C than in the cold-treated parents (Winokur & White, in prep.), comparable cytoplasmic effects could be involved in mediating lepidopteran evolution; although induced changes in sperm chromosomal DNA could represent a possible mechanism (cf. Vuillaume & Berkaloff, 1974).

Vuillaume & Berkaloff, working with the large white butterfly, *Pieris brassicae* L., had found that larvae administered LSD failed to undergo the usual pupal diapause under daylengths of 9 h or less, but that their progeny were resistant to corresponding doses of the drug. They suggested that LSD activates a detoxifying mechanism in the parent butterfly that is passed on to its offspring. Moreover, since the resistance of the progeny to LSD proved greater when just the male parent had been treated than when the female alone had been treated, Vuillaume & Berkaloff suggested that inheritance of the detoxification mechanism is mediated via induced changes in sperm chromosome structure.

Alternatively, adaptation might involve the process of gene amplification, in which multiple copies of appropriate DNA sequences are generated and incorporated within the genome (see Pollard, 1988). Gene amplification, for instance, is known to

be involved in the rapid acquisition by insect populations of insecticide resistance, and appears to be part of the physiological repertoire of all cells (Ho, 1988). Moreover, the environmental stimulus may actually stabilize those cells in which the appropriate genes are being amplified, in which respect the environment, rather than selecting for a pre-existing genetic variant, is selecting for a cytogenetic response (Ho, 1988). For example, it was above suggested that in *P. a. oblita*, adult size was compromised to a lesser degree by rearing at 14° versus 17°C than in *P. a. tircis*, because the former had become metabolically adjusted to enable more efficient growth at lower temperatures. Should this have involved the amplification of genes appropriate for efficient nutrient assimilation and metabolism, and also present in *P. a. tircis* but in a lesser complement (as opposed to selection for a gene just improving metabolism at 14°C), then this would explain *P. a. oblita* continuing to attain the greater size at 17° and 20°C. However, when egg yields and fertility were compared, performance was severely compromised at 14°C compared to 17°C in *P. a. oblita* (Sibly *et al*, in prep.), the reverse of what might be expected should *P. a. oblita* be carrying the greater metabolic gene complement. An alternative explanation therefore, is that in S. England, where the hotter summers and more intense solar radiation force high metabolic rates with a concomitant risk of tissue damage, *P. a. tircis* has responded by amplifying genes appropriate for coping with rapid metabolic turnover. Not only would this protect such individuals from heat stress, but the amplified complement of metabolic genes may enhance the allocation of metabolic resources to other functions such as reproduction. Should this have involved genes also present in *P. a. oblita* only in lesser complement (as opposed to a gene enhancing performance specifically at 20°C), then this would explain *P. a. tircis* continuing to grow faster (and accordingly to produce smaller adults) yet remaining more fecund than *P. a. oblita* at also 17° and 14°C. The initial adjustment to warmer conditions however, would likely have required a shift in the allocation of metabolic resources from growth (and reproduction) to cytogenetic restructuring, leading to an initial loss of condition, as occurs with flax plants transplanted between culture media (Cullis, 1983). Indeed, it is noteworthy that among *P. a. oblita* undergoing larval aestivation at 20°C (warmer than normally experienced in the field, Table 1), a number of individuals showed varying degrees of wing pattern abnormality (Plate I Fig. 21), indicative of developmental stress. Furthermore, a shift in resource allocation to cytogenetic restructuring could explain why rearing at 20°C did not bring fecundity up to the level exhibited by *P. a. tircis*. However, cytogenetic and molecular studies will be required before firm conclusions are drawn. Such considerations, as well as those pertaining to the spatial and temporal heterogeneity of ancestral environments (Sibly & Atkinson, 1994), are particularly critical if the success of introduction attempts necessitating stock of disparate origin, the capacity of species to expand their ranges, and the impact of rapid climatic shifts as with global warming, are to be accurately predicted.

Reciprocal crosses between stocks (e.g. *oblita* female × *tircis* male, *tircis* female × *oblita* male) with pure crosses as controls, and between cohorts reared under different culture regimes (e.g. 14°C female × 20°C male, 20°C female × 14°C male) could identify more specifically the roles of maternal (cytoplasmic) effect, genotype, and environment, in determining life history strategy and consequently adult size and pattern. A high incidence of pattern abnormalities in such crosses might disclose nuclear/cytoplasmic incompatibilities, important in predicting the effects of mixing between locally adapted populations, as could occur between *P. a. tircis* and *P. a. oblita* south-west of the Great Glen.

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SHORT COMMUNICATION

***Swammerdammia compunctella* H.-S. (Lepidoptera: Yponomeutidae), in Merthyr Tydfil, Glamorgan, S. Wales.**—Whilst curating G. Fleming's collection of Lepidoptera (accession number NMW.1927.644) in the National Museum of Wales, Cardiff, I came across a series of *Swammerdammia* that he had named as *S. caesiella* (Hübner). The series was collected from the area of Merthyr Tydfil between 1920 and 1926, in the months of June and July. Of the twenty specimens, 18 were re-determined by myself as *S. albicapitella* (Scharf), and the remaining two as *S. compunctella* (H.-S.). My determinations were confirmed by David Agassiz at the 1994 BENHS exhibition.

It would appear that *S. compunctella* has not previously been recorded in Glamorgan (VC41), and possibly not even from Wales (Agassiz, 1987). It would therefore be useful to search for the larvae in the spring on young Rowan trees.

It is also worth noting that the G. Fleming collection contains a great number of micro-Lepidoptera, mostly from South Wales, the records of which have probably never been published.

The full data from the two specimens are: Merthyr Tydfil, 22.vi.1925, and Merthyr Tydfil 25.vi.1926.—D. J. SLADE. c/o National Museum of Wales, Cathays Park, Cardiff CF1 3NP.

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TWO NEW SPECIES OF *MEGASELIA* (DIPTERA: PHORIDAE) FROM EUROPE

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The genus *Megaselia* Rondani is the largest in the family Phoridae, probably including more than half the species of the present-day phorid fauna. Not only the boundaries of the genus but also the recognition of the species is still far from satisfactory. The problems and the identification literature for the world are reviewed elsewhere (Disney, 1994). The present priority is to characterize clearly the males and to provide illustrations of the male hypopygia. The most recent treatment of European species is a key to the males of species recorded from the British Isles (Disney, 1989).

This paper describes two new species, which were collected in Germany and were sent to me by Dr Sabine Prescher and Dr Gisela Weber. In addition the male hypopygia of two poorly known species are illustrated.

The specimens have been mounted on slides in the standard manner recommended for male phorids (Disney, 1983, 1994). The type material has been deposited in the Cambridge University Zoology Museum.

DESCRIPTIONS OF SPECIES

Megaselia haraldlundi sp. nov.

Type locality, Germany, near Adenau.

Type material, holotype male, Germany, Eifel mountains, Nordrhein-Westfalen, near Adenau, 20.v.-3.vi.1990, in emergence trap in spruce forest. Leg. Mechthild Engel, deposited in Cambridge University Museum of Zoology; 1 male paratype with holotype.

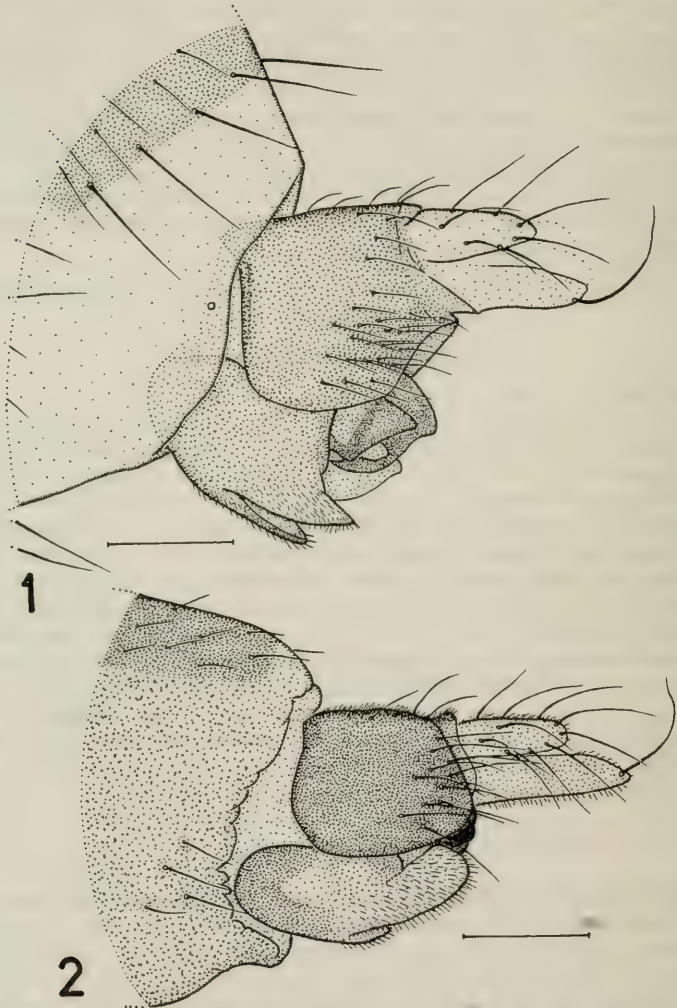
Etymology. The species is named after Harald Lund.

Diagnosis. Lower supra-antennal bristles strong, but a little shorter than upper pair, frons dull, labella with only sparse spines below, palps largely pale yellow, two notopleural bristles, scutellum with two hairs and two bristles, mesopleuron bare, epandrium with more than 20 hairs on left side, anal tube a little shorter than epandrium and brownish yellow, hairs of proctiger slightly more robust than those on cerci, hypandrial lobes with short hairs, legs mainly pale yellowish brown with darker apex to hind femur, hairs below basal half of latter longer than those of anteroventral row of outer half, hind tibia without differentiated anterodorsals, costal index about 0.47, costal section 1 longer than sections 2 + 3, costal cilia long, vein Sc free, haltere knob essentially yellow.

Description (male only)

Frons brown, with bristles positioned as Fig. 3. The lower supra-antennals are robust but a little shorter and more slender than the upper pair. Four bristles on cheek and four stronger ones on jowl. Frons with dense microtrichia (i.e. dull) and 50-60 hairs. Palps pale yellow very lightly tinged brown and with seven bristles, the longest being at most 0.09 mm long. The brown, subglobose, third antennal segment somewhat large (greatest diameter 0.16 mm). Arista brown, the basal segments about 2.5 × as long as broad, the first being fractionally longer, and swollen basal section of

third segment being just over $3 \times$ as long as broad. Pubescence of third segment short. Proboscis pale dusky yellow, including labrum, whose greatest breadth is about 0.1 mm. Labella a little expanded, but with only a few scattered pale spines below apart from dense patch apicolaterally. Thorax brown, being darkest on top and more chestnut on sides. Each side of scutum with a humeral, two notopleurals, an intralar, a postalar and a prescutellar dorsocentral bristle. Scutellum with an anterior pair of hairs, at most as strong as those at rear of scutum, and a posterior pair of bristles. Mesopleuron bare. Abdomen with brown tergites with scattered short hairs, which are a little longer posterolaterally on 1-5, especially on 2. Posterior row of tergite 6 much stronger and longer (Fig. 1). Internally with four rectal papillae. Venter



Figs. 1-2. *Megaelia*, left faces of male hypopygia: (1) *M. haraldhundi*; (2) *M. intercostata*. Scale bars = 0.1 mm.

pale greyish yellow, but with darker transverse bands on flanks below sides of tergites. Ventrally with scattered hairs on segments 3–6, the longest being at rear of 6 in the middle. Hypopygium with brown epandrium, paler hypandrial lobes, a pale brownish yellow anal tube, and as Fig. 1.

Legs pale yellowish brown, with darker brown at apex of hind femur and along dorsal face of hind tibia. All five fore tarsal segments with a well-developed posterodorsal hair palisade. Front metatarsus more than $5 \times$ as long as broad. Dorsal hair palisade of middle tibia extends three-quarters of its length. At least six of the hairs below basal two-thirds of hind femur are longer than those of anteroventral row in distal half. Hind tibia with about a dozen differentiated posterodorsal hairs, of which the seven lowest are more spine-like. The dorsal hair palisade is deflected onto anterior face just before last posterodorsal spine. Spines of apical comb of posterior face all simple. Wing 1.8–1.9 mm long. Costal index 0.47. Costal ratios 3.17–3.35:1.84–1.85:1. Costal cilia 0.13–0.14 mm long. Veins yellowish to brownish grey. Membrane lightly tinged brownish grey. Vein Sc clearly ending before reaching R_1 . A small hair at base of vein 3. Axillary ridge with four bristles, the outermost being as long as costal cilia of section 3. Vein 4 originates just beyond fork of vein 3. Haltere with brown stem and pale yellow knob, which may be lightly tinged grey.

Similar species

In the keys to British *Megaselia* (Disney, 1989) this species readily runs to couplet 225 and then by a return loop to couplet 159 and to *M. septentrionalis* (Schmitz). This species and *M. haralddundi* are evidently sibling species. The latter tends to be a little smaller and with much paler legs and palps. The size difference is best indicated by the length of the hind femur, which is less than 0.85 mm in *M. haralddundi*, but more than this in *M. septentrionalis*. The hypopygia are similar (cf Fig. 1 with fig. 398 in Disney, 1989), but differ in small details. For example the hairs of the posterolateral extremity of the left side of the epandrium below the anal tube of *M. haralddundi* are the shortest hairs, but in *M. septentrionalis* the hairs in this position are among the longer hairs on the side of the epandrium. The anterior scutellars are stronger in *M. septentrionalis*.

Megaselia septentrionalis was originally described from a single female (Schmitz, 1919). A male was included in the keys of Schmitz & Delage (1981), but the description is cut off in mid sentence, after the characterization of the antenna; this work having remained unfinished ever since. The inclusion in the key to British species, therefore, provides the best available published characterization of the male of this species.

Megaselia intercostata (Lundbeck, 1921)

Material examined, 1 male, Germany, Thüringen, Apfelstädter Ried nature reserve, 1–15.vi.1985. Leg. Jörg Weipert.

Lundbeck (1922) provides a description, with a figure of the wing, of this species. The male hypopygium is depicted in Fig. 2, a suitable specimen for illustration having not been available when writing the key to British *Megaselia* (Disney, 1989).

Megaselia jameslamonti sp. nov

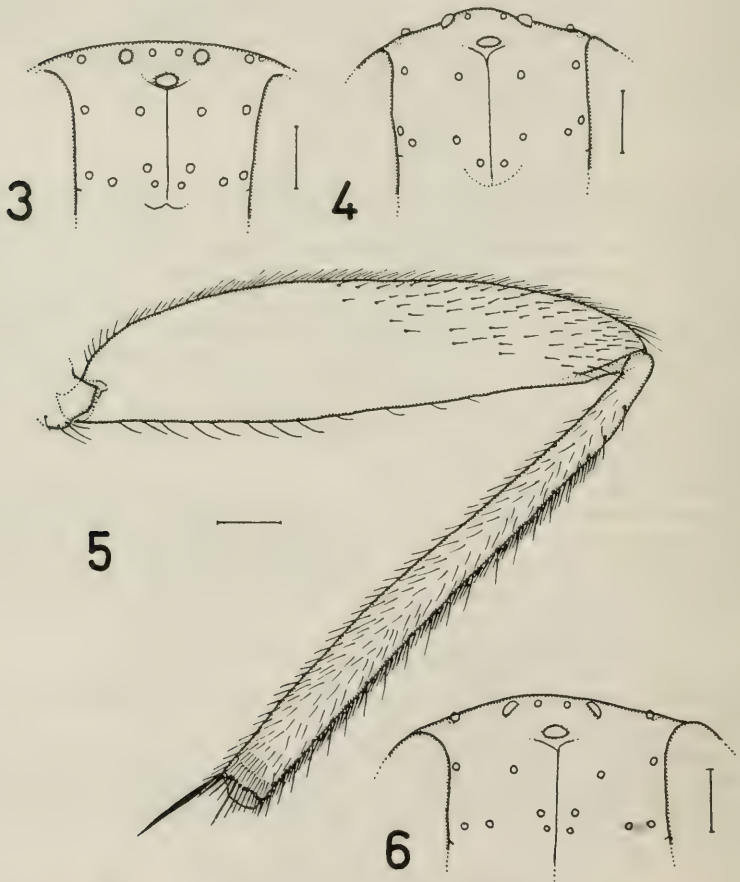
Type locality, Germany, Thüringen.

Type material, holotype male, Germany, Thüringen, Apfelstädter Ried nature reserve, 12–26.ix.1985, moist meadow with *Cirsium oleraceum* (L.) Scop., *Salix* and

Populus, in yellow bowl-trap. Leg. Jörg Weipert, in University Museum of Zoology, Cambridge, England.

Etymology. The species is named after James Lamont.

Diagnosis. Lower supra-antennal bristles subequal to upper pair, frons dull, palps brown, three notopleural bristles, scutellum with two hairs and two bristles, epandrium with less than a dozen hairs on left side plus one longer bristle-like hair, anal tube pale brown and clearly longer than epandrium, hairs of proctiger little if any stronger than hairs of cerci, left lobe of hypandrium very short, it and right lobe with short hairs, legs mainly brown, hairs below base of hind femur longer than those of anteroventral row in distal half, hind tibia without differentiated anterodorsal hairs, costal index 0.48–0.49, costal section 1 longer than sections 2 + 3, costal cilia short, vein Sc free, haltere knob brown.



Figs. 3–6. *Megaselia* males. (3) *M. haraldundi* frons, with bristles represented by basal sockets only; (4) *M. jameslamonti* frons; (5) *M. teneripes*, posterior face of hind femur and tibia; (6) *M. teneripes* frons. Scale bars = 0.1 mm.

Description (male only)

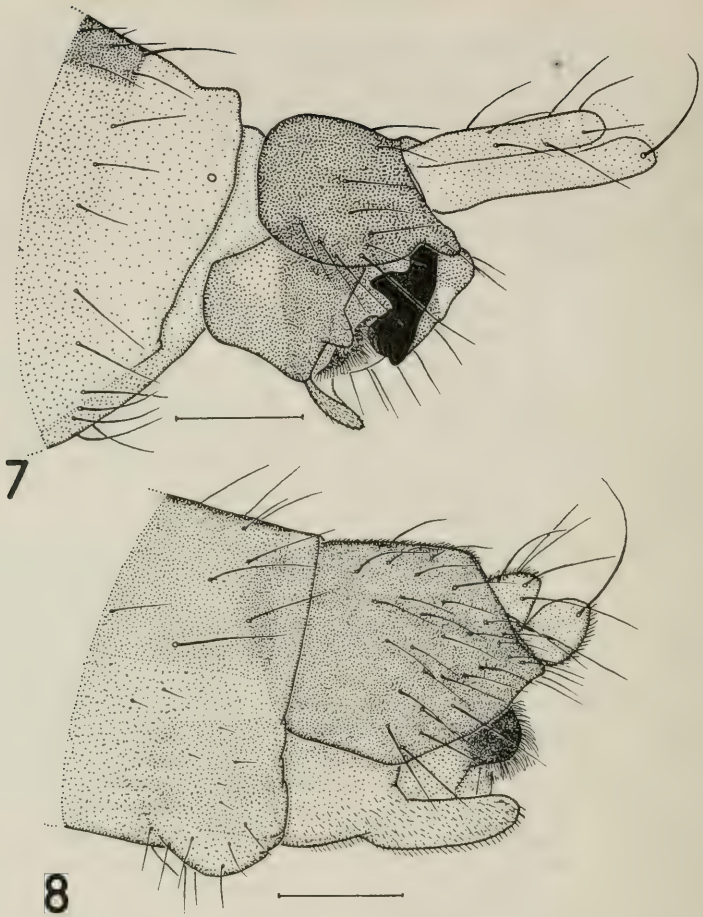
Frons brown, with bristles positioned as Fig. 4. The lower supra-antennal bristles subequal to upper pair. Three bristles on cheek and two stronger ones on jowl. Frons with dense microtrichia (i.e. dull) and 54–60 hairs. Palps brown, with a very short vestigial basal segment. Distal segment a little inflated in basal half and with 8–9 differentiated bristles, the longest being 0.11 mm in length. The brown, subglobose, third antennal segment large (greatest diameter 0.16 mm). Arista brown and short-haired. Labrum pale brown, its greatest breadth about half diameter of third antennal segment. Labella relatively narrow, pale whitish yellow but tinged pale brown above, with only a few scattered pale spines below.

Thorax brown to almost black on top. Each side of scutum with a humeral, three notopleurals, an intra-alar, a postalar and a prescutellar dorsocentral bristle. Scutellum with an anterior pair of fine hairs (shorter and finer than those at rear of scutum) and a posterior pair of bristles. Mesopleuron with 11–12 hairs and a bristle at hind margin that is longer than anterior notopleural bristle. Abdominal tergites brown with scattered short hairs, which are a little longer at hind margins. Venter brownish grey with scattered hairs below on segments 3–6. Hypopygium with brown epandrium and hypandrium apart from paler posterior lobe of right side, with a paler brown anal tube, and as Fig. 7.

Legs brown, but tarsi and front tibia paler, being pale yellow lightly tinged brown. All five fore-tarsal segments with a well developed postero-dorsal hair palisade. Front metatarsus a little thickened, being about $4.5 \times$ as long as greatest breadth, and ventrally with a single longitudinal row of differentiated truncated hairs. Dorsal hair palisade of middle tibia extends only about 0.6 of its length. Five or six hairs below basal half of hind femur are longer than those of anteroventral row in distal half. Hind tibia with about 14 differentiated posterodorsal hairs, the six or seven in middle being the most robust. The dorsal hair palisade is deflected a little onto anterior face from position of penultimate posterodorsal hair. Spines of apical comb of posterior face all simple. Wing 1.59 mm long. Costal index 0.48–0.49. Costal ratios 4.10:2.05:1. Costal cilia 0.08–0.09 mm long. Veins grey to yellowish grey. Membrane only lightly tinged grey. Vein Sc fades away before reaching R_1 . No hair at base of vein 3. Axillary ridge with two, well spaced, bristles, the outermost being longer than costal cilia of section 3. Vein 4 originates at or just beyond fork of vein 3, but its base is obscure. Both stem and knob of haltere brown.

Similar species

In the keys to British species (Disney, 1989) *M. jameslamonti* runs to couplet 48. Neither lead applies, although lead 2 is to be preferred. If one proceeds it runs to couplet 58 and then by a return loop to couplet 47; neither lead applies, because of the details of the hypopygium. A note at couplet 48 directs one to couplet 60, if neither lead of 48 applies. It will then run readily to couplet 126, but neither lead applies because of its long anal tube. In the keys of Schmitz (1957a) *M. jameslamonti* will run to couplets 19–22 on page 432. The species covered by these couplets are also included in my keys to British species except for *M. intonsa* Schmitz. The latter resembles *M. jameslamonti* but it has a shorter costal index, different costal ratios, longer costal cilia, and differences of detail in the hypopygium.



Figs. 7-8. *Megaselia*, left faces of male hypopygia. (7) *M. jameslamonti*; (8) *M. teneripes*. Scale bars = 0.1 mm.

Megaselia teneripes Schmitz, 1957b

Material examined, 1 male in Museum Koenig, Bonn, labelled "Dolomiten grasteilenpaß. S. Hang + 2540 m, 3/7/56 Klebelsberg" (or perhaps "Klobolsberg") "*Meg. teneripes*".

Schmitz (1957b) described a single female from the Spanish Sierra Nevada. The hitherto undescribed male has been remounted on a slide and is characterized below. The male closely resembles the female in its overall brown coloration and slender femora and tibiae (e.g. Fig. 5). The frontal bristles are disposed as in Fig. 6. The brown labrum much narrower than greatest diameter of third antennal segment (0.09 and 0.17 mm respectively). The brown labella relatively short and narrow, with only

a few pale spines below. The hypopygium as Fig. 8. As in the female, there are only two notopleural bristles. There is no notopleural cleft. Anterior scutellars reduced to small hairs, at most as long as hairs at rear of scutum. Apical comb on posterior face of hind tibia with all spines simple (Fig. 5). Wing similar to female (fig. 8 in Schmitz, 1957b), with strong vein Sc reaching and fusing with R_1 . A minute hair at base of vein 3. Six well developed bristles on axillary ridge.

Similar species

In my keys (Disney, 1989) the male of *M. teneripes* runs to couplets 273 and 274. The details of the hypopygium and slender hind femora will readily distinguish it from the species of these couplets.

ACKNOWLEDGEMENTS

I am grateful to Dr H. Ulrich (Zoologisches Forschungsinstitut und Museum Koenig, Bonn) for the loan of the specimen in his care and for his hospitality during a visit to Bonn. My work on Phoridae is currently funded by a grant from the Leverhulme Trust (London), made to Dr W. A. Foster for a Research Associate, and a grant from the Isaac Newton Trust (Trinity College, Cambridge).

The new species are named after Harald Lund and James Lamont, who responded to an appeal for funds made by our local church

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LETTER TO THE EDITOR

Capital letters for English names.—Both of us were wondering about the Journal's policy regarding the use of capital letters. We know that you are keen to avoid moving towards the German position, where every noun is capitalized, and we both heartily agree with this policy. Where we are unsure concerns the titles of articles which we are quoting. If an author used capitals in a paper or book title and we are quoting such a publication, we feel that we should use capitals exactly as he did. Similarly, in our paper (*Br. J. Ent. Nat. Hist.* **7**: 59–65), we quote Sladen who referred

to *Bombus ruderatus* as the 'Large Garden Humble-bee' we would like to think that Sladen's original usage might have been allowed to stand (as indeed it has).

Regarding the English names of wild flowers: originally when we wrote the paper, we used capital letters in both parts of the English binomial, e.g. "Deadly Nightshade", "Long-stalked Orache", "Lesser Water-plantain" and "Narrow-leaved Everlasting-pea". This system is recommended in the *English names of wild flowers*, by J.G. Dony, S.L. Jury and F. Perring (2nd edn, B.S.B.I., 1986). This system is used to distinguish between a specific identification, e.g. "Spear Thistle", *Cirsium vulgare*, and the general name "thistle" which could refer to various members of several genera.

We hope you will not think us presumptuous in writing on this matter, but wonder whether the current policy might be in need of a rethink.—STUART ROBERTS, 22 Belle Vue Road, Salisbury, Wiltshire SP1 3YG and GEORGE ELSE, Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5BD.

Reply from the Editor.—Capital letters are overused and often misused, and I must admit that I have come down rather hard on them. In most cases, however, capital letters serve no purpose and often interrupt the flow of thought when one is reading a sentence. But to take the points in order.

Capital letters can be used to good stylistic effect on the cover and title page of a book—take for example the Society's own book on hoverflies. However, when quoting this publication in text or in a reference list, a decision must be made which words to capitalize. Examination of the original book is useless, since *all* the letters of the book's title are capitals. It would be daft to list the book as it appears on its own title page with six words totalling 49 capital letters. Similarly, the title of the article by Else and Roberts is composed entirely of upper case letters in the original, but in quoting it in a reference list, this would not be followed.

It may be seen as ironic that the reference style of the Journal, occasionally reproduced on the inside back covers, suggests that article and book titles should carry only initial capital letters for the first word while journal titles have all words capitalized. This is especially ironic since the "World List" suggests journal titles should have lower case for adjectives and hence "*Br. J. Ent. nat. Hist.*" However, the current practice (*Br. J. Ent. Nat. Hist.*) is regarded as "more modern" by scientific publishers.

Whether or not other authors have used capital letters is no guide to how we should use them now. At certain periods, and in certain popular books, capital letters are used with abandon for all and sundry. However, I am intrigued to discover that botanists have adopted an "official" system.

What should entomologists do? Faced with names such as small white and large white, it might be suggested that they deserve capital letters whereas the general term "white" does not. But then what of the peacock butterfly? The birds peahen, peacock and peafowl do not ordinarily take capital letters, so why should the butterfly?

At present, I have adopted a style in which capital letters are zealously guarded against unless truly a "proper" noun. Thus New Forest burnet, Portland ribbon wave and Roesel's bush-cricket. However I recently came unstuck on the cousin german moth, initially capitalizing it as a cousin from Germany, until it was pointed out to me that it was a corruption of the French *cousin germain*, meaning simply a first cousin.

Having said all this, I would be interested to hear the opinions of readers.—RICHARD A. JONES, 13 Bellwood Road, Nunhead, London SE15 3DE.

THE DIPTERISTS' FORUM: A MODEL FOR OTHERS TO FOLLOW?

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One of the features of recent decades has been the proliferation of invertebrate recording schemes. Some of these are very active, providing the support that is needed in terms of assistance with identification, new keys, field meetings and other events that bring people together, and in particular, newsletters that maintain enthusiasm for a common purpose.

Directly or indirectly, various new societies have been generated. The Balfour Brown Club (water beetles) is a prime example. The British Dragonfly Society grew, in large part, out of the success of the dragonfly recording scheme. Apart from insects, one only has to look at the BRC atlas on terrestrial and freshwater molluscs to appreciate what a dynamo recording has been in the Conchological Society, and the British Arachnological Society was begun by enthusiasts for recording in the field.

A further element in this growth has been the increasing range of identification keys and books that have opened up taxonomic groups that were previously fraught. With groups such as butterflies, dragonflies and grasshoppers, which are suitable for the general naturalist (including ornithologists suffering from boredom in the mid-season lull in birds), the relationship between good books and adherents is obvious. One only has to look to moths to see this effect. A decline in popularity followed a decline in plate quality in the last edition of the book by South, and the marked rise in popularity followed publication of better illustrated books.

On the back of this enthusiasm for insects, conservation has become a growing concern. Butterfly Conservation has gained a large membership, taking the lead with the butterfly recording scheme, whilst the British Dragonfly Society, with its recording base, is developing its own conservation role.

So where does this leave a long-standing traditional society such as the BENHS? In my own experience, from virtual isolation as an entomologist, it was a revelation to attend a 'South London' meeting in 1966 and find such activity going on, unbeknown to me, only half a mile from my office. Since that date, lures for allegiance from recording schemes and new societies have arisen, yet, apart from Lepidoptera, the Society is becoming less and less central to the action. The Society has taken no lead in recording, or for that matter conservation, which are the two main growth points in entomological activity. The chances are that the isolated entomologist of today will discover recording schemes, or conservation orientated societies, and not the BENHS.

The move to Dinton Pastures was from the outset seen as providing new opportunities, such as the workshop meetings and open days at the weekend for access to the collections and library. Many of us hope that other opportunities can be found that will increase the relevance of the Society to entomologists.

As regards Diptera, the Society already has about 80 members who are solely dipterists or include flies in wider entomological interests. The Society has published *British hoverflies*, which has been a success in stimulating study of these insects and focused attention on the Society, including drawing in more dipterists as members. The BENHS journal has published papers on Diptera and some dipterists have played a prominent role in the society, not least Peter Chandler as Curator. However, the main action, centred on recording schemes, has been outside the Society.

Hence at a time when the dipterists find it necessary to set up their own 'society', the concept of affiliation to BENHS as the Dipterists' Forum has emerged as an option with considerable merits.

THE DIPTERISTS' FORUM

Origin of concept

After 21 years, the Diptera recording schemes have reached the point where a formal organization has become essential. To the present we have managed to get all our circulars and newsletters produced free but at long last we have had to face up to collecting subscriptions, and there are other previously free services to be covered. Hence we have to set up an administration and also spread the tasks more equitably. Thus we may as well go the full hog and form a society.

This was discussed at the recording schemes annual meeting in November 1993. Whilst there was support for starting a society there was also considerable concern at this further step in fragmenting entomology into isolated disciplines. Quite a few dipterists have wider entomological interests. Hence it was put to the meeting that we should consider affiliation with a parent national society, with BENHS as the most compatible option. Since various other recording groups watch for how the dipterists operate, it was possible that this could start a momentum towards bringing entomology together again.

A small working party was set up which produced a consultation document for scheme organizers, outlining the implications and options. With unanimous support, the relevant parts of the consultation document were sent to BENHS Council to seek affiliation. A meeting was held at Dinton Pastures in April 1994 to discuss the implications with representatives of Council, and having clarified various points, Council agreed to affiliation at its July meeting. The Forum held its inaugural AGM in November 1994 and is now functioning as intended.

Objectives

- (a) To foster the study of Diptera, linking with other disciplines where there is a relationship with other animals and plants.
- (b) To promote recording of all aspects of the natural history of flies, including the advancement of distribution mapping.
- (c) To encourage and support amateurs, in harmony with professionals in museums, institutes and universities.
- (d) To promote conservation of flies.
- (d) To organize indoor meetings, workshops, field meetings and other relevant events.
- (f) To disseminate news and information via newsletters and publications.
- (g) To focus on the flies of the British Isles, whilst maintaining an interest in Europe and elsewhere.

Our journal, *Dipterists Digest*, has an increasing list of foreign subscribers and there is a great deal of interest abroad in how British dipterists organize themselves.

Background history

The Forum has evolved out of the launch of the Cranefly Recording Scheme in 1973. Even the first indoor meeting had people coming from as far as Scotland and

the first week-long field meeting in 1974 had 14 people. Newsletters were produced. Soon there were 80 people registered, with a quarter of that number attending week-long field meetings. A need was clearly being met, but it was soon apparent that the popularity was not so much craneflies as bringing together people with a wider interest in Diptera.

The demand was for a hoverfly recording scheme. In 1976 such a scheme, together with recording schemes for a few other groups of flies, was launched. All the meetings and events were run under the auspices of the Central Panel of Diptera Recording Scheme organizers, with a coordinator who produced a *Bulletin* of the Diptera recording schemes. Most of the schemes produced newsletters, some quite vigorously, and indeed there are newsletters for various study groups which are not running recording schemes as such. In the last 2 years we have run residential workshops based at Preston Montford Field Centre in Shropshire, with over 30 people attending for the two themes so far, hoverflies and pictured-wing flies.

We encourage the study of flies well beyond the recording schemes, and indeed on field meetings it can be amazing the range of insect groups which are being recorded in response to requests for material. The recording schemes, inevitably, are in various states of advancement. Provisional BRC atlases have been published for two groups of craneflies (long-palped craneflies and Ptychopteridae), for Sepsidae and with selected maps for larger Brachycera (robber flies etc.). Sets of maps have also been produced for snail-killing flies, meniscus midges and selected mosquitoes and various other flies.

Increasingly we are looking to our own resources to computerize data for atlas production. The Hoverfly Recording Scheme now has well over 200 000 records processed on computer, with many more records in hand.

It is important to emphasize two things. Firstly, we are concerned with all aspects of improving knowledge on the identification, life history, behaviour and ecology of flies; distribution maps are but one output of our combined recording effort. Secondly, the existence of the national schemes has been a stimulus to various county or district recording schemes and some of these have already produced excellent atlases.

At present there are 12 recording schemes and study groups: craneflies (Tipulidae sl, Trichoceridae, Ptychopteridae and Anisopodidae), meniscus midges (Dixidae), mosquitoes, fungus gnats, chironomid midges, hoverflies, larger Brachycera (robber flies, soldier flies, horseflies etc.), Dolichopodidae & Empidae, Pipunculidae, Conopidae, snail-killing flies, Tephritidae (pictured-wing flies), and Sepsidae.

The annual meeting in the autumn, held at the Natural History Museum in London, attracts about 80 (it used to be over 100 until costs of travel became so high), with people still coming from as far afield as Scotland, plus one or two from Europe, especially for the event. We have a morning series of lectures and in the afternoon exhibits, demonstrations and discussion topics. A separately run Dipterists' Dinner is held in the evening, a buffet with 40 to 50 attending.

In the last 21 years we have held a week-long field meeting over a wide geographic area; sometimes there have been twin-centred fortnights. In a week we expect to cover anything up to 100 sites within up to 30 10-km squares. We also hold long-weekend autumn field meetings and various one-day meetings. Over the years we have dramatically increased knowledge of ecology and distribution of flies by blitzing under-recorded areas, including the addition of about 50 species to the British list.

The enthusiasm for the recording schemes gave confidence for the launch of a refereed journal, *Dipterists Digest*, run as a separate venture but now being brought into Forum publications.

The advantages of affiliation to BENHS

The Forum will in any event have to set up its own structure and administration which will to all intents and purposes amount to a society. Affiliation is an elastic term for the present since it will take time to sort out with the Charities Commissioners whether an affiliated Forum is within BENHS charitable status. Hence, it will be a loose affiliation for an initial period of 3 years. It would be an undue imposition to *require* all recording scheme dipterists to join BENHS, though 80 are already members, and the hope is that more will join. Hence the affiliation is with the Forum, not individual members, but we are looking to something much more meaningful than a token label.

So what is the advantage? It cuts both ways, since there is advantage to both BENHS and the Forum.

The Forum brings to the Society an active group of field-orientated entomologists, with considerable experience in running events and producing information which has been a successful catalyst in helping people find their feet in entomology and in generating enthusiasm for common objectives. Not least it brings to the Society a major locus in national recording schemes. It is *not* a case of dipterists trying to take over, but it means that the Society gains a broader image than catering largely for Lepidoptera. It also further enhances its image as a national society (the South London connection still within memory). The hope is that the Society will gain more affiliations and be stimulated into meeting the needs of members of all disciplines. Field meetings should become more viable as greater numbers of entomologists are invited and there is increased expertise to call on for running workshops at Dinton Pastures. The collection and library are more likely to be strengthened as Forum members recognize the value of Dinton Pastures. The long-term prospects for the Society to be offered key works for publication is enhanced.

The advantage of affiliation to the Forum is the wish of many of its members to be part of a multi-disciplinary entomological society rather becoming yet another isolated part of entomology. The BENHS has a membership of kindred spirits and is the only national society with a collection, library and day workshop facilities, notably available at weekends. There has already been the successful relationship in publishing *British hoverflies*. With the Forum setting out without a cushion of money in the kitty, it is reassuring to find that the Society can provide limited bridging loans if the need arises (we expect to balance the books each year). There is also the benefit of the advice of entomologists used to running the Society, and potential advantages of an umbrella society such as the charitable status that these days is difficult and expensive to obtain by new groups such as the dipterists.

Conclusion

The affiliation, in the first instance, is for 3 years. We think it will work well and hopefully everyone will find that the Forum concept will prove a stimulus within and outside the Society.

Martin Drake has joined BENHS Council to represent the Dipterists' Forum and Peter Chandler is BENHS Council's representative on the Dipterists' Forum committee. Alan Stubbs is the Dipterists' Forum Secretary.

SHORT COMMUNICATION

Some records of root-aphids (Aphidoidea: Pemphigidae) feeding on spruce (*Picea* spp.) in Britain.—Over the past few years there has been some interest in the root-aphid fauna of Sitka (*Picea sitchensis* (Bong.) Carr.) and Norway spruce (*Picea abies* (L.) Karsten) two of Britain's most important forestry trees. Aspects of their taxonomy (Stroyan, 1975, 1991; Carter & Danielsson, 1991), complicated life-cycles (Carter & Danielsson, 1993) and interactions with air pollutants have been studied (Salt & Whittaker, 1995). However, little is known of their distribution in Britain. The following records are based on identifications of adult apterous virginoparae collected from roots just below the surface of the needle litter. We are grateful to R. Danielsson and C. Carter for help with identifications of some of this material.

Pachypappa tremulae (L.): 2.xi.89 SD68, Old Park, Cumbria, *P. abies* & *P. sitchensis*; 17.x.90. SU854298, Iron Hill, W. Sussex, *P. abies*; 14.v.91 NS68, Carron Valley Forest, Strathclyde, *P. abies*; 15.v.91 NY67, Spadeadam Forest, Cumbria, *P. abies*.

Pachypappa vesicalis Koch: 14.viii.90 SD68, Old Park, Cumbria, *P. sitchensis*; 17.x.90. SU864298, Iron Hill, W. Sussex. *P. abies*; 13.v.91 SE88, Dalby Forest, N. Yorks, *P. sitchensis*; 13.v.91 NX78, Barr Hill, Dumfries & Galloway, *P. sitchensis*; 13.v.91 NX66, Laurieston Forest, Dumfries & Galloway, *P. abies*; 13.v.91 NX36, Bennan Plantation, Dumfries & Galloway, *P. sitchensis*; 14.v.91 NT20, Craik Forest, Borders, *P. abies* & *P. sitchensis*; 14.v.91 NS68, Carron Valley Forest, Strathclyde, *P. sitchensis*; 14.v.91 NS49, Loch Ard Forest, Central, *P. sitchensis*; 15.v.91 NY67, Spadeadam Forest, Cumbria, *P. abies* & *P. sitchensis*.

Pachypappella lactea (Tullgren): 7.x.89 SD45, Bailrigg, Lancs, *P. sitchensis*; 2.xi.89 NY61, Bank Moor, Cumbria, *P. sitchensis*; 2.xi.89 SD68, Old Park, Cumbria, *P. sitchensis*, 22.iii.90 SD38, Astley's Plantation, Cumbria, *P. sitchensis*; 8.ix.90 SE20, Langsett S. Yorks, *P. sitchensis*; 13.v.91 SE88, Dalby Forest, N. Yorks, *P. abies*.

Prociphilus (*Stagona*) *xylostei* (De Geer): 25.x.91 SU82, Iron Hill, W. Sussex, *P. abies*; 2.xi.91 SD68, Old Park, Cumbria, *P. sitchensis*; 14.v.91 NT20, Craik Forest, Borders, *Picea abies*; 15.v.91 NY67, Spadeadam Forest, Cumbria, *P. abies*.—D. T. SALT, Division of Biological Sciences, Lancaster University, Lancaster LA1 4YQ & E. MAJOR, Forestry Authority, Alice Holt Research Station, Wrecclesham, Farnham, Surrey GU14 4AH.

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THE 1993 PRESIDENTIAL ADDRESS—PART 1 REPORT

DAVID LONSDALE

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During my year as President I have been very much aware of the lengthy service that many of my predecessors rendered to the Society before their presidencies. I can claim no such deserving record, and so feel all the more honoured for having been nominated for this post. The President has to do a certain amount of work behind the scenes, as well as simply being there to chair meetings. However, the really hard work of routine management and of coping with the past year's particular exigencies has been done by the Society's officers, some of whom have given their reports this evening. My thanks are due to all of them, and indeed to all members of Council. Special thanks are due to the retiring Assistant Treasurer, Geoff Burton, who concludes ten years' service early in 1994. The awkward cases that crop up in the handling of members' subscriptions have added considerably to Geoff's workload, and he is to be congratulated for tackling these problems with efficiency and perseverance.

It has been my sad duty to announce the deaths of ten members during the year. I regret that I was not able to find out very much about the interests and achievements of some of these deceased members.

Lt. Col. Gordon Eastwick-Field, who died on 29 April 1993, joined the Society in 1978. He set up a Lepidoptera study group at Aldermaston, and recorded species there over many years. He was also involved in the establishment of a national moth recording network, and designed a refrigerated moth trap for use in surveys.

Mr W. G. Vosper died in the Spring of 1993, having been a member since 1969. His main interest was in the Lepidoptera.

Mr P. W. Brown died on 25 May 1993. He had joined in 1988, with interests in Lepidoptera and general entomology.

Mr Michael F. W. Tweedie died in the Summer of 1993, having been a member since 1953. He was a well known naturalist who will be remembered for his work as a photographer and radio broadcaster. Until several years ago he had enjoyed a fairly regular attendance of the Society's meetings, at which he was a speaker on a number of occasions. He also contributed regularly to the Annual Exhibition, especially in the field of macro-moths, and was on the Society's editorial panel until 1991.

Mr C. S. H. Blathwayt, whose death was notified to us in June 1993, was a lepidopterist and had been a member since 1949.

Mr A. Crowhurst, who died in the late summer of 1993, having joined the Society in 1988, was a coleopterist.

Mr F. Wright, whose death was notified to us in September 1993, joined the Society in 1987.

Mr Peter W. Cribb died on 30 October, having been a member since 1970. He was an all-round naturalist whose special interest and considerable expertise was in European butterflies, which he studied throughout southern Europe. He organized many collecting trips which were attended by various members of the Society. He was also a regular contributor to the Annual Exhibition and was a speaker at indoor meetings. He will be particularly remembered for his pioneering work for insect conservation, conducted partly under the auspices of the Amateur Entomologists' Society, to which he gave outstanding service.

Mrs Katie Emmet died on 23 December 1993. Long before joining the Society in 1984, she began to attend its meetings and exhibitions regularly with her husband, Lt. Col. A. M. Emmet, a past President and honorary member. She was a good field naturalist, who contributed to Maitland Emmet's outstanding work on the microlepidoptera and elucidated the life cycles of a number of species.

Mr C. B. Ashby died early in January 1994. Brad Ashby had been a member of the Society since 1965, providing considerable service which culminated in his becoming a Trustee in 1987. In this role he did more than was required of him, especially by regularly attending Council meetings over the last few years of major change in the Society's affairs, on many occasions providing valuable guidance. During the storage of the Society's library, he arranged for our members to have access to the library of the London Natural History Society, one of several other organizations that he served. He also secured for us the donation of a notable collection of Lepidoptera by the Swedish entomologist Stig Torstenius. As well as serving the Society in these special ways, Brad contributed very much as an active naturalist, regularly attending meetings, and providing exhibits. The Society was represented at his funeral by Mr Eric Groves who was a long-standing friend.

We have already stood in memory of these members at previous meetings, and so I will not ask you to do so now.

I have mentioned that Council has been concerned not only with routine management, but also with special tasks. One such area of activity has been created by the need to comply with the new charity law, as you have heard in the Hon. Treasurer's report. This has involved re-drafting the Society's byelaws, as well as re-investing part of its assets. Special thanks are due to Tony Pickles for all the hard work that he has done to ensure the successful implementation of these changes.

We have this evening heard about our new Headquarters, the Pelham-Clinton Building at Dinton Pastures Country Park in Berkshire. On 27 June 1993, following completion of the building in the previous August, I had the pleasure of welcoming Professor Sir Richard Southwood who carried out the formal opening ceremony. It was an opportunity to thank all the individuals and organizations who contributed to the success of our move to Berkshire. Their various roles have been documented in our Journal, but I would like once again to give especial mention to Peter Chandler, who has overseen every stage of the commissioning, construction and equipping of the building. I am aware that he is, to this day, still coping with what we hope are teething troubles with the air conditioning system. Council has recognized his contribution by nominating him for honorary membership. This honour is also accorded to Stephen Miles, who has worked very hard and with great care to re-house our library and to update its indexing system.

The opening ceremony at Dinton Pastures was itself a great success, with everything going according to plan under glorious sunshine. I must thank all the Council members who worked so efficiently to ensure the smooth running of the event, especially Dr Ian McLean who master-minded the operation.

Another special occasion at Dinton Pastures was the visit in May of a group of French entomologists who had welcomed a party of the Society's members to France in 1992. They greatly enjoyed their visit, and their comments made us very much aware of the exceptional heritage that is enjoyed by natural history societies in Britain, not least our own Society.

With the acquisition of the Pelham-Clinton Building, the range of our activities has widened. In particular, we have begun a series of workshop meetings, which have been well attended and very well received. Also, members' access to our Library and Collections has been restored and improved, with the twice-monthly system of

opening that is now in operation. Finally, the value of the Dinton Pastures site for wildlife is reflected in our involvement in the recording of species there, and in providing advice on conservation management.

The need for invertebrate conservation is receiving much wider attention than was the case several years ago, and there are increasing calls on the expertise of our individual members to supply information that is of great value in identifying sites and species that require special attention. Apart from the work of individual members, our Society as a whole is represented on the Joint Committee for the Conservation of British Invertebrates (JCCBI), and thus on Wildlife and Countryside Link. We are indebted to Stephen Miles and Frances Murphy for giving up their time to represent us, and it must be hoped that the JCCBI, which is now in dire need of resources, can continue. I should add that the Society also makes occasional donations to conservation bodies, most recently in the case of the Royal Society for the Protection of Birds, which received £250 towards the purchase of a reserve at Cantley Marshes.

Although our Society is represented on outside conservation committees, there is no stated BENHS policy on conservation which could guide our representatives when they are asked to respond to initiatives from other organizations. The only options are as follows: to take up Council's time with detailed discussion of these issues, to let individual Council members represent our conservation interests at their purely personal discretion, or to do nothing. I feel that our Society now needs to consider whether it wishes to play more of a corporate role alongside other non-governmental bodies. The wish of some of these bodies to be involved in invertebrate conservation is not always matched by their ability to receive advice from naturalists who have relevant knowledge and ideas. The Council will welcome the views of members on this matter, particularly with regard to the question posed by Stephen Miles as to whether we should form a conservation group or committee. This matter will be discussed during 1994, and may have been resolved by the time that this address is published.

In one area, the Society already has a conservation policy; I refer here to our definition of what is acceptable for display at our Annual Exhibition. Apart from upholding the law concerning scheduled species, we discourage the display of long series of others that are endangered. However, the wording of our guidelines has not been precise enough to ensure that exhibitors will be beyond reproach regarding the collection and display of such species. It is, in any case, hard to define the term "long series". Even for the many species for which collecting cannot intelligently be seen as a threat, we should not encourage their collection on a scale that shows no respect for them as living things. To these ends, Council is reviewing the guidelines that have been in existence for some years, and which were slightly strengthened before the 1993 Exhibition. It is hoped that the new guidelines will reflect the responsible attitude that most field entomologists already adopt, while in no way detracting from the need to collect specimens where appropriate.

I feel privileged to have been President at a time when the Society has been emerging with renewed vigour from a period of change. We have been able to continue our traditional activities, and have now embarked on a range of new ones that can only add to the strength of the Society.

THE 1993 PRESIDENTIAL ADDRESS—PART 2 SOME OBSERVATIONS ON THE PROS AND CONS OF BEING A BARK-FEEDING INSECT

DAVID LONSDALE

*Forestry Authority Research Station, Alice Holt Lodge, Wrecclesham, Farnham,
Surrey GU10 4LH.*

The bark of woody plants offers special advantages for insects that use it as a food source. Under its outer corky layer (periderm), it contains relatively succulent tissues (phloem and in some cases cortex) which are a much better source of carbohydrates and amino-acids than the underlying wood. It can therefore be compared nutritionally with leaves and young shoots, but it provides a resource that is not available to insects that feed on the green tissues of deciduous trees; that is, a habitat in which survival and even development can take place throughout the year, given a sufficiently mild winter climate.

Although bark is one of the few year-round food sources available to phytophagous insects in woodlands, it is a strongly defended tissue in many woody plant species. The need for defences against bark-feeding insects becomes clear when we consider how important bark is for a tree's survival. The evolutionary success of trees and shrubs has depended on their ability to form and maintain a long-lived woody cylinder, which in turn depends on the presence of a largely intact covering of bark. The bark overlies the vascular cambium which lays down annual rings of both bark and wood, and its own inner layers include the phloem which is essential for the translocation of sugars and other assimilates. The outer bark (periderm), provides a vital protection for all the perennial parts of the plant, preventing excessive moisture loss and the entry of pathogenic micro-organisms. If an area of bark is killed or removed, it can usually be replaced only through the rather slow process of occlusion, which involves the inward growth of new tissues from around the edge of the damaged area.

As I have mentioned, the protection of the woody cylinder by bark needs to be long-term. Since some tree species can live for several or even many centuries, the need for good defences against attack by bark-feeding insects and micro-organisms is paramount. Defences in bark can be broadly divided into chemical and structural types. Chemical defences make bark tissues unpalatable or toxic, while structural defences take the form mainly of physical barriers. There is some overlap between these two categories, as I shall explain later. As with all forms of defence, including human armaments, there is a price to be paid in the diversion of resources which might otherwise fuel faster growth. In the case of trees, fast growth has advantages for competition for space within the forest canopy. To some extent, trees can minimize their defence expenditure by producing certain kinds of defence only after damage begins to occur. These responsive defences contrast with pre-formed ones, which are an unavoidable cost to the plant. As I shall show, using some specific examples, the dual system of "strategic" and "tactical" defence can involve both chemical and structural mechanisms.

The effectiveness of defence mechanisms in bark is demonstrated by the fact that a largely intact covering of bark is the norm, even on old trees. However, bark is too good a source of nutrients for its defences to have gone unchallenged. Thus, bark-feeding insects have evolved strategies by which the defences of bark can to some extent be overcome or evaded. The resulting interactions between bark-feeding

insects and their hosts are fascinating, and I hope that this will be apparent from the examples that I will mention.

The role of both pre-formed and responsive defences is illustrated by the first of my examples, which is the colonization of the bark of beech, *Fagus* spp. by the beech scale insect, *Cryptococcus fagisuga* Lind. As a sucking insect, *C. fagisuga* removes materials in solution from individual cells of the cortex without ingesting structural components of the cells, which might be toxic or unpalatable to a biting insect such as a bark beetle. However, most sucking insects can feed on bark only if the outer corky layer is thin enough to allow insertion of their mouthparts into the cortex or phloem. For *C. fagisuga* on beech bark (Fig. 1), the penetrative depth of 1–2 mm is sufficient to allow feeding over most of the bark surface. Additionally, this insect's food source becomes enhanced by the stimulation of a gall-like growth of the cortical cells that surround the tip of its mouthparts (Hartig, 1878). In some cases, infestation is so heavy and continuous over the bark surface that the stem takes on a whitewashed appearance owing to the presence of the insect's white, woolly wax secretion (Fig. 2). In such cases, the growth of the tree is impaired, and the wood of the stem grows abnormally (Fig. 3) (Lonsdale, 1983). Heavy infestations also predispose the tree to a potentially lethal attack ("beech bark disease") by the fungus *Nectria coccinea* (Pers. ex. Fr.), which is otherwise usually incapable of causing much damage to beech trees (Lonsdale & Wainhouse, 1987).

The vulnerability of thin-barked trees like beech to attack by sucking insects may explain why other tree species normally develop a thick, rough bark as a pre-formed defence. Also, since a thick corky layer is a good thermal insulator and shock absorber, it helps to protect trees against injury from extremes of temperature (e.g. through sunscorch or forest fire) and from mechanical damage. Nevertheless, there



Fig. 1. Longitudinal section through bark of beech, *Fagus sylvatica*, showing penetration of mouthparts (stylets) of the beech scale insect, *Cryptococcus fagisuga*.



Fig. 2. A heavy infestation of a beech stem by the bark-sucking insect *Cryptococcus fagisuga*, Queen Elizabeth Forest, Hampshire. The white woolly wax secreted by the insects is conspicuous.

are advantages in having a thin bark. As, I have already mentioned, there is a place for economy in defence expenditure, and such an economy is achieved by minimizing the thickness of the outer corky bark. A thin corky layer also allows light to penetrate to the living cells beneath, so that the bark can contribute to photosynthesis. In the case of beech, chlorophyll can indeed be seen in the bark even of large old stems.

Of course things are not so simple that we can divide trees and shrubs simply into thick-barked and thin-barked species. Even in thick-barked species, at least the young twigs have a thin smooth bark. Like those of thin-barked species, they are at this stage enveloped by a simple primary periderm which expands to accommodate their increasing diameter. This smooth expansion ends sooner or later when the characteristic thick bark (rhytidome) starts to form through the development of



Fig. 3. Abnormal wood anatomy, with local reduction in annual ring width and parenchyma-like xylem cells, seen in a transverse section in the region of a colony of *Cryptococcus fagisuga*. The bark is at the right of the picture.

overlapping secondary periderms which arise in the outer phloem. In species where this "mature" bark forms only after many years, sucking insects have the opportunity to colonize the surface of stems of semi-mature trees. Even after this stage, there may still be localized sites in natural fissures where such insects can persist, and I shall mention an example of this later.

Although some tree species such as beech can retain a thin primary periderm throughout their lives, they also retain the ability to form a thickened bark ("pathological rhytidome") in response to injury. Thus, they can benefit from the advantages of reducing expenditure on cork production and from retaining photosynthetic capacity in the bark, while also being able to switch on a defensive response if necessary. A pathological rhytidome can often be seen in beech after several years' attack by *C. fagisuga* (Kunkel, 1968; Lonsdale, 1983; Ostrofsky & Blanchard, 1983). The resulting thickened, furrowed bark is more reminiscent of an elm or an ash than a beech.

When a beech stem forms a pathological rhytidome in response to prolonged feeding by *C. fagisuga*, the insect's feeding sites become restricted to the bases of fissures which form between the corky ridges of the rhytidome (Kunkel, 1968; Lonsdale, 1983). Even before this stage is reached, however, the initial feeding sites become unavailable due to the necrotic breakdown of the gall-like zones which previously served as enhanced food sources. It is this necrotic reaction which seems to trigger the development of "wound periderms" which eventually give rise to the pathological rhytidome.

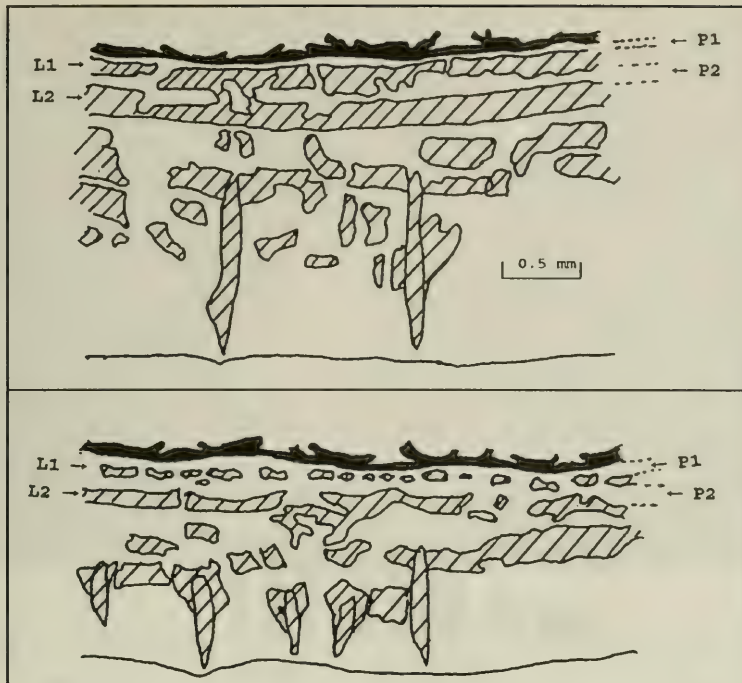


Fig. 4. Drawings of transverse sections of bark from beech trees whose resistance to attack by *C. fagisuga* was apparently high (above) or low (below); from Lonsdale (1983), ■ suberized tissue, ▨ lignified tissue, □ 'soft' tissue.

Although the primary periderm of beech is too thin to deter feeding by *C. fagisuga*, this does not mean that the bark as a whole lacks pre-formed defences. Within the living tissues beneath the periderm, there are heavily lignified cells (stone-cells) which provide a partial barrier to the penetration of the sucking mouthparts (Ehrlich, 1934). Lignin is a major structural constituent of wood, but its occurrence in other plant tissues is often associated with defence. Since colonization of beech by *C. fagisuga* can become very heavy despite the presence of lignified cells, the defensive role of lignin in beech did not at first attract much interest following the work of Ehrlich (1934). In the 1970s, David Wainhouse, one of my colleagues at Alice Holt Research Station, began to investigate genetic variation in resistance to *C. fagisuga*. He identified a number of beech clones of either high or low genetic resistance (Wainhouse & Howell, 1983), and I examined these to see whether they showed any obvious differences in bark anatomy.

I found that most of the relatively resistant trees identified by David Wainhouse had either a fairly unbroken sheet of stone-cells just beneath the corky periderm (Fig. 4), or a generally high content of such cells (Lonsdale, 1983). The resistant and susceptible clones could in most cases be distinguished anatomically by reference to an index, calculated from the relative thicknesses of the "soft" (parenchymatous) and "hard" layers of bark, and from the overall density of lignified cells (Fig. 5). Even

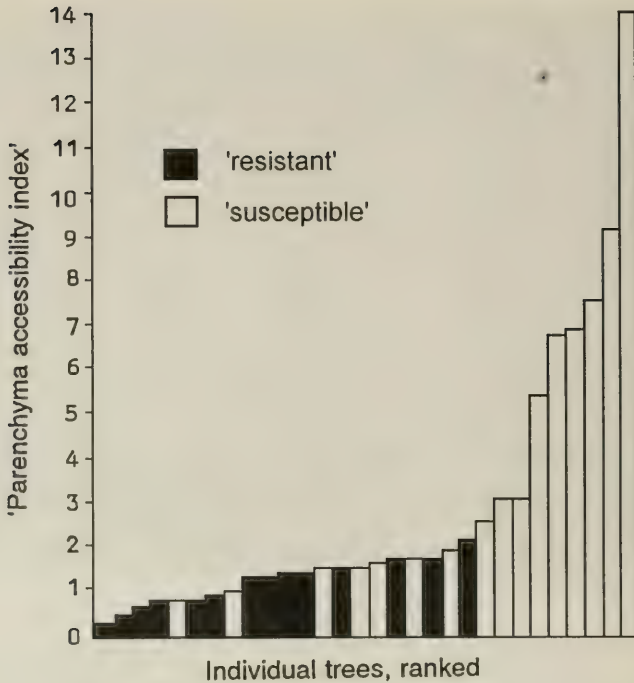


Fig. 5. Index values of the depth and accessibility of outer parenchyma (feeding zone) in beech trees with apparently high and low resistance to *C. fagisuga* attack; adapted from Lonsdale (1983).

$$\text{Bark accessibility index} = \frac{100 (P_1 + P_2)^2}{(\%L_1 \times \%L_2) (P_1 + P_2 + L_1)}$$

where = $\begin{cases} P_1, P_2, L_1 = \text{depths in } \mu\text{m of the corresponding layers in Fig. 4} \\ \%L_1, \%L_2 = \text{percentage lignin content of layers L1 and L2} \end{cases}$

relatively susceptible trees showed some ability to use lignin defensively, by laying down new lignin in the cell walls of tissues attacked by the insect.

Since, in a few cases, David Wainhouse found beech trees with an anatomically "susceptible" bark type which were quite resistant to attack by *C. fagisuga*, it was clear that other factors (probably chemical ones) were also contributing to resistance. The chemical explanation is borne out to some extent by another of his findings; that individual clonal lines of this parthenogenetic insect become adapted to their particular host trees (Wainhouse & Howell, 1983), a phenomenon known as 'host-tracking' (Edmunds & Alstad, 1978).

In North America, where *C. fagisuga* has the status of an introduced pest on the American beech, *Fagus grandifolia* (Ehrh.), this relative of the European beech also supports other bark-sucking insects. These include the beech blight aphid, *Prociphilus imbricator* Fitch, which can occur on main stems (Baker 1972), but



Fig. 6. The beech blight aphid, *Prociphilus imbricator*, Tunxis Forest Massachusetts.

often seems to prefer thin-barked twigs and even leaves (Fig. 6). Dense colonies of this woolly aphid are quite spectacular, since their members respond to disturbance by waving their abdomens, which bear long tufts of the insects' waxy secretion.

The feeding preferences of *P. imbricator* show that the age and thickness of bark, even on a thin-barked species like beech, affects food quality. If we look at tree species which normally develop a rhytidome, we tend to find bark-sucking insects largely confined to their twigs and small branches. Well known examples of such insects include the pine woolly aphid, *Pineus pini* (L.), and the large willow aphid, *Tuberolachnus salignus* (Gmelin) (Bevan, 1987). In the case of spruces, the periderm of the main stem tends to remain fairly thin until the tree has reached a considerable size, and thus allows feeding by the great black spruce bark aphid, *Cinara piceae* (Panz.).

Among those sucking insects that can occur even on thick-barked stems, though only in fissures, is the oak scale or "pox", *Kermes quercus* (L.). The oak scale, whose waxy capsules are visible as small shiny spheres, is associated with a dieback of oak in some parts of Britain. The prevalence of this disorder in the Forest of Wyre in Worcestershire has given it the name "Wyre pox". Another well known scale insect that is seen on thick-barked trees is the horse chestnut scale, *Pulvinaria regalis* Canrard. Its hosts include several genera of broadleaved trees apart from *Aesculus*, these including *Acer*, and *Tilia*. The adult females of this insect are found on the main stem and large branches of the host, but this is merely their final resting place where they lay their eggs under a conspicuous waxy secretion. The immature stages feed in the crown of the tree, where there are soft shoots and thin-barked twigs and branches.

As I have mentioned, the solid constituents of bark tissues often include substances which deter feeding by biting insects, even on tree species that are susceptible to attack by bark-sucking insects. However, there is a major group of biting insects that are common in the bark of tree species belonging to many plant families. I refer to the bark beetles, which belong principally to the family Scolytidae. Many such beetles only attack environmentally stressed or moribund individuals, which are probably less able to manufacture anti-feeding materials as a defensive response. One of the most notorious bark beetles is the greater elm bark beetle, *Scolytus scolytus* (F.), which is one of the main vectors of the fungi which cause Dutch elm disease, *Ophiostoma* (Buisson) Nannf. and *O. novo-ulmi* Brasier. The transmission of these fungi occurs when beetles which have bred in the bark of moribund victims of the disease emerge and migrate to twig crotches of healthy trees, where they eat the young bark in their "maturation feeding" phase.

It is interesting that the lignin story crops up in relation to bark beetle attack, as well as in the case of the sucking insect, *C. fagisuga*, which I have already mentioned. Following my work on the stone-cells of beech bark, my colleague, David Wainhouse found that stone-cells in the bark of spruce, *Picea* spp., confer some resistance to the great spruce bark beetle, *Dendroctonus micans* Kug. This Eurasian beetle is not native to Britain, but was apparently imported here in the early 1970s on logs from the Continent (King & Fielding, 1989). It is rather unusual among bark beetles in that it can attack perfectly healthy trees. It does so by feeding communally, and also by virtue of its large size, both being attributes which help to overcome induced host resistance in the form of resin secretion. David Wainhouse has shown that the stone-cells in the bark of relatively resistant individuals of spruce confer partial protection by occurring in a layer which confines the larvae to a relatively narrow zone of soft tissue either above or below this layer. This confinement, perhaps together with the ingestion of some of the nutritionally poor stone-cells themselves, reduces the growth potential and survival of the larvae (Wainhouse *et al.*, 1990).

In many other relationships between trees and bark beetles, the size of larval galleries is probably determined by the thickness of the phloem layer that is available for feeding: either the total thickness of the soft zone of the phloem, or the thickness of a layer delimited by stone-cell barriers. This may account for the small size of bark beetle species which are able to feed in tree species with prominent stone-cell layers, such as *Ernoporus fagi* (F.) in beech.

These examples are just some of those for which research—led by an economic need—has revealed something of the fascination of the relations between bark-feeding insects and their hosts. I am sure that there must be many others for which field observations suggest the existence of equally interesting interactions.

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SHORT COMMUNICATION

Dorcatoma dresdensis Herbst (Coleoptera: Anobiidae) new to Gloucestershire.—On 28.xi.1993, I collected a large piece of the bracket fungus *Ganoderma adspersum* (Schulz.) Donk. which had fallen from an ancient beech along the southern parish boundary of Rendcomb (SP 022089), E. Gos. The beech is one of a series along this boundary and which extend up the slope from Conigree Wood, an ancient woodland which has been much modified by Victorian plantings. The fungus was kept in a plastic box in a cool room and re-examined the following summer. Some 14 specimens of *Dorcatoma dresdensis* were found to have emerged, together with a few *Cis* and a parasitic wasp. This is the first time that this *Dorcatoma* has been reported from the county, although it is known from the adjoining counties of Oxfordshire (Cornbury Park in 1986, P. Hyman, pers. comm.) and Worcestershire (Whitehead, 1992), in both cases also on the Cotswold Limestone country. The Rendcomb locality is within 1 km of one of the county's best sites for saproxylic beetles, Rendcomb Park.

The species is otherwise only known from a thin scattering of ancient pasture-woodland sites in southern and eastern England. It was given red data book category 1 (endangered) status in Welch (1987) but this has since been revised to 'notable A' in Hyman & Parsons (1992), i.e. is believed to be confined in Britain to 30 or fewer 10 km squares. The reasons for the extent of the down-grading are not clear as I am only aware of records from about 10 other localities this century, with Windsor, Burnham Beeches and the New Forest being the only other records since 1980. RDB category 3 (Rare) seems to be more appropriate.—K. N. A. ALEXANDER, National Trust, 33 Sheep Street, Cirencester, Gloucestershire GL7 1QW.

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BENHS INDOOR MEETINGS

13 December 1994

The President, Dr P. WARING, announced the deaths of Mr R. G. T. St Leger and Mr W. E. Minnion.

Dr Waring showed colour photographs of the silky wave moth, *Idaea dilutaria* (Hübner) and the dwarf cream wave, *I. fuscovenosa* (Goeze). The former is a scarce species, being known from Durdham Common, near Bristol, and at Great Orme, Caernarvonshire. They can be confused, especially at sites such as Great Orme where both occur together. Dr Waring noted that the silky wave appeared to be a more active species and flew more readily than the dwarf cream wave.

Mr R. A. JONES showed three beetles from Powdermill Reservoir, near Brede, East Sussex, taken on 23.viii.1994. These were the ground beetle *Bembidion octomaculatum* (Goeze), the weevil *Rhinoncus albicinctus* Gyll. and the leaf beetle *Galerucella sagittariae* (Gyll.). On a previous visit to the reservoir, on 23.vi.1992, Mr Jones discovered the *Bembidion*, the first British specimens for 105 years. These were exhibited at the BENHS indoor meeting of 8 September 1992. Several other coleopterists have since visited the site and confirmed a strong colony. Judging from previous records, this is the first time a colony of the beetle has been recorded in Britain, other occurrences being only singletons. Subsequently a Norfolk specimen was found in 1993 and a 1926 Wicken Fen record unearthed. A recent trip to the lake revealed that water levels had dropped many feet and much of what was once open water was now an exposed and sun-baked mudflat. Mr Jones showed slides of the half-drained lake, now a waist-high jungle of amphibious bistort, *Persicaria amphibia* (L.) Gray. Despite this change to the habitat the beetle was still present on the wet mud around the feeder stream which was reduced to a trickle after the long hot summer. Feeding on the *Persicaria* were *Rhinoncus albicinctus*, first discovered in this, its second, British locality by Mr P. J. Hodge in 1992 and countless millions of *Galerucella sagittariae*. Mr Jones showed slides of the gregarious larvae of the *Galerucella* and of two semi-aquatic plants exposed by the falling water levels: the six-stamened waterwort, *Elatine hexandre* (Lapierre) DC. and the New Zealand pigmyweed, *Crassula helmsii* (Kirk) Cockayne.

On hearing the minutes of the 7 November meeting read Mr C. W. PLANT noted that he had shown, at an earlier indoor meeting, a similar exhibit on the difficulty of separating *chrysodeixis acuta* (Walker) and *C. chalcites* (Esp.) to that shown by Dr Waring on 7th November. He believed that these species can only be separated reliably on male genitalia characters. Examination of specimens in collections indicate that all male specimens of *acuta* taken in Britain in recent years are, in fact, *chalcites*, and it is doubtful whether *acuta* should be on the British list.

Dr Helen Marcan-Hill, Mr Kent Hing Kun Li, Ms Jacklyn Louise Ryrrie, Mr Roger Clive Kendrick, Mr Stephen H. Hind, Dr Keith Murray Harris and Mr Peter Verdon have been elected as members.

Mr C. W. PLANT announced that he was going to produce a list of the microlepidoptera of Middlesex. Apart from a brief list produced by Cockerill in 1891 there is no publication that covers this topic. He anticipated the project would take about five years to complete and he would be pleased to receive both old and recent records for Middlesex.

Dr ANDREW PULLEN spoke on the prospects for the conservation and restoration of the large copper, *Lycaena dispar* (Haw.), in north-west Europe. The British strain

of this butterfly became extinct in about 1850 and the Dutch strain ssp. *batavus* (Ob.) has been introduced at Wood Walton Fen since 1927. The large copper is widespread in Europe but is in decline due to drainage schemes and loss of habitat, especially in north-west Europe. In Holland it has declined to just one stronghold at Weerribben National Park. Dr Pullen has been investigating means of conserving the remaining populations in Holland, with the longer-term aim of restoring viable populations to suitable sites in Holland and Britain. This has involved studies into the butterfly's biology.

In northern Europe the large copper has one generation a year, unlike the two or three generations achieved in warmer areas. Eggs are laid singly or in small groups, usually near the mid-rib on the upper side of water dock leaves, in July and August. The newly hatched larvae crawl to the underside of the leaves where they graze the lower epidermis and create distinctive slot shaped "windows" in the foliage. The young larvae overwinter in curled dry leaves between September and March, but not necessarily at the base of the plant as widely reported in the literature. Feeding commences again during April and May, with pupation in June and adult emergence in July.

Earlier studies at Wood Walton Fen have shown that overwintering mortality can be as high as 95%. Experiments to identify the causes of larval mortality at various times of year have been conducted over a three-year period. This involved caging some host plants with netting to exclude birds and mammals, some plants with smaller mesh netting to also exclude invertebrate predators and parasites, with other plants fully exposed as controls. Comparisons were also made between water docks growing in reed beds with those in more exposed positions in waterside situations, and between larval mortality at Wood Walton and Weerribben. The studies showed that invertebrate predation is a significant factor for young larvae and that unseasonal flooding during the larvae's active periods can be catastrophic. About 50% of the mortality at Wood Walton is unexplained by predation. Laboratory studies suggest there can be a high mortality of larvae between hatching and starting to feed. This may be an indication of in-breeding and consequent lack of vigour in the Wood Walton stock.

Studies of larval mortality in the diapausing period show that predation is not important, although significant losses do occur over winter. Winter survival is significantly higher at the Dutch site, where over 70% survived during the study period, whereas at Wood Walton the best achieved was 38%. Future experiments will involve taking Wood Walton stock to Weerribben and *vice versa* to see whether this difference is maintained. If it is, it would support the view that Wood Walton stock has become weakened by in-breeding. Flooding has been more frequent at Wood Walton in recent years and this may be an important factor in the different mortality rates at the two sites. Vertebrate predators take significant numbers of post diapause larvae and a few were killed by the tachinid fly, *Phryxe vulgaris* (Fallén). No significant differences were detected between waterside and reed bed plants.

It is possible that the Wood Walton site is too small and isolated to sustain a viable population of the large copper. Its numbers fall to very low levels without supplementary captive rearing and release. The possibility of releasing the butterfly into the Norfolk Broads, where the Bure, Ant and Yare river system provides a potentially large linked habitat, is being investigated. A study of the Weerribben site has been undertaken to identify important habitat features and management techniques. At Weerribben the males choose large open fen meadow areas when establishing their territories. These meadows have few nectar plants which are thinly distributed amongst sparse *Phragmites*. Flowering spikes of purple loosestrife are

always used by the males as resting posts in the centres of their territories. Similar habitats occur in the Norfolk Broads, e.g. at Upton Broad, but these are smaller areas than at Weeribben. The highest numbers of eggs were laid on waterside dock plants in warm sunny positions, although plants in other situations are also used. If an attempt to introduce the large copper into the Broads is made, eggs will be taken from Weeribben water dock plants in fens that are due to be mown in order to avoid depleting the population. Dr Pullen summarized the management requirements for the large copper as: (1) having food plants in sunny open positions; (2) having active plant growth at egg laying time to provide good quality food for the young larvae; (3) lowest-lying sites will be prone to fatal floodings; (4) large open summer-cut marshes are required for mating territories, and (5) a network of sites is desirable to allow dispersal to new sites at the right stage for colonization.

10 January 1995

The President, Dr P. WARING showed two colour transparencies to indicate the difference between the copper underwing moths, *amphipyra pyramidea* (L.) and *A. berbera* Rungs (Lepidoptera: Noctuidae). The first slide showed a *berbera* larva together with the female moth from which it had been reared. The second slide showed a final instar larva of both species together and Dr Waring indicated the diagnostic features. The most obvious feature is the red-tipped caudal horn in *berbera*, which is yellowish-green in *pyramidea*. Dr Waring noted that when beating for larvae it was always *pyramidea* larvae that he found. He suggested that *pyramidea* larvae feed in the shrub layer, especially on hawthorn, hazel, honeysuckle and blackthorn, while *berbera* may be feeding higher in the tree canopy.

Dr Waring also showed a slide of a pyralid moth *Salebriopsis albicilla* (H.-S.) attracted to an MV light at the BENHS field meeting at Westbury Wood, Glos. Both sexes of the scarce moth were recorded. The specimen photographed was a male and Dr Waring noted that as it rested on the trap it waved its white-based antennae alternately.

Mr K. MERRIFIELD showed a glass-topped display case containing an arrangement of dry seeds and flowers. On examining this closely Mr Merrifield had noticed that there were some as yet unidentified lepidopterous larvae busy devouring the *Helichrysum* flower heads.

Referring to the minutes of the meeting of 13 December 1994, Dr Waring asked Rev D. Agassiz to comment on whether the noctuid moth *Chrysodexis acuta* Walker had ever been taken in Britain. Rev Agassiz thought that one had been taken in the 1950s but not in recent years. He noted that *Chrysodeixis chalcites* Esper was a glasshouse pest species in Europe and was therefore more likely to reach Britain than *acuta*, which is North African. The specimen photographed as *acuta* in Barnard Skinner's book *Moths of the British Isles*, is now known to be *chalcites*.

Mr S. MILES said that the Joint Committee for the Conservation of British Invertebrates was preparing consultation papers for the quinquennial review of the Wildlife and Countryside Act. Butterfly Conservation had submitted a paper proposing that all British butterflies with Red Data Book or notable status should be put under Schedule 9. This would mean that bred specimens could not be released into the wild except under licence. The President noted that this was an attempt to regulate rather than prevent the release of the scarcer species. Comments were invited. Mr R. Softly said he had no objections to this provided everyone was made aware of the regulations and that licences were not difficult to obtain.

Mr CLIVE CARTER spoke on the subject of gall-forming aphids and adelgids on trees, rather than his original title of the importance for wildlife of canopy gaps in forests. A gall is defined as a growth abnormality induced in the plant by the influence of an animal or pathogenic organism. Gall formation involves the production of tissues different from those found in a normal leaf or stem, and so abnormalities such as simple leaf rolls, leaf mines and spun leaves are excluded from this definition. Aphids and adelgids have sucking mouthparts, and, as they feed, they secrete saliva into the plants. Some species secrete growth hormone mimic compounds that induce the growth of gall tissues.

Insects of the Adelgidae family are all associated with conifers and a number of the species found in Britain have come originally from overseas and are found on exotic conifers. Like aphids, many adelgids alternate between two host plants. The primary host on which they overwinter is a spruce, *Picea* sp., and they migrate to other conifers such as larch *Larix* sp., silver fir *Abies* sp., douglas fir *Pseudotsuga* sp. or pines *Pinus* sp. The gall forming generation occurs on spruce during the spring. The gall is initiated by a female feeding near a dormant bud during the late winter. She lays a batch of eggs covered by fluffy white waxy wool and these hatch at bud burst. The bases of the developing leaves are swollen and the newly hatched nymphs crawl into them. Shoot extension is halted by the adelgids' feeding activities and a globular gall develops with nymphs feeding inside in a series of hollow chambers. The gall dries up and cracks open in late summer to release the winged adults. In some adelgids occurring in Britain the gall forming generation is scarce and the insect is found throughout the year in its non-gall forming state on its alternative conifer host plant. Dr Carter showed slides of various adelgid galls and described the life cycles of the causal insects.

Amongst the tree aphids it is those of the Pemphigidae family which are mostly responsible for galls on trees. The *Pemphigus* genus has poplars as its primary host and migrates to herbaceous plants in the summer. They induce galls on the petioles or leaf veins of poplar leaves in the spring. They secrete waxy filaments from their abdomens and this forms a coating around the honeydew excreted by the aphids within the galls. This enables the aphids to keep dry and avoid drowning in their excrement.

Aphids in the *Prociphilus* genus have a variety of trees as their primary host and these include *Populus*, *Fraxinus*, *Lonicera* and *Crataegus* spp. During the summer these aphids migrate to the roots of conifers. In 1986 the speaker had investigated poor growth in a sitka spruce plantation in south Wales. The roots were found to be heavily infested with a north American species which was likely to be overwintering on poplars. Such trees are scarce in the locality of the plantation. Grey poplar trees, *Populus canescens*, with galled leaves were found later many miles to the north of the plantation. Conifers for commercial plantations are raised in nurseries, often long distances from their ultimate planting site. If seedlings become infested with root aphids in the nursery they will be carried to the plantation site and this may explain infestations in areas where the alternative host plant is absent. Dr Carter closed his talk by showing some slides of aphid galls on apple and elm.

28 February 1995

The President Dr P. WARING passed round some empty lepidopterous pupal cases found on a birch trunk and asked if anyone could recognize what sort of moth had

emerged. No one could name the moth but it was confirmed that they were not clearwing pupal cases.

Mr A. J. HALSTEAD showed some live specimens of the firebug, *Pyrrhocoris apterus* (L.) (Hemiptera: Pyrrhocoridae). These had been sent in for identification at RHS Garden, Wisley from a private garden at Ripley, Surrey on 11.ii.95. Four live and two dead specimens had been found on a yew tree purchased from a garden centre at Lyne, near Chertsey, Surrey. *P. apterus* is a common plant bug in the warmer parts of Europe and it lives gregariously on a wide range of plants. It had presumably been imported with nursery stock since, although it has previously been recorded in Britain, it seems unable to sustain itself under our climate.

Mr R. A. JONES showed specimens of the two British *Arhopalus* species (Coleoptera: Cerambycidae). These were *A. rusticus* (L.) from Tunstall Forest, East Suffolk, 25.vii.93 and *A. tristis* (F.) from Harbridge, South Hampshire, 25.vii.77. The two British species of this genus were added to the British list at the beginning of the century and were both regarded as rare natives, found in the relic heartlands of Scotland (*A. rusticus*) and the New Forest (*A. tristis*). However, in the ensuing 90 years both species have spread widely. *A. tristis* occurs in much of England, but is less common than *A. rusticus* which, after a slow start in the West Country, has recently spread to almost the entire south-east. On the Continent, *A. rusticus* is distributed further north into Scandinavia than *A. tristis* which appears to be quite sporadic in occurrence. Although the two species closely resemble each other and both vary tremendously in size, there are distinct and obvious differences in the tarsi and eyes.

Mr JONES also showed 13 species from seven diverse beetle families showing remarkable similarity in their colour schemes—reddish fore-parts but metallic blue elytra. Hardly any of these species occur together, so he wondered how mimicry could possibly have evolved. These were: Carabidae: *Lebia chlorocephala* (Hoffmannsegg), *Brachinus crepitans* (L.); Staphylinidae: *Paederus litoralis* Grav.; Erotylidae: *Triplax aenea* (Schaller); Tetratomidae: *Tetratoma fungorum* F.; Cleridae: *Tillus elongatus* (L.); Salpingidae: *Rhinosimus ruficollis* (L.); Chrysomelidae: *Zeugophora subspinosa* (F.), *oulema melanopa* (L.), *Gastrophysa polygona* (L.), *Sermylassa halensis* (L.), *Derocrepis rufipes* (L.), *Podagricra fuscipes* (F.).

Mr B. SKINNER showed a unicolorous form of Dumeril's rustic, *Luperina dumerilii* Dup. (Lepidoptera: Noctuidae) taken at the Lizard, Cornwall on 7.ix.83. The specimen lacked the pale whitish stigma and subterminal shading found in most specimens and was initially identified as an aberrant form of the flounced rustic, *Luperina testacea* (D. & S.).

Rev D. AGASSIZ showed some specimens of the white-line dart, *Euxoa tritici* L. (Lepidoptera: Noctuidae). This is believed to be a complex of three species in Europe and it is likely that all three taxa are resident and widespread in Britain. These are *E. tritici* (L.), the majority of specimens, usually with the "white line"; *E. eruta* (Hüb.), forms with the ground colour largely speckled; *E. crypta* (Mann), generally smaller, dark brown forms, occurring late in the season. There are differences in the genitalia; in males chiefly in the everted vesica, but also in the ratio of the length of the sacculus extension to other processes; in the females in the shape of the bursae and the ovipositors. Examples determined by Michael Fibiger were shown but these were not confirmed and the status of the names used still requires confirmation. All three taxa can be found in the same locality. Members were encouraged to examine their series and make careful observations and descriptions of the larvae.

Leslie Alan Wiles, Michael George Sexton, Jonathon Stewart Brock and Maxwell V. L. Barclay have been elected as ordinary members, and Robert Graham as a junior member.

Mr S. MILES made available for inspection a booklet produced by the Biodiversity Challenge Group. This is made up of various NGOs and the document provides an alternative agenda to the government's programme on biodiversity.

The Ordinary Meeting then closed and was followed by the Annual General Meeting and the President's Address.

**Minutes of the Annual General Meeting of the Society
held at the Royal Entomological Society of London's rooms
at 6.30 pm on 28 February 1995**

Chairman: The President, Dr P. WARING. Present: 32 members.

Minutes of the last Annual General Meeting were read and signed.

The Secretary read the Council's report, followed by the Treasurer who read his report. The Treasurer then invited questions on his report but there were none. The Editor, Librarian and Curator then read their reports and Dr M. Scoble read the report of the Hering Memorial Fund. The President proposed the adoption of the reports, this was seconded by Mr D. Young and passed unopposed.

The President then read the names of the Officers and Members of Council recommended by the Council for 1995/96 and, as no other names had been submitted, he declared the following duly elected: President M. J. Scoble, Vice-presidents P. Waring and C. Hart, Treasurer A. J. Pickles, Secretary R. F. McCormick, Editor R. A. Jones, Curator P. J. Chandler, Librarian I. R. Sims, Lanternist M. J. Simmons, Building Manager P. J. Baker, Ordinary Members of the Council J. Muggleton, D. Lonsdale, I. F. G. McLean, G. Collins, C. M. Drake, D. Young, R. K. Merrifield, M. Parsons, A. Jenkins and J. Firmin.

The Secretary then read bye-law 26(d) and invited motions or questions. There was none.

The President then read his report and gave his address.

The President then installed the new President, Dr M. J. Scoble.

The President proposed a vote of thanks to the retiring President, and this was seconded by Mr Stubbs. The President asked for permission to publish the Presidential address, and this was given.

Mr B. SKINNER gave a vote of thanks to the retiring Officers and Council.

The President proposed the election of Mr R. A. Bell and Mr D. O'Keeffe as auditors for the coming year, with Council being empowered to appoint registered auditors under the Charities Act if necessary. This was seconded by Mr Jones and passed unopposed.

The Meeting closed at 9.30 pm.

The new President, Dr M. J. SCOBLE, invited comments on the exhibits. Mr E. Bradford recalled that he had found another red and black plant bug, *Eurydema dominulus* (Scop). earlier last year and he had made drawings of their distinctive banded eggs which are laid in rows of six. Mr A. Stubbs suggested that the red and metallic blue colour of the diverse beetles shown by Mr Jones might be warning colouration to indicate they are distasteful to would-be predators. He suggested that Mr Jones might experiment by eating a few. Without showing much enthusiasm for this proposal, Mr Jones pointed out that some of the beetles spend much of their time under bark or in other concealed places where the risks of predation are reduced.

14 March 1995

Mr A. J. HALSTEAD showed an unusual colour form of a burying beetle, *Necrodes littoralis* L. On 27.vii.93 a brown example of this normally all black beetle was taken in a Rothamsted light trap at RHS Garden, Wisley, Surrey. Despite the killing fluid used in this type of trap, the beetle survived for several days and showed no signs of developing its usual colour. A typical example, also taken in a Rothamsted trap at Santon Downham, Suffolk on 21.ix.87, was shown for comparison.

Neil Arthur Robinson, Ronald H. Carpenter, Simon Curson, Ronald H. Harvey, Colin Nichols and David Colin Neville have been elected as ordinary members.

The President Dr M. J. SCOBLE, drew attention to a meeting being held on 4th May at the Natural History Museum by the UK Systematics Research Forum. The purpose of the meeting is to set priorities for the study of systematics and training. Anyone interested in attending should contact Prof Stephen Blackmore; also any systematists not yet registered with the UK Forum should get in touch so that their database can be made more complete.

KEVIN PAGE spoke on the subject of ammonites. This large group of marine animals became extinct at about the same time as the dinosaurs but has left behind a rich fossil record. Ammonites show some similarities to the modern animal, *Nautilus*; both have (or had) air-filled chambered shells which the animals can regulate to allow them to rise or sink in the water. Ammonite fossils can be found in suitable rock strata in various situations such as coastal cliffs, land slips, quarries and cuttings created by road works. The species assemblages of ammonite fossils can be used to date and classify rock deposits. Ammonites often occur in large and small forms, and it is likely, that like modern squids, ammonites were sexually dimorphic with the larger forms being females. Dr Page showed some slides of a number of notable ammonite sites in Britain, France and Spain. Also shown were some of the wild flowers and insects found at these sites.

BOOK REVIEW

Systematic and applied entomology: an introduction, edited by I. D. Naumann, Melbourne University Press (UK: UCL Press, London), 1994, viii + 484 pp, softback, Aus\$ 44.95, £24.95—Although an Australian publication, the coverage is international and represents a highly attractive and well-produced summary of current entomological theory and knowledge. The book begins with general chapters on insect structure, biology, phylogeny and applied study. Then follow 32 chapters on the 32 orders of insects recognized by the authors. The editor candidly admits that these chapters are abridged from the huge (and hugely expensive) *The insects of Australia* (Melbourne University Press, 2nd edn, 1991), but they maintain a thoroughly general stance, offering biological details wholly relevant to study anywhere in the world, including the United Kingdom. The only concession to an antipodean audience is a brief paragraph in each chapter outlining a few special features of the Australian fauna. Of special interest is each order's world-wide classification, offering a modern listing of all known suborders, superfamilies and families irrespective of which part of the world they might occur in. Eight superb colour plates offer a taste of what the Australian fauna has to offer and the text is copiously illustrated throughout with line drawings and half-tones. Apart from the fact that all the page numbers in the first page of the contents list are wrong, this is an excellent introductory text for the general entomologist, A-level student or undergraduate.

R.A. JONES

OFFICERS' REPORTS FOR 1994

COUNCIL'S REPORT

The Society's membership stood at 729 at the end of the year, a small increase on the numbers for the previous year; 44 new members were elected during the year, 12 were struck off for non-payment and 1 member resigned. Six deaths were reported to the Society during 1994.

The Council met 7 times during 1994 and, on average, 15 members attended each meeting. Less of the Council's time was taken up discussing Dinton Pastures, (the Pelham-Clinton Building), but there are still ongoing problems with the air conditioning and alarm systems. The two Council members who have taken the brunt of attending for engineers' visits have been our Curator, Mr Peter Chandler, and our Building Manager Mr Peter Baker. Our thanks go to these hard working members of Council, and to any other members who have helped with this work. Because of the death of Mr C. B. Ashby, a replacement Trustee had to be found. A special meeting was arranged on the 10 May 1994 and Rev D. Agassis was elected by vote at this meeting and by postal ballot; the ballot also covered the increase in the number of Honorary Members to 12 and this matter was passed by a majority in the postal ballot and unanimously at this special meeting. Other topics that have taken up a lot of Council time have been the formation of a Dipterist's Forum affiliated to the BENHS; there will be an article about this affiliation published in the Journal. The formation of a conservation group within the BENHS has been initiated. Two meetings have taken place and further information will be distributed with the Journal; we have also discussed ongoing environmental issues.

There were 11 indoor meetings held at the rooms of the Royal Entomological Society which included the joint meeting with the London Natural History Society. In general, attendances at indoor meetings were improved with around 25 or more people coming to each meeting; this was probably because of the hard work put in by our Indoor Meeting Secretary, Dr McLean, in arranging speakers for these events. Six workshops were arranged at the Pelham-Clinton Building, and these proved to be very popular; along with these, three moth trapping evenings at Dinton Pastures were carried out in order to increase our knowledge of the Lepidoptera of the area. The Pelham-Clinton Building was opened on a Sunday every second week during the months of January to April and October to November and every 2nd Sunday of the month from May to September and December; in the main these were poorly attended and the Council will be reviewing the open day frequency at a future Council meeting. The poor attendance on open days shows a marked contrast to the interest of the membership in the other organized events; this interest makes it rewarding for the hard-working Council Members involved and our new premises a moderate success. A full programme of meetings and events is being prepared for 1995/96.

The Society continued to represent members' interests in the field of conservation and Mrs F. M. Murphy and Mr S. R. Miles take an active part as the Society's representatives on the Joint Committee for Conservation of British Invertebrates. The Society also paid an annual subscription of £60 to Wildlife and Countryside Link as part of the joint payment contributed by all the major entomological groups to this countryside policy forum and conservation promotion organization.

Eighteen field meetings were held in wide-ranging areas of the countryside, including the moth trapping events at Dinton Pastures Country Park. Attendance at these varied widely. We would like to thank Mr Roger Morris our outgoing Field Meetings Secretary, for all his hard work in arranging these meetings; Mr Morris has

had to retire due to other commitments and his position will be taken over by Dr Paul Waring. A full list of field meetings for 1995, arranged by Dr Paul Waring, has been distributed.

A successful Annual Exhibition was organized by Mr Michael Simmons and was attended by 200 members and 103 visitors, around the same numbers of members who attended the previous year with an increase in the number of visitors. There were around 175 exhibits with the usual slant on the Lepidoptera but with a welcome increase in the other orders. The Council reinforced its guidelines to stop controversial exhibits from being shown at our Exhibition. The aim is to stop long series of any species from one locality from being shown, unless for a special reason. Mr Michael Simmons organized the Annual Dinner for the first time and made a great success of a job that was suddenly thrust upon him; an increase in the numbers of members and companions sat down to a meal that was enjoyed by all.

ROY MCCORMICK

TREASURER'S REPORT

1994 has been the first full year of normal occupation of Dinton Pastures and it is now possible to see how the actual costs compare with our estimates. Our budget for running the Society was £14 000 and at first sight the actual cost of £18 555 seems excessive. However there were two exceptional items, firstly the expenditure of £2300 on equipment, a water softener and a new computer, principally for the library, but having implications for other activities of the Society. Secondly, the financial implications of the water leak we suffered. The leak was in the length of mains leading to the building but for which we are responsible. As a result we had to pay the water authorities £1700 and some £500 for repair costs. The bankruptcy of our builders has not made it possible to claim successfully.

Taking away these items our expenditure has not been vastly higher than anticipated, but the worrying feature which remains is the cost of controlling the humidity and temperature of our premises. There have been continuing problems in this area most of which have cost money, either for increased electricity costs, for repair, or for the water softener, which we are advised may relieve problems but costs £984 in the short term.

This year the cost of producing the magazine was reduced to £5700 due to a hold over to next year, and because some costs of the supplement were included last year. Once again a grant of £1000 towards the cost of colour plates has been made from the Bequest Fund.

Turning to income we see a sharp increase in subscriptions resulting from the increase in rates and the effects of covenanting which has provided a further £600 reclaimed from the exchequer. Investment income is slightly down but in assessing this the nature of our new investments has to be considered. The theory is that income for the most part is accumulated within the bonds until we require it. Unfortunately the value of our investments has fallen during the year in common with the stock exchange, although there have been encouraging signs of recovery towards the end of the year. Fortunately we consider these investments to be long term, and the current value is not a problem to us. The value of our investments overall still exceeded their cost by some £30 000 at the balance sheet date.

I am pleased to report that the Society is in a strong financial position with a balance sheet value of £348 000 and a value taking into account the unrealized profits of investment of nearly £380 000.

*Income and expenditure account
year to 31st December 1994*

	1994	1993
<i>General account</i>		
Subscriptions	10,249	7,990
Interest and dividends	10,181	11,512
Redemption surplus	—	57
Donations and bequests	1,339	1,330
Surplus on Christmas cards	130	85
Surplus on cabinets and collections	23	700
	<hr/>	<hr/>
<i>Total income</i>	(21,922)	(21,674)
Headquarters services	4,811	3,687
Insurance	935	692
Headquarters security and maintenance	1,807	1,348
Council rooms and expenses	1,981	1,699
Equipment	2,328	—
Members meetings and exhibitions	2,345	1,503
Administration	2,534	1,512
Library	960	1,165
Donation to RSPB	—	250
Subscriptions and donations to other societies	173	340
Honorariums	—	340
Cost of dinner	181	205
	<hr/>	<hr/>
<i>Cost of running society</i>	18,055	12,751
	<hr/>	<hr/>
	(3,867)	(8,923)
 <i>Publications account (free to members)</i>		
Sales	(1,267)	(1,344)
Bequest fund grant for plates	(1,000)	(1,000)
Production of journal	6,402	6,775
Distribution costs	1,572	1,844
	<hr/>	<hr/>
Net cost of journal	5,707	6,275
Deficit (surplus) on membership	1,840	(2,648)
 <i>Special publications (for sale)</i>		
Sales	(6,128)	(1,786)
Opening stock	9,088	4,000
Publication costs	128	5,532
Distribution and general costs	871	362
Closing stock	(5,021)	(9,088)
	<hr/>	<hr/>
Surplus on sale of special publications	(1,062)	(980)
	<hr/>	<hr/>
	778	(3,628)
Transferred to Hering fund	643	564
Transferred to bequest fund	8,170	7,451
Transferred to general fund	(11,242)	(5,367)
Transferred to special publications fund	1,651	980
	<hr/>	<hr/>
	(778)	3,628
	<hr/>	<hr/>

Balance sheet as at 31st December 1994

	1994	1993
<i>Employment of capital</i>		
Leasehold property	154,736	144,432
Additions	—	10,304
Opening amortization	(2,210)	—
Amortization	<u>(2,210)</u>	<u>(2,210)</u>
	150,316	152,526
<i>Quoted investments</i>		
General fund	28,036	28,036
Hering fund	3,540	3,540
Investment bonds	139,000	139,000
<i>Current assets</i>		
Special publications	5,021	9,088
Christmas cards	50	289
Sundry debtors and payments in advance	3,149	3,591
Bank capital reserve account	14,200	—
Business reserve deposit	—	11,327
Bank societies reserve account	4,468	—
Bank current account	2,424	8,070
	<u>29,312</u>	<u>32,365</u>
<i>Current liabilities</i>		
Sundry creditors and accrued expenses	2,048	2,724
	<u>(2,048)</u>	<u>(2,724)</u>
<i>Net current assets</i>		
	<u>27,264</u>	<u>29,641</u>
	<u>348,156</u>	<u>352,743</u>
<i>Capital employed</i>		
<i>General fund</i>		
Opening balance	39,590	39,589
Transfer from bequest fund	11,242	5,367
Transfer from income and expenditure account	<u>(11,242)</u>	<u>(5,367)</u>
	39,590	39,589
<i>Housing fund</i>		
Contributions from other funds	152,526	144,432
Amortization	<u>(2,210)</u>	<u>(2,210)</u>
	150,316	152,526
<i>Special publications fund</i>		
Opening balance	29,495	28,515
Surplus from sales	1,651	980
	31,146	29,495

<i>Bequest fund</i>			
Opening balance	126,191	136,411	
Income	8,170	7,451	
Grants & expenditure	(12,242)	(17,671)	
			122,119
			126,191
<i>Hering memorial fund</i>			
Opening balance	4,942	4,878	
Income	643	564	
Expenditure	(600)	(500)	
			4,985
			4,942
			348,156
			352,743

Accounting policies

- The accounts are prepared under the historical cost convention.
- The costs of building and equipping leasehold premises at Dinton Pastures Park have been capitalized. The total cost of these premises which were completed during the year to 31st December 1993 are being amortized over the term of the lease. The first amortization charge was made in 1993.
- The value of the library, collections, ties, back numbers of Proceedings and Journals and the computer system is not included in these accounts. Current expenditure on such items is written off to the income and expenditure account.
- Donations and legacies are brought into account when they are received by the Society.
- Surpluses (or deficits) arising on the special publications fund which accounts for publications primarily for sale are transferred to that fund to finance future publications.

<i>Investments</i>	<i>Book value at cost</i>		<i>Market value</i>
	<i>General & bequest</i>	<i>Hering memorial</i>	
1230 Shell T&T 25p Ord.	477.79	771.83	8561
750 Unilever 5p Ord.	248.45		8685
6272 M&G Charifund Units	19091.17	1147.24	51556
2450.90 Treas. 9 1/2% 1999	771.22	1621.21	2523
3863.71 Treas. 8 3/4% 1997	36876.94		3890
3882.90 Treas. 9% 1994	3759.57		3883
	28036.14	3540.28	79098
<i>Investment bonds</i>			
	<i>Total</i>		
Hendersons	58000.00		49253
Sun Life	56000.00		49599
Barings	25000.00		21293
	139000.00		120145

Fund movements

Amortization on the leasehold premises at Dinton Pastures has been charged to the Housing Fund. A grant has been made from the bequest fund towards the cost of coloured plates published in the Journal and towards the general running expenses of the Society.

Make up of funds

The funds are represented by the following assets:

<i>Housing fund</i>		<i>Bequest fund</i>	
Leasehold premises	150,316	Hendersons bond	48,000
<i>Special publications</i>		Sun Life bond	56,000
Stock	5,021	Barings bond	18,119
Cash deposits	12,125	Cash deposits	—
Hendersons bond	10,000		
Barings bond	4,000		122,119
	<u>31,146</u>	<i>General fund</i>	
		Barings bond	2,881
<i>Hering fund</i>		Investments	28,036
Investments	3,540	Current assets	8,673
Cash deposits	1,445		<u>39,589</u>
	<u>4,985</u>		

The audit of these accounts marks the end of an era as it is the first time for over 15 years that Col. Dougie Sterling has not been associated with the preparation of the accounts either as treasurer or auditor. We have been fortunate in obtaining the services of Dennis O'Keeffe who has performed the audit together with our long serving joint auditor Reg Bell and I extend my thanks to these gentlemen.

Mark Telfer took on the onerous task of Assistant Treasurer at the beginning of 1994 and has done splendid work in re-organizing the computer system and carrying out a smooth transfer and I would also like to extend my thanks to him.

A. J. PICKLES

Report of the auditors to the members

We have examined the financial statements attached which have been prepared in accordance with the recommendations of SORP 2.

We have audited the financial statements annexed in accordance with approved Auditing Standards.

In our opinion the financial statements which have been prepared under the historical cost convention give a true and fair view of the state of the Society's affairs at 31st December 1994 and of its income and expenditure for the year then ended.

D. O'KEEFFE

R. A. BELL

PROFESSOR HERING MEMORIAL RESEARCH FUND

The committee agreed to support two applications to the Fund for 1995. Mr Roland Johansson (Växjö, Sweden) was awarded the sum of £300 to help with the cost of a visit to the Natural History Museum, London, to study and illustrate types

of Australian Nepticulidae. Mr Johansson is well known for his studies and excellent colour illustrations of microlepidoptera. His work on the Australian Nepticulidae forms part of a collaborative study with colleagues from Canberra and Leiden.

Dr Sergej Sinev (Russian Academy of Sciences, St Petersburg) was awarded £300 to further his work on Russian microlepidoptera. The funds will be used to support fieldwork in the far east of Russia, particularly for the collection of immature stages, to enable Dr Sinev to make his work on keys to Russian Microlepidoptera more complete.

Reports have been received on the results of work of the two projects funded last year. Michael Bonsall, Imperial College, London, who is working on the parasitoid complexes of Tephritidae on thistles, has reared and identified several species of parasitoids from various tephritid flies. The data will be used to compare the host-parasitoid associations on the various hostplants.

The study of Dr Alan Gange (Royal Holloway College) involving the tephritid fly *Urophora cardui*, which forms galls on the thistle *Cirsium arvense*, has shown that significantly larger galls and greater numbers of live larvae were found on thistles treated with fungicide to reduce mycorrhizal infection. Application of fertilizer, to increase nitrogen levels, seems to counteract the effect of the fungicide. This work is the first report of the protective effect of a mycorrhiza against insect herbivory. Chemical studies are currently in progress to examine whether mycorrhizal infection is altering the nitrogen-carbon balance in the plant.

MALCOLM J. SCOBLE

LIBRARIAN'S REPORT

The major occupation in the Library this year has been to specify and purchase a personal computer. This, it is hoped, will not only benefit the running of the library but assist the Society in many other ventures. With the help of a small committee a proposed specification was produced. I then set myself the task of examining possible equipment, not only obtaining brochures but also visiting demonstration sites. This culminated in the purchase of an Elonex PC-450 model in mid-December 1994. With the help of Graham Collins' expertise, the library program database disks were converted in January 1995 from 5.25 inch format to 3.5 inch format and transferred to the new computer. The computer was finally installed at Dinton Pastures on the 12th February.

As the result of a kind offer by Frances Murphy and her husband a single sheet photocopier has also been installed at the Society's rooms.

A further tranche of book purchases, originally recommended by the library committee in 1993, with subjects ranging from European Noctuidae to field keys for Neuroptera, was completed this year. Thanks are due to Andrew Halstead for arranging these purchases.

One exchange journal arrangement was agreed during the year, this was with Sociedad Entomologica Aragonesa for their journal *Zapateri*.

Moves are being suggested to dispose of some of the older items in our library to lighten the insurance load. Depending on the extent of disposal to be contemplated I believe this to be a retrograde step. Potentially it could diminish the interest in the library from those who would not normally get the opportunity to see these types of items, let alone borrow them by special permission, which is still feasible.

I am still concerned with those members who don't return books they have borrowed, due perhaps to an unwillingness to make the effort to visit Dinton Pastures a second time. It is the responsibility of all members to make arrangements

to return books they have on loan, once they have received a request from the librarian to do so.

During the year I placed an advertisement in the Society's journal for a replacement librarian following the announcement of my resignation in last year's report. I am glad to say that Mr Ian Sims, a resident of the Reading area, has volunteered to take on these responsibilities from today. I shall be still concerned with the library for a little time yet in order to ensure that the transition runs smoothly, particularly the aspect of the use of the computer for library work. I wish Ian success and hope that the members, the library committee and Council will support him in this endeavour.

Special thanks are due this year to Graham Collins, Ken Merrifield, Stuart Ball, Ian McLean and Peter Verdon for giving me advice leading to the specification of the Society's computer requirement.

Thanks are due, for books donated to the library during the past year, to Brian Baker and also to the Biodiversity Challenge Group.

Finally I would like to thank all those who have helped me over the past twelve years in the library, particularly the understanding shown during the traumatic period of reported losses when the books were in store and for the help received at the installation of the books to Dinton Pastures.

S. R. MILES

CURATOR'S REPORT

In the reports for the past two years I have referred to the ongoing rearrangement of the beetles, involving uniting the Massee and Henderson collections into a single entity. Progress on this has continued as time allowed and the layout according to John Owen's revised check list has now been completed in 86 drawers. It will now be easier to assess the gaps in this collection and determine how they can best be filled. Notes provided by Peter Hodge on recent splits and synonymy in the Coleoptera, as well as likely areas of confusion, are invaluable in indicating where revision is essential, and assistance of specialists will be sought to resolve the identity of such material. Some help has already been given by Keith Alexander on the Cantharidae and David Moore on the Elateridae.

This has now freed the two cabinets (40 and 20 drawer respectively), formerly housing the Massee collection for the arrangement of the European butterflies to begin in due course. It has also freed two Hill units, which after repapering will be used to begin the projected new layout of the British moths.

Preliminary work on the moths has continued with selection of suitable material from the Mackworth-Præd collection, begun by Peter Baker and being continued by David Moore, who has offered to make a start on the moth arrangement later in 1995.

During 1994, the Society was offered Michael Tweedie's collection of Lepidoptera, excluding the cabinets. Due to lack of space for rehousing them at the time it was initially agreed that we would take specimens of value to our collection, which included most of his micro moths (an area in which we are still weak) and a smaller number of the macros. This initial selection was made by Bernard Skinner and I am most grateful to him for this valuable contribution. A cabinet of Geometridae passed to Barry Goater and it is understood that Barry has selected a representative collection to pass to Guy Sircoulomb, a member of the Société Entomologique d'Évreux, who specializes in Geometridae, in continuation of the links already established between our two Societies. The residue was then obtained for us by Peter

Baker but most of necessity became duplicates and the greater part were immediately donated to the Northamptonshire Natural History Society to assist in building their Lepidoptera collection.

Some further donations of sawflies have been made by Andrew Halstead, and due to the additions made by him our collection now includes 200 species of this group.

It is expected, with the changes in organization of the Lepidoptera collections, that a number of the older cabinets will become available for sale over the next few years as they are cleared. It is then hoped to replace them with additional ten-drawer units for the eventual rehousing of the Diptera, Hymenoptera and those smaller orders still awaiting arrangement.

Use has been made of the collections during four of the workshop meetings held during 1994, and microscopes and table space have been fully utilized on these occasions. On the other hand attendance at the open days has been very variable and it may be necessary to reduce their number unless there is fuller use of the library and collections on each occasion. Anyone who has not already visited the building would be welcome to attend any of the open days or workshops. It is hoped that the associations with Dipterists' Forum and BWARS will increase use of the collections of those orders and it is also hoped that coleopterists will be encouraged to attend now that the beetle collection has been updated.

There have been some further occasional upsets over the air conditioning system, despite some modifications to the design carried out during the year as well as the addition of a water softening facility in an effort to reduce the impact of lime scale on the rehumidifying component of the system. This was initially successful but due to a neglect in routine maintenance there has been renewed malfunctioning in recent months and the hardness of the water has proved too great for water softening to fully solve the problem. The required parameters have nevertheless been consistent for most of the time and regular maintenance visits by the contractor have now been resumed. Consideration is still being given to the longer term operation of the air conditioning, but it is as yet unclear whether beneficial changes to its mode of operation can be achieved.

Our initial inability to accept the Tweedie collection in its entirety under the arrangement described above, led some members to express concern that we should have a formalized Collections Policy. Any member with views on this subject should let me know.

I am grateful to all those already mentioned for their assistance and encouragement during the year.

PETER CHANDLER

EDITOR'S REPORT

I hope it will come as no surprise when I say that the Journal continued on its merry way in 1994, as per usual. There were, however, two small detours from its normal annual path. Although four colour plates were printed, only three were actually published in 1994; the fourth is being held over to accompany two papers on butterfly genetics which will appear in 1995. And the Journal published a supplement, its first in a more or less continuous publishing history of 110 years.

This was actually quite a departure from standard procedure since the contents of this special supplement were actually the proceedings of a completely different society—the National Federation for Biological Recording, the NFBR. There is no formal link between that group and the BENHS, so how did our Journal become involved in issuing their notes?

As it turned out, the subject of the NFBR annual meeting in question was 'invertebrate recording' and how such recording could be used in site evaluation and monitoring, quite a vogue topic and one which the BENHS Council thought worthwhile supporting. Many of the delegates to that NFBR meeting and some of the speakers were also members of the BENHS and all of the papers presented were of potential interest to BENHS members, many of whom are already involved with local and national recording schemes and surveys.

The cost of producing the supplement was to some extent defrayed by the fact that the guest editor, Paul Harding from the Biological Records Centre, was able to take all of the authors' papers, and generate the camera-ready copy from his own department. The printing costs were also partly met by a special grant from the NFBR. In this way the supplement was produced with only a minimal cost to the BENHS, but, I hope, with great benefit. The supplement was circulated to many organizations and it further raised the Society's profile among a wide variety of bodies involved with invertebrate recording. It also offered readers a deeper insight into just how important is the work of the field entomologist.

The supplement aside, the Journal continues relentlessly. There is always a steady supply of papers to publish, though I am always happy to receive more of the shorter communications which will usually enjoy very rapid publication indeed. I'll close with a thank you to the 14 listed members of the Editorial Committee who referee, revise or proof-read all the material, and without whose help I would find the job of Editor a burden instead of a joy.

RICHARD A. JONES

BOOK REVIEW

Ground beetles in the Yorkshire Museum, by Michael Denton, Yorkshire Museum, 1993, 84 pages, paperback, and **Flies in the Yorkshire Museum**, by Andrew Grayson, Yorkshire Museum, 1994, 160 pages, paperback.—Both of these small books were published and issued free to anyone sending a stamped and addressed envelope, and have been produced with local backing to promote the Museum and its collections.

The ground beetles were primarily collected by Herbert Willoughby Ellis (1869–1943) and represent a portion of his collection of 80 000 beetle specimens. For each species, a brief entry records the number of specimens in the collection and comments on the contemporary and present status as well as local and national distribution. A short biography describes how Ellis corresponded with all the eminent coleopterists of the day and the comprehensiveness of this current reference collection reflects this.

The flies were collected mainly by Percy Hall Grimshaw (1869–1939) a former keeper of natural history of the Royal Scottish Museum where his main collection is housed. The systematic list gives full data for the collection's 801 specimens.

The books are rather generously laid out and could probably have been adequately printed with two-thirds or half their actual number of pages. Nevertheless they are attractive and useful publications and succeed in their aim of raising awareness of the Museum's collections.

RICHARD A. JONES

LETTER TO THE EDITOR

Habitat preference in the Lepidoptera and patterns of distribution in light-traps.— I was most interested to read the results of Majerus *et al.* (1994) concerning light-trapping comparisons in woodland and grassland. As they report, I also found significant and persistent differences in the abundance of particular species when comparing two or more habitats within woodland, and readers will not be surprised to read of greater differences between woodland and open grassland where there are likely to be differences relating to shelter and wind speed as well as habitat type. In fact, interesting comparisons between catches in grassland and woodland were reported by Hosny (1953, 1955, 1959) way back in the infancy of mercury vapour light traps.

As Majerus *et al.* discuss, reasons for these patterns of distribution can be expected to relate to various factors. Amongst these are the relatively weak flight of many geometrids and the dependence of a large proportion on woody perennials for food as larvae. No British geometrid moths feed as larvae on grasses, unlike the larvae of many of the noctuids, and low herbaceous plants of open conditions are also exploited widely by noctuids, many of which are strong fliers, able to fly higher and in windier conditions than most geometers.

Just as with butterflies, presence of the larval foodplant is not enough to guarantee the presence of the moth. Very often the situation in which the plant is growing proves to be important, with some species of larvae occurring more frequently in sunny situations, others in shade, and with differences between abundance or density on mature trees and shrubs and on regrowth. Some results illustrating these differences are given in Waring (1990).

A particularly interesting example in the British context is provided by Shaw (1991) who found larvae of the magpie moth, *Abraxas grossulariata*, and the V moth, *Semiothisa wauaria*, only on gooseberry bushes growing in sunny locations, while those of the phoenix, *Eulithis prunata*, were found only on more or less fully shaded gooseberry bushes in woodland understorey.

My Ph.D. thesis (Waring, 1990) includes many other examples, some of which clearly relate to local differences in the availability of particular species of plants and even to the proximity of a single tree or bush. However, as Bowden (1982) suggests, and I found, some apparent patterns of distribution can be artifacts of the trapping technique, such as differences in the visibility of individual traps or the degree of shading and contrast between the light-trap and its background. In Waring (1990) I explored several different methods of evening out and correcting for such factors using species expected to have uniform distribution. By looking at the ratio in which moths actually occur in traps and comparing the distributions of other species against this empirical ratio, it was hoped that it might be possible to correct for the resultant combination of all the factors which might be biasing trap results, such as one site being slightly warmer, windier or more shaded than another. Needless to say, the results depended on which species I selected as my bio-indicator: the large yellow underwing, *Noctua pronuba*, riband wave *Idaea aversata* and the small fan-footed wave *I. biselata*. In practice I found that in the real world each of these species let me down sooner or later, appearing to favour one habitat in preference to another.

For many species the pattern of distribution between habitats was the same no matter what method of analysis I chose, the latter affecting only the degree of difference in the comparisons. I repeat the advice I gave in Waring (1989) to all moth recorders interested in using light-traps for looking at differences between habitats and management regimes—make things easy for yourself—try and ensure that all traps which you wish to compare with each other are operated under an open sky, or

all under tree canopy, and that they are visible for about the same distance. This makes the comparisons much simpler and the results much more easy to interpret. For other tips on the practicalities of light-trapping, readers may find Waring (1994) and the references listed there of interest.

Lastly, I am sure readers will look forward to reading the results of Dearnaley *et al.* (referred to as "in prep." in Majerus *et al.* 1994 p129 para. 4) when this study is published. There is already a large body of literature reporting that the effectiveness of light-traps is influenced by trap design, bulb height and the height of the trap above ground. It is also known that the performance of bulbs deteriorates with age and use. Just for the record, all the traps in the experiments reported by Waring (1989, 1990) were operated on the ground. All the tubes and bulbs for the traps were purchased new at the start of the experiments and the tubes in the actinic light traps were replaced at the start of each year. In all comparisons the traps were operated all night in order to sample as large a range of moths and their possible times of flight as possible. These and other experimental details, including dates and sites, are given in full in Waring (1990).—PAUL WARING, Windmill View, 1366 Lincoln Road, Werrington, Peterborough PE4 6LS.

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SHORT COMMUNICATIONS

Deadwood Coleoptera from two important Denbighshire parklands, including five species new to Wales.—Two National Trust owned historic parks, Chirk and Erddig, have received very little attention from entomologists in the past, but have now proved to be of considerable interest for their deadwood fauna. Both were visited in 1993 as part of the Trust's national programme of biological survey. The park at Chirk originated as a 14th century hunting park, while the early history of Erddig is not yet known.

Erddig Park (SJ326482) straddles the Black Brook immediately above its confluence with the Clywedog River and therefore encompasses ancient river-cliff woodland within its present bounds. Amongst the more interesting finds are a

Tetratoma desmaresti Lat. found beneath bark of a dead lower branch on an old oak, 23.vi, a *Prionocyphon serricornis* (Müller, P. W. J.) swept at the base of a wooded river-cliff section in Big Wood, 24.vi, and a dead *Prionychus ater* (F.) beneath loose bark on the trunk of a mature ash, and a *Quedius ventralis* (Aragona) under loose bark with congealed sap on a horse chestnut trunk, both 28.vi.1993. Other species of lesser note include *Ctesias serra* (F.), *Bitoma crenata* (F.), and *Xestobium rufovillosum* (Deg.). A subsequent visit, on 26.iv.1994, added an elytron of *Ischnomera ? cyanea* (F.) found beneath loose bark on an oak, and A. P. Fowles took a *Ernoporus fagi* (F.) from beech bark.

Chirk Castle Park (SJ269381) was visited on 19.vii. 1993. The old deer park includes a large concentration of ancient oaks, partly within a matrix of secondary birch, oak, beech and sycamore, partly in conifer plantation and including a large area of open bracken with some hawthorns. The most important find here was *Dorcatoma serra* Panz., which was tapped from a bracket of *Inonotus dryadeus* on an oak. *Ctesias serra* was found on another old oak. The neighbouring Baddy's Park is a large area of sheep pasture studded with overmature oak and hawthorn, plus a few field maple. The most interesting find here was *Abdera quadrifasciata* (Curt.) which was tapped from a dead lower branch of an old spreading oak. *Eledona agricola* (Herbst) was typically found in *Laetiporus sulphureus* bracket on an oak, and other species noted include *Cryptarcha strigata* (F.), *Prionychus ater*, *Pediacus dermestoides* (F.) and *Xestobium rufovillosum*. A dead tree in the Home Park was riddled with borings of a *Xyloterus* sp., most probably *X. domesticus* (L.). This is clearly an important old Border parkland and would merit further investigation.

Of these beetles, *Abdera quadrifasciata*, *Dorcatoma serra*, *Ernoporus fagi*, *Quedius ventralis*, and *Tetratoma desmaresti* are new to Wales, and *Cryptarcha strigata*, *Eledona agricola*, and *Prionychus ater* new to North Wales.

These findings bring both sites into the top league of Welsh parklands. The "Alexander index" for both parks currently stands at 13, a total surpassed in Wales only by Dinefwr Park (Alexander & Pavett, 1992) and Powis Castle Park, with indices of 25 and 17 respectively. Old Cilgwyn, Ceredigion also has 13, while Gregynog Great Wood stands close at 12. Welsh parks are however currently the subject of a major survey by the Countryside Council for Wales.

My thanks go to Adrian Fowles of the Countryside Council for Wales for his comments on an earlier draft of this note.—K. N. A. ALEXANDER, National Trust, 33 Sheep Street, Cirencester, Gloucestershire GL7 1QW.

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Myopites eximia Seguy (Diptera: Tephritidae) new to Devon.—While in S. Devon on holiday, I collected some dead flowerheads of golden samphire, *Inula crithmoides* L., growing from rock crevices low down on the rocky coast on the south side of Bolt Tail (SX 669394), 14.xi.1993. In due course, a single specimen of this red data book (Shirt, 1987) species emerged (called *M. frauenfeldi* Schiner in that publication).

M. eximia is only known from western and south-western Europe (White, 1988), and in Britain has only so far been reported from south-eastern England, as far west as Dorset (Falk, 1991). The foodplant is much more widespread than this, occurring from the Mull of Galloway southwards along the Atlantic coasts of Europe and across the Mediterranean (Clapham *et al.*, 1989). Falk (1991) associated the species

with saltmarsh and coastal shingle banks. While the foodplant is perhaps most frequent in these habitats in the south-east, it is very characteristic of the splash zone of rocky cliffs in the south-west and it is perhaps no surprise that it has now been found at a rocky south-western site.—K. N. A. ALEXANDER, 14 Partridge Way, Cirencester, Gloucestershire GL7 1BQ.

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***Dirhagus pygmaeus* (F.) (Eucnemidae) and *Hallomenus binotatus* (Quen.) (Melan-dryidae): two beetles new to Wales.**—These two deadwood beetles were discovered new to Wales in the course of National Trust Biological Survey fieldwork during 1994. A dead *Hallomenus binotatus* was found within a bracket of the fungus *Laetiporus sulphureus* (Bull.) growing on oak in Graigllech Woods (SN848119), Brecon., 26.vii.1994. Although reasonably widespread across much of England and Scotland, it does appear to be much rarer in the south-west, being unknown in Devon and Cornwall for instance. A male and a female *Dirhagus pygmaeus* were swept within the extensive woodlands of the Bishopston Valley (SS568878), Gower, Glam., 22.vi.1994. The distribution of this species in Britain is rather curious, but it occurs right across the southern counties, in the West Midlands and the north, and its discovery in Wales is therefore no real surprise. Bracken oakwoods are a very typical habitat and there is no shortage of such in Wales.—K. N. A. ALEXANDER, National Trust, 33 Sheep Street, Cirencester, Gloucestershire GL7 1QW.

A winter emergence of *Phyllonorycter strigulatella* Zeller (Lepidoptera: Gracillariidae).—A large number of *Phyllonorycter* mines, situated on the underside of the leaves of grey alder (*Alnus incana* L.), were collected from a supermarket car park in the eastern suburbs of Cardiff, in early November. They were taken indoors with the intention of placing them into individual storage for the winter, but began to hatch within a few days. After one week, forty adults and one parasitoid (Pteromalidae) had emerged. The moths were later identified as *P. strigulatella* (Zeller, 1846), by the authors. This would appear to be a new record for Glamorgan (VC41), and is possibly new for Wales.

P. strigulatella is described as being bivoltine (Heath & Emmet, 1985), with the adults on the wing in early May, or late July and August. The autumn larval stage is thought to be completed in October, leaving the pupae to survive the winter. It seems unusual for the moths to have emerged so quickly upon being brought indoors, especially since the autumn was reasonably mild prior to collection.—D. J. SLADE & M. R. WILSON, National Museum of Wales, Cathays Park, Cardiff CF1 3NP.

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BOOK REVIEWS

Invertebrates of Wales: a review of important sites and species, by Adrian Fowles. JNCC and Countryside Council for Wales, 1994, 157 pages plus 16 colour plates, £24.50, hardback.—Britain has the best known invertebrate fauna in the world, the result of over 150 years' accumulation of the records of field collecting. We are now in a position to use this knowledge, however incomplete it may sometimes seem, to evaluate the rich variety of natural sites in Britain for conservation purposes. *Invertebrates of Wales*, by the invertebrate ecologist for the Countryside Council for Wales (CCW), Adrian Fowles, is an attempt to present an overview of the range of habitats in Wales, to describe their conservation status and highlight some of the key invertebrates. The bulk of the book is divided into three sections, corresponding to the three regions formerly administered by the Nature Conservancy Council; North Wales, Dyfed–Powys and South Wales. Within these sections the habitats represented, e.g. woodlands and coastland are described drawing upon examples of both the fauna present and also particular localities. These localities are drawn together into an appendix of notable sites for conservation of invertebrates in Wales. Here 93 sites are listed for which current information indicates the localities are of notable significance. Some of these sites are SSSIs and other national nature reserves. I would have greatly valued a complete list and brief account of the SSSIs and NNRs in Wales. Naturally many of these would not have been originally designated for their invertebrate fauna. In his position in CCW Adrian Fowles would be able to produce such a site inventory. This would, however, have produced an entirely different sort of book. Also, valuable as such an inventory would be, I suspect, however, the author may feel that such a list would polarize and concentrate recording to these sites at the expense of work at other potentially important sites. This is an important issue—should we concentrate recording and collecting at protected sites or those that might benefit from formal designation?

I felt that the emphasis in this book on the conservation aspects of habitats overlaps to some extent with Peter Kirby's *Habitat management for invertebrates: a practical handbook* (JNCC & RSPB, 1992) (which strangely is not listed in the bibliography). Both describe habitats and the invertebrates that may be present, although obviously Kirby's book has a different purpose and coverage and *Invertebrates of Wales* concentrates on one large area and its habitats. It is possible to make comparisons in the way information is given. The style of presentation in the two books is considerably different and I find Kirby's book much easier to browse because it is broken up with many sub-headings and spaces between paragraphs, notably lacking from Fowles's. That aside I find myself asking when would I use *Invertebrates of Wales* and which audience was it written for? There is much useful information but it is not easily accessible. The introductory material is not especially helpful to someone wanting rapid information on the status of sites and recording coverage in Wales. Just how well recorded are the Lepidoptera, Odonata or Orthoptera in Wales? Fowles does not really tell us. I couldn't find a statement as to the number of SSSIs or NNRs in Wales or a proportion of the total land under such protection (or in a National Park) compared with other parts of the British Isles. The Invertebrate Site Register could have been more thoroughly introduced for the uninitiated. The photographs, especially those of habitats, are excellent and will certainly encourage interest in recording in Wales.

The book is completed by a selected bibliography of around 150 references, which serve to highlight papers containing information on Welsh Invertebrates. This may be too selective since it does not include any general works or list any of the excellent series of JBCC guides "*Reviews of the scarce and threatened . . .*"

Over 30 of the references given are relatively recent articles in newsletters or unpublished reports (or reports produced in low numbers). This serves to emphasize the increasing importance of newsletters for publication of such information as long as they are widely available. (But are all journals easily available?) I am more concerned about the general availability of information in "unpublished" reports but that is another matter! Kirby's book includes an appendix listing recording schemes and record centres, societies, further reading, invertebrate identification guides and works on invertebrate conservation and habitat management. I would have thought a similar appendix could have been usefully included in *Invertebrates in Wales*. Only a list of organizations associated with the conservation of invertebrates in Wales is given by Fowles.

This book should certainly be widely available, used and consulted, although as mentioned above the lack of sub-headings does not make it easy browsing. It should certainly raise the profile of invertebrate conservation in Wales. Unfortunately the price, at £24.50 for an A4 hardback, may make many amateurs think twice about a personal purchase even with the excellent photographs

M. R. WILSON

BOOK REVIEW

Agricultural entomology, by D. S. Hill, Timber Press, Portland, Oregon, USA and Cambridge, UK, 1994, 636 pp, hardback, \$89.95 (about £60).—Although there are many books in the field of agricultural entomology, there are few that claim to take a *global* view of this agricultural scene. Plenty concentrate on particular crops, particular pests or particular regions, but the author has set his sights high to try and cover the subject across international borders. A short introduction considers some of the current problems with agriculture, especially those of poverty, emphasis on cash crops, the need for land reform, erosion and over-population. It is these underlying causes which aggravate the developing world and make straightforward entomological problems into devastating and life-threatening plagues. Illustrated by examples from Africa and elsewhere, the theories behind our ideas of insect distribution, ecology and population dynamics are put into a farming perspective. The majority of the book is given over to order-by-order accounts of major pest species, from the minor nuisance of the firebrat eking out a living on bakery floors to migratory locusts ravaging the African plains. All important groups and major species are listed with details of their geographic range and pest status. Along with pests of farming, forestry, livestock and humans, beneficial insects receive welcome coverage since it is often the balance with natural enemies which causes insect outbreaks. We are rather sheltered in the United Kingdom, and we get upset by a few lily beetles making holes in our prize blooms, but looking through the book it is sobering to consider just how many of the creatures we like to study do great damage to the world's crops. Despite the rather bland quality of the paper, most of the large number of illustrations are crisp and clear and only a few rather sketchy figures leave something to be desired. For a book which lists specific insect pests it is strange that authors' names are not given for the specific names. Entomologists concerned with agriculture will find the book a useful reference and summary and perhaps also a teaching aid, but although the book is large, and hence very good value, its moderately high price will put it beyond the reach of many of the neediest workers in Third World countries where a book like this will be the greatest benefit.

R. A. JONES

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General. Contributions must be typed double-spaced on one side only on A4 paper with 3-cm margins either side to facilitate marking up. Layout should follow that of the *Journal*, but apart from underlining scientific names, no marks should be made to define typeface.

Two copies of typescripts and figures are required, the second copy can be a photocopy. Authors who have prepared their article on word processor are invited to supply a disk also.

Nomenclature. Use the most up-to-date nomenclature available. After first use of a specific Latin name give the author's name; use parentheses only if required according to the rules of nomenclature. This should apply not only to insect names, but also to the names of plants, non-insect invertebrates and other animals.

Figures and tables. Line figures and half-tones are accepted. Size of lettering, thickness of lines and density of shading, stippling and hatching must take into account likely reduction in size to fit appropriately into the journal page size. Illustrations must be of good quality, however lettering can be typeset if necessary; indicate requirements on a duplicate figure. Colour illustrations may be available, please contact the Editor. Tables should be prepared on separate sheets; avoid vertical rules, use horizontal rules sparingly.

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- Allan, P. B. M. 1947. *A moth-hunter's gossip*. 2nd edn, Watkins and Doncaster, London, p. 149.
- Baker, P. 1994. The modified status of *Strymonidia w-album* (Knoch) (Lepidoptera: Lycaenidae) in north west Surrey. *Br. J. Ent. Nat. Hist.* 7: 25–26.
- Jones, R. A. 1994. [Bilobed inflorescences of *Plantago lanceolata* L. Exhibit at BEHNS Annual Exhibition 1993.] *Br. J. Ent. Nat. Hist.* 7: 179.
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- West, B. K. 1994. The time of appearance of *Lancanobia oleracea* L. (Lep.:Noctuidae) in the British Isles. *Entomologist's Rec. J. Var.* 106: 81–84.

Offprints. Authors of main articles qualify for 25 free offprints taken directly from the *Journal*. These may contain extraneous matter such as short communications or book reviews used as 'fillers'. Extra copies must be ordered when proofs are returned.

ANNOUNCEMENT

Public liability insurance.—It has come to the notice of the Society that some organizations issuing permits to enter their land to study insects are now asking that all those issued with such a permit should have public liability insurance, typically for two million pounds cover.

This may at first sight seem a somewhat daunting requirement. The Society has consulted its insurance brokers and it emerges that many members who have household insurance may already have public liability insurance included. It is suggested that if in doubt the policy document should be consulted. We discovered however that for a nominal sum the Society could extend its own public liability insurance to cover members of the Society while engaged on entomological pursuits. We have taken this option and are pleased to inform all members that they now have public liability cover of two million pounds while engaged on their own field work, research and entomological study in addition to such activities arranged by the Society. Typically this would give cover against claims by third parties for injury caused in the course of such pursuits. A copy of the schedule to the policy is available for inspection at Dinton Pastures.—A. J. PICKLES, Hon. Treasurer, 2a Park Avenue, Lympington, Hampshire SO41 9GX.

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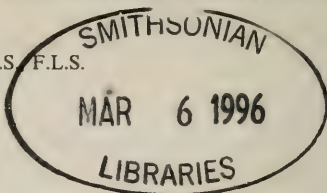


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Cover illustration: Globular water beetle, *Hyphydrus ovatus* (L.). Photo: Robin Williams.

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**PANOQUINA PANOQUINOIDES EUGEON SKINNER
(LEPIDOPTERA: HESPERIDAE) FROM THE WINDWARD
ISLANDS, LESSER ANTILLES**

DAVID CORKE

*Department of Environmental Sciences, University of East London, Romford Road,
London E15 4LZ*.*

Panoquina panoquinoides panoquinoides Skinner (1891) is widespread in the southern part of the USA and the northern West Indies but is usually restricted to coastal habitats (Spencer Smith *et al.*, 1994). The subspecies *P.p.eugeon* (Godman & Salvin, 1896) seems to be unique to the Windward Islands but it is not known to which subspecies the population that inhabits Trinidad (Riley, 1975) belongs. It is presumably the nominate form, as on the mainland of South America. Barcant (1970), in a monograph of Trinidad butterflies, does not list the species at all and nor is Trinidad listed as a locality by Spencer Smith *et al.* (1994).

DISTRIBUTION RECORDS

P.p.eugeon was described from specimens collected on Union Island, Grenadines and Granville & St George's parishes in Grenada (Godman & Salvin, 1896). Spencer Smith *et al.* (1994) give records from the following Grenadine Islands: Bequia, Caille, Mayreau and Palm.

My own investigations on St Lucia (April 1983, June/July 1986, May/June 1989) and St Vincent (May 1989) were incidental to a survey of reptile populations and the preparation of conservation management plans for endangered reptile species (Corke, 1987, 1992). St Lucia has an excellent guide book to its butterflies (Hunt & Mitchell, 1979) and with one exception I saw no species in St Lucia that were not included in that guide and in the habitat types already associated with the species. The sole exception was a small brown hesperid which was quite common on the halophytic grassland just above the beach on Maria Major island at the extreme southern tip of St Lucia (see fig. 1). I could not identify these specimens beyond the level of genus using Riley (1975) [*P.p.eugeon* is not figured]. The find was announced as a new species for St Lucia (but not identified) in Geoghegan & Renard (1985). Specimens were seen on the Maria Islands on each of my three visits in the 1980s.

The same species was found in very similar conditions at Milligan Cay off the extreme south of St Vincent in May 1989. My work on reptiles tended to pay especial attention to small islets, so there is no reason to suppose that *P.p.eugeon* will not be found on the coastal mainland of St Lucia & St Vincent.

With the publication of Spencer Smith *et al.* (1994) the identification problem was resolved. The specimen from Maria Major (April, 1983) in Fig. 2 is quite clearly *P.p.eugeon*.

Figure 3 summarizes the known distribution of the two subspecies of *P.panoquinoides* in the Lesser Antilles. It is likely that the species will be discovered on most of the islands north of St Lucia but where the transition from *P.p.eugeon* to *P.p.panoquinoides* will occur is pure conjecture.

LARVAL FOODPLANTS

The larva of *P.p.eugeon* is unknown and thus its likely foodplants can only be guessed at by what is known for other subspecies. *P.p.panoquinoides* on Jamaica were

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Fig. 1. Maria Major Island, St Lucia, seen from the north. The coastal grassland on the leeward side of the island is the only habitat for *P.p.eugeon*. [photo: David Corke]



Fig. 2. The first specimen of *P.p.eugeon* collected (in 1983) from the Maria Islands, St Lucia. Scale lines 1 mm intervals. [Photo: David Corke]



Fig. 3. Map of the Lesser Antilles showing islands and island banks (from Lazell, 1972) and the known distribution of *Panoquina panoquinoides panoquinoides* (p) in the Leeward Islands and of *Panoquina panoquinoides eugeon* (e) in the Windward Islands.

reared on *Cynodon dactylon* although the eggs were found on *Mimosa pudica* (Brown & Heineman, 1972). *P.p.errans* from California feeds also on *C. dactylon* and also on *Sporobolus virginicus* (Comstock, 1930).

On the Maria Islands, which have been thoroughly surveyed botanically (Fournet, 1982), *Sporobolus virginicus* and *S. cf.jacquemontii* occur as does a species of *Mimosa* (cf. *camporum*) but *Cynodon* is absent.

FLIGHT TIMES

The type specimens of the species were captured in October (Godman & Salvin, 1896). I saw adults flying in all months from April to July. As with many tropical species, *P.p.eugeon* may fly throughout the year.

IS *P.P.EUGEON* A GOOD SPECIES?

The taxon was originally named as a full species (*Prenes eugeon* Godman & Salvin, 1896). Riley (1975) says "It could well be a distinct species". Spencer Smith *et al.* (1994) consider that description of the larva is necessary before assessing this suggestion. Certainly the adults are quite distinct in terms of wing pattern.

Entomologists holidaying in the islands of the Lesser Antilles could help greatly with further distribution records and studies of egg-laying and larval morphology. Only then will the question of specific status be resolved.

SUMMARY

The skipper butterfly *Panoquina panoquinoides eugeon* (Godman & Salvin, 1896) is reported, for the first time, from St Lucia and St Vincent. In both cases the species was inhabiting a tiny island close inshore to the main island.

The known distribution of the subspecies in the Windward Islands, to which the taxon is probably unique, is mapped.

The possibility that the taxon merits specific status is discussed.

ACKNOWLEDGEMENTS

I am extremely grateful to the staff of the St Lucia National Trust (Robert Devaux) and of CANARI (Yves Renard) for helping my work on St Lucia in many practical ways. On St Vincent Brian Johnson and his staff at the St Vincent & Grenadines Division of Forestry were exceptionally helpful. Financial assistance was provided by WWSF (USA), the Herpetological Conservation Trust (UK), the Vincent Wildlife Trust (UK) and British Airways.

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THE EFFECTS OF CATTLE POACHING ON INSECTS LIVING AT THE MARGIN OF THE RIVER ITCHEN, HAMPSHIRE

C. MARTIN DRAKE

English Nature, Northminster House, Peterborough PE1 1UA.

An important factor affecting the entomological interest of stream and river margins is the amount of disturbance to the banks. Streams with a natural flow regime are subjected to annual disturbance by high flows, resulting in regularly regraded shores and eroding banks. This disturbance has been much reduced as a result of bank reinforcement and flood alleviation work. One mechanism that can partially replace the natural process is trampling (poaching) by cattle. Trampling promotes a diverse fauna at the margins of ponds and ditches on soft substrates (Biggs *et al.*, 1994; Dolman, 1993; Drake, in press). However, it is also known that trampling harms the specialized beetle fauna of the shoals of stony rivers and the bare shores of rivers draining catchments on rocky substrates (Lott, 1992). Between these two extremes of still waters on soft sediments and rivers on hard rocks, there is presumably a change in best management practice for insects of the margins. For instance, it is uncertain what the best recommendation is for chalk streams.

A brief survey was undertaken to see whether there was an obvious answer to this problem. The reasons for looking at chalk streams is that fishing syndicates blame cattle trampling for damaging salmonid fishing (Summers, 1994), but it is likely that low flows of the recent droughts are more culpable than a change in the response of the rivers to disturbance by cattle. Several chalk streams, including the River Itchen, are currently being notified as Sites of Special Scientific Interest so the information will be useful when advising on conservation management.

SITES AND METHODS

Six sites along the River Itchen were selected to include banks with and without cattle access. They were visited on 8 and 9 July 1994. Full details of the sites are given in Drake (1995). Briefly, they were four stations at the Itchen County Park (grid reference 41/4617), four stations at Twyford Moors near Colden Common (41/4722), two stations at Winnall Moors SSSI (41/4830 and 41/4930), one station at each of Itchen Stoke (41/5432) and Ovington Mill (41/5631), and three stations on the Candover Stream, a tributary of the Itchen near Abbotstone (41/5634).

Insects were sampled at the water margin using a sweep net, supplemented by direct capture using a pooter. Although a wide range of taxa was taken, only flies, caddis and dragonflies were identified in all samples. Occasional beetles, bugs, crickets and stoneflies were identified.

Species were allocated to simple habitat groups based on their known biology. The categories were streams, ponds, water margins, fen and other wet places but not necessarily the water edge, grassland and woodland. The habitat of some species was unknown and others were "tourists" in the river margin context, although they may have been specific to other habitats such as heathlands.

RESULTS

Two hundred and forty species were identified, dominated by 210 flies. Craneflies (Tipuloidea) were not kept in their separate stations and were later identified by Alan Stubbs. A full species list is given in Drake (1995). Four red data book (RDB) species and 12 nationally scarce species were recorded (Table 1). One of these, the

scathophagid fly *Cosmetopus dentimanus*, was the second British record (Drake & Ball, in press). Nine of the nationally rare or scarce species are associated with water margins. These species were found most often on unfenced water margins although a few were also found along fenced sections. Another three species are found in fenland or wet grassland and one in grassland, and these were found mainly along fenced sections of stream-bank. None of the rare or scarce species was found with any great frequency. The southern damselfly *Coenagrion mercuriale* was present at three of the four sampling stations at Itchen County Park where it has a thriving colony (Mayo & Welstead, 1983, and subsequent observations) and the empid *Hilara woodi* was found at two stations at Twyford Moors and at the Candover Stream. Two craneflies normally found in carr woodland, *Limonia lucida* and *Pilaria fuscipennis*, may have strayed from their more typical habitat.

Some nationally uncommon species were frequently recorded. The sepsid *Themira superba* (Hal.), whose larvae probably feed in dung-enriched wet mud, was particularly common at most trampled sites but absent from fenced margins. *Parydra aquila* (Fallén), an ephydrid whose larvae probably live in shallow water or saturated margins, was also found mainly at trampled stations. Two dolichopodids had contrasting preferences, *Dolichopus campestris* Meig. being found only at fenced stations, whereas *Syntormon denticulatus* (Zett.), in common with most other dolichopodids, was present mainly at trampled sites. Several other frequently recorded species were probably no more frequent at trampled sites than at fenced ones: the hoverfly *Neoascia tenur* (Harris), the empids *Platypalpus pallidicornis* (Collin) and *Hilara obscura* Meig., the dolichopodid *Teuchophorus spinigerellus* (Zett.) and the scathophagid *Cleigastra apicalis* (Meig.). The location of capture of craneflies was not known so their association with fenced or unfenced margins could not be assessed. However, *Helius flavus* (Walk.), a species associated with emergent

Table 1. Nationally scarce (notable) and rare (red data book, RDB) species recorded from several sites along the Itchen valley. National statuses are defined in Ball (1994) and were obtained from Recorder (Ball, 1992); the prefix "p" indicates a provisional status. ICP—Itchen Country Park; TM—Twyford Moors; WM—Winnall Moors; IS—Itchen Stoke; OM—Ovington Mill; CS—Candover Stream.

		Status	ICP	TM	WM	IS	OM	CS
ODONATA								
Coenagiidae	<i>Coenagrion mercuriale</i> (Charp.)	RDB3	*					
DIPTERA								
Tipulidae	<i>Limonia lucida</i> (de Meijere)	Notable						*
	<i>Pilaria fuscipennis</i> (Meig.)	Notable		*				
	<i>Cheilotrichia imbuta</i> (Meig.)	Notable		*				
Stratiomyidae	<i>Beris fuscipes</i> Meig.	Notable						*
	<i>Oxycera morrissii</i> Curt.	Notable				*		
	<i>Vanoyia tenuicornis</i> (Macq.)	Notable	*					
Hybotidae	<i>Platypalpus infectus</i> (Collin)	pRDB3			*			
	<i>Syneches muscarius</i> (F.)	pRDB2			*			
Empididae	<i>Hilara woodi</i> Collin	Notable		*				*
Dolichopodidae	<i>Hercostomus plagiatus</i> (Loew)	Notable						*
	<i>Campsicnemus pectinulatus</i> Loew	Notable	*	*				
Syrphidae	<i>Neoascia geniculata</i> (Meig.)	Notable		*	*			
Lauxanidae	<i>Sapromyza opaca</i> Becker	Notable		*				
Chloropidae	<i>Elachiptera pubescens</i> (Thalh.)	Notable	*					
Scathophagidae	<i>Cosmetopus dentimanus</i> (Zett.)	RDB1		*				

Table 2. The mean percentage ($\pm 95\%$ confidence limits) of species in four habitat groups at fenced and unfenced margins. n = number of stations.

	Number of species	Unfenced ($n=10$)	Fenced ($n=4$)
Water edge species	80	51.3 \pm 7.3	36.8 \pm 9.9
Fen species	33	14.8 \pm 3.9	17.5 \pm 7.4
Grassland species	36	20.0 \pm 3.7	24.3 \pm 8.3
Tourists	22	9.5 \pm 5.0	12.5 \pm 6.7

plants, was widespread, showing that its habitat was not eliminated by grazing, for example at the Candover stream which had a broad fringe dominated by yellow iris *Iris pseudacorus* L. and reed canary grass *Phalaris arundinacea* L.

There were differences in the frequency of occurrence of some common species between fenced and unfenced stretches. Water-margin species that were most often found on trampled margins were the saldid bug *Saldula saltatoria* (L.), a predatory species that hunts over bare mud, the empid *Clinocera stagnalis* (Hal.) whose larvae probably develop on saturated margins or in shallow water and whose adults sit about on muddy margins, the dolichopodid *Syntormon pallipes* (F.), the ephydrid *Scatella paludum* (Meig.) whose larvae develop in saturated mud and whose adults abound on its surface, the muscid *Lispe tentaculata* (Deg.) whose adults hunt on bare mud, the sepsid *Themira minor* (Hal.) and the scathophagid *Norellisoma spinimanum* (Fallén). The only species in this water-margin group that was obviously more frequent at fenced sites was *Anthomyza collini* Andersson, which is an anthomyzid inquiline of galls of other Diptera in tall emergent plants such as common reed *Phragmites australis* (Cav.) Trin., so it is not surprising that this species was not favoured by grazing. The craneflies *Erioptera fusculentata* Edw., *E. fuscipennis* Meig. and *E. trivialis* Meig. are usually abundant at sites with bare mud (A. Stubbs, pers. comm.) and were numerous at trampled sites including Candover Stream and Itchen Country Park. They were absent from Itchen Stoke where there was limited bare mud, but instead bare chalk where the bank was grazed.

Among the grassland species that showed clear differences in occurrence between fenced and unfenced sites were the sepsids *Sepsis cynipsea* (L.) and *S. orthocnemis* Frey, and the scathophagid *Scathophaga stercoraria* (L.), which all develop in cattle dung, and the soldierfly *Chloromyia formosa* (Scop.) whose larva is a detritivore in grassland; all were more frequent where stock had access. Species that were more abundant at fenced sites were the opomyzid *Opomyza petrei* Mesnil and perhaps also the chloropid *Cetema neglecta* Tonnoir, both of which have grass-mining larvae.

In general, most of the common species were not obviously distributed differently between fenced and unfenced sites, even though their biology suggests that they might prefer one type to the other. However, casual observations made while collecting the samples suggested that some grassland species were more numerous in the taller vegetation by fenced margins, and that some water-margin species were particularly abundant at trampled sites, even though a few individuals were also found at fenced sites.

Because sampling effort was uneven, the numbers of species in each of the habitat groups was expressed as a percentage of the total recorded, and these were compared between fenced and unfenced margins. Most groups were represented by too few species to show any real differences, but species of water edge, fen and grassland, and tourists were numerous (Table 2). The sample from Ovington Mill was excluded because the site was atypical, being next to scrubby, ungrazed fen. Although none of the mean values were significantly different, there was a notably larger percentage of

water-edge species along unfenced margins than along fenced margins. There was a similarly large, although non-significant, difference in the percentage of uncommon and scarce water-edge species alone between unfenced and fenced margins ($17.4 \pm 7.6\%$ and $11.0 \pm 12.1\%$, respectively). The percentages of fenland and grassland species were much the same for both groups of sites.

DISCUSSION

The survey showed that the river-edge fauna contained some nationally rare or scarce species. Most of these were found on unfenced margins where cattle had trampled the edges and partially grazed the taller vegetation. Unfenced margins also supported a slightly greater proportion of water-margin species, both common and uncommon, than did unfenced edges. Few species of note seemed to be more frequent at fenced sites and none was apparently confined to these.

Mild trampling helps to restore some of physical diversity lost through flood defence work and other modifications made to improve conditions for salmonid fishing. If the river was allowed to develop a natural pool and riffle structure, there would be plenty of areas of bare silt left by normal deposition processes, and perhaps areas of sparse vegetation suppressed by annual inundation. These features would be interspersed with margins dominated by tall vegetation, forming a linear matrix where each species would be able to find its niche. Fast-flowing water and a clean, silt-free bottom, suitable for fish and aquatic invertebrates that require these conditions, would also be present. In the absence of a natural flow regime, allowing stock access to parts of the banks replaces this natural variation, at least in the structure of the bank where much of the invertebrate interest of these rivers lies. It is not suggested that the whole length of the river should be subjected to trampling or that it should be heavy and damaging, as undoubtedly it is along some stretches of this river. Only one station in this survey had been damaged by trampling (at Ithen Country Park) and all the others had a more diverse physical structure as a result of the cattle's activity. Low-intensity grazing along, say, half of the river's length would achieve the desired result.

The tentative conclusion that lightly cattle-trampled margins are superior habitat to fenced margins for river-edge species needs to be tested more rigorously using a wider selection of lowland rivers and invertebrate groups.

ACKNOWLEDGEMENTS

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LETTER TO THE EDITOR

County names.—I was interested to read the editorial on county names (*Br. J. Ent. Nat. Hist.* 1995; 8: 27–32). For over 30 years I have kept all my records of insects on 5" × 3" filing cards (over 50 000 of them by now!) and have always filed them in drawers under the vice-county names. I take no notice of the modern administrative county names as they cover too big an area. It is almost useless to have a record simply listed as "Gwynedd" when this county stretches for 100 miles from N. Anglesey to S. Merioneth.

Referring to Gwynedd, which includes Anglesey, Caernarfonshire and Merioneth, I am puzzled by the omission of this name from the list when Clwyd, which covers Denbighshire and Flintshire in North Wales (not "several" former counties) is included. Also baffling is the reference to Caernarfonshire as the mainland part of VC 49; this vice-county is *only* mainland, apart from Bardsey Island at the tip of the Llyn Peninsula, and one or two tiny little islets. The reference at this point to Anglesey is confusing; while it is now included in Gwynedd, it was never part of Caernarfonshire.

One of the name problems I have found, especially in the older journals, is the use of "Caernarfon" (or "Caernarvon"), "Flint" and "Denbigh" where it is not at all clear from the context whether the reference is to the town of Flint or the county of Flintshire. To avoid this confusion I always abbreviate the counties as Caerns., Flints. and Denbs., which makes it quite clear that one is not referring to the county towns. The terminal s is used in this way in, for example, the abbreviation of Bedfordshire so as not to confuse it with the town of Bedford. Of course this confusion would not arise if grid references and more details were added, but they are not always provided.—JOAN MORGAN, School of Biological Sciences, University of Wales, Bangor, Gwynedd LL57 2UW.

Reply by the Editor.—My thanks to Joan Morgan for her astute observations. Of course, Gwynedd should have been in the list of names, but luckily is short enough not to warrant any abbreviation. Hopefully references to Denbigh and Caernarfon (or Caernarvon) will always signify the towns, while Denb. and Caer. the vice-counties. However, the possible confusion over Flintshire would be solved by accepting Flints. as the vice-county abbreviation. Buck's original list was only of "suggested abbreviations" and this is all I can claim for my revision. Although I hope the list can form a basis for conserving space in the journal, it must to some extent remain up to individual authors to try and avoid needless confusion between similar sounding place names.—RICHARD A. JONES, 13 Bellwood Road, Nunhead, London SE15 3DE.

BENHS WORKSHOP

8 April 1995, The National Network for Recording Britain's Moths: the way forward

The accompanying photograph shows some of those who attended the penultimate workshop of the BENHS 1994/5 season at Dinton Pastures. On this occasion the subject was the National Network for Recording Britain's Moths. The workshop consisted of an introductory session explaining how the network was set up and operates, the importance of county recorders, other sources of information and some of the products of the network to date, including a draft atlas of Britain's rarer macros. A range of nationally scarce species were discussed for which members, together with local branches of Butterfly Conservation and other moth groups, could help develop our knowledge of their distribution and habits. Techniques for finding these moths were demonstrated. In the afternoon there were several sessions demonstrating computer databases and their advantages in sorting data and plotting maps. This included a problem-solving session for more experienced users. In parallel there were informal presentations and discussion groups by several county moth recorders and Butterfly Conservation officers dealing with their work and ways of developing moth recording in the future.

Council would like to thank all leaders of this year's workshops, all members who attended and Ian McLean, Indoor Meetings Secretary, for putting together such an interesting and wide-ranging programme and ensuring that the workshops have run smoothly on the day.



BENHS workshop, 8 April 1995. Left to right, standing: G. Collins, G. Revill, J. Clarke, D. Coleman, I. Rutherford, S. Jeffcoate, P. Winter, R. Barnett, M. New, M. Albertini, —, —, R. Soutar, S. Lucas, P. Fleming; front: G. Jeffcoate, S. Carson, R. Kendrick, A. Pym, I. Sims, P. Waring.

A CORRECTION TO BUTTERFLY CONSERVATION'S CLAIMED ATTITUDES IN INVERTEBRATE CONSERVATION

ALAN E. STUBBS

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On 12 May 1992 BENHS held a discussion meeting to consider invertebrate conservation in the United Kingdom (Miles, 1995). The meeting covered a lot of ground and was clearly a valuable occasion for views to be expressed. In the published report there are a number of statements about the attitudes of Butterfly Conservation which misrepresent its position, most certainly in today's context. As one who has been closely involved with both societies, particularly so with the issues raised, the National Conservation Officer has asked me to reply.

BUTTERFLY CONSERVATION AS A SOCIETY

Under its former public name of British Butterfly Conservation Society, it began over 25 years ago in a small way, reflecting the attitudes of those who founded the society. The constitutional motives were laudable but there was an image problem in some quarters. Nonetheless, worthwhile advance was made and the Society grew, attracting in some of the entomologists with good expertise who were keen to see the society adapt to the challenges ahead.

Few outside Butterfly Conservation will be fully aware of just how profound a change has taken place. A Director was appointed with office support and a membership drive trebled the membership to 10 000 in three years. That post has not been refilled; instead emphasis has been focused on building up a team of professional conservation staff. Thus in very recent years, there has been the appointment of a National Conservation Officer, Martin Warren (a leading butterfly conservation researcher), an Assistant Conservation Officer, Paul Kirkland (with much experience in site management and formerly with Cumbria Wildlife Trust) and a Projects Officer, Linda Barnett (a moth specialist who is drawing up action plans for 25 butterflies and national and regional action plans for butterflies as a whole). These three are based in the Society's Dorset office. In addition, Paul Waring is working half-time on the national review of scarce macro moths, via a contract with the society from the Joint Nature Conservation Committee.

There is a great deal of other expertise that the society can draw on, including professional researchers and some quite remarkable amateur research specialists. There are now 26 branches of the society in the UK effecting local action, some with considerable expertise, others still developing. Until the national action plan is in place in about three years time there will be some variation in priorities. It would take many pages to spell out all that the society is doing, such as being the lead society for a new butterfly atlas in the closing years of the century, called the Millennium Project.

The society has an executive committee that attends to the business end of things. There are other committees for the advancement of various functions. These include the conservation committee to whom the scientific staff are directly responsible. All policies concerned with entomological conservation are the province of this committee, with a membership of wide expertise. I am on that committee and see my role as ensuring that the wider context of policies is evaluated.

It is important to add two points. Firstly, the constitution of Butterfly Conservation embraces 'Lepidoptera', and the direct promotion of moth conservation is now

being advanced vigorously at both national and branch levels. The conservation of fauna and flora as a whole is allowed for but the emphasis is on the Lepidoptera. Secondly, the society is now accepted as belonging to the ranks of leading conservation agencies, for instance being a full partner in the authorship of *Biodiversity challenge*, a review document setting out targets for conservation, and largely accepted by government within the framework for conservation over the next ten years (the other partners were FoE, PlantLife, RSPB, Wildlife Trusts and WWF). Thus Butterfly Conservation has gone well beyond its original butterfly role. In the case of *Biodiversity challenge*, the opportunity to ensure the needs of all invertebrates were taken into account was covered by deploying a member with wide invertebrate conservation experience, in this case, myself.

BUTTERFLY CONSERVATION'S ATTITUDE TO COLLECTING

A society whose purpose is conservation either picks up the image that it is against all collecting or it is accused of hypocrisy if its members are collecting. With 10 000 members, most of whom joined because they like to see butterflies alive, those who collect are in the minority.

In the paper published by BENHS, both the opening address and the discussion sessions expressed concern about the anti-collecting attitude of Butterfly Conservation. That is understandable, indeed it would be far more worrying if the accusation was one of the hypocrisy of unnecessary collecting.

Everyone knows collecting is a fraught issue and that it is impossible to please all the people all the time. Butterfly Conservation has been addressing this issue to determine where, within its membership, the boundaries should come. The conservation committee has devised a policy, which should be published shortly, and if it is seen as closely resembling the stance that you know I have been favouring over the years, then I admit to being the person who drafted the text.

The Butterfly Conservation guidelines closely follow the JCCBI code on collecting, which all leading entomological societies have endorsed. That code asks for restraint with regard to scarce species, and advises there should be no collecting at all with regard to the most vulnerable species. The justification for taking moths for identification and vouchers is upheld, as indeed are such purposes within invertebrates as a whole. The society is somewhat tougher in that it cannot endorse the collecting of butterflies for collecting's sake and effectively has a hands off policy with all the rare and scarce species, including scarce races etc. The guidelines do, however, allow for some flexibility with common species, in particular the finding and keeping of a few caterpillars to learn about their life history. There is room for openness for those with special needs.

The membership will be asked to accept these guidelines. The predominant anti-collecting members have to see the justification for taking and killing insects. Those in favour of some flexibility have to know that their reasonable needs, which are necessary to support the conservation efforts via survey and study, are understood and accepted within the society.

Hopefully other entomological societies will feel comfortable with a fellow society adopting the needs and purpose of these guidelines. The one point that Butterfly Conservation has to be tougher on is butterfly collecting, which is anathema these days in so many conservation circles. I led a BENHS discussion meeting on this topic (Stubbs, 1982) which concluded that there was no general justification that would hold the respect of the conservation movement. Anyone with particular needs ought to discuss these openly with local conservation bodies and site owners.

WOULD BUTTERFLY CONSERVATION PROMOTE THE CONSERVATION OF A SITE CONTAINING NO INTERESTING BUTTERFLIES?

This was question 11 of the opening address by Stephen Miles. It will be evident from the above account that about 2400 species of moths come directly within the society's ambit, and macro-moths are already getting serious treatment. When deciding on the case for making a Butterfly Conservation reserve, or in the management or defence of a site, all invertebrates are taken into account, indeed the society welcomes collaboration with other specialists. However, the constitution and resources of the society require it to concentrate on the Lepidoptera. Most sites have some potential for Lepidoptera, and it is always helpful to have real bullets to fire. More generally, the society sees its remit as including support of the wider efforts to ensure a future for habitats of importance for plants and animals. This was the case with *Biodiversity challenge* and will no doubt increasingly be the case on many site-related issues.

BUTTERFLY CONSERVATION AND ITS WIDER ROLE

As expressed in Stephen Miles's report, 'a major concern of the meeting was that Butterfly Conservation could take over as the main conservation organization for invertebrates, as it is keen to take on a wider role'. Part of that concern was that 'it might set the agenda for the issue of butterfly collecting'. The commentary continued 'Butterfly Conservation is viewed as a large society of non-specialists, as is the RSPB, however, that organization is very successful'.

Well, it is for others to take their view based on what they see and hear of Butterfly Conservation. The points not already covered need to be put in perspective.

We all want entomologists to be better understood and the needs of entomologists, and the future of invertebrates, to be taken seriously in all the quarters that matter. There are two ways in which this can be accomplished. There is personal responsibility, to get involved with the conservation bodies and to utilize one's expertise to good effect. There is also corporate responsibility through the entomological societies to which we belong, including our influence on non-entomological societies and the official arms of local and central government, including the wildlife agencies (these issues were addressed in Stubbs, 1982).

What is the track record over the last 25 years? The three leading national entomological societies have made little headway on the ground in influencing conservation until recently. All credit to the Amateur Entomologists' Society for at least having a conservation group and for publishing its well-received book on insect conservation (Fry & Lonsdale, 1991). BENHS has only just begun a conservation group. The Royal Entomological Society has tended to duck potentially controversial conservation issues. As a member of all three, and as such part of that blame could rest on me, the memberships have not shown a strong desire to roll up their shirt sleeves and take action for conservation. The Joint Committee for the Conservation of British Invertebrates (JCCBI), of which I was a founder member and one-time representative of BENHS, has hardly been a driving force for joint action by the societies, except with regard to codes, and it is now trying to re-vamp itself after a near-death experience. The Nature Conservancy Council did much behind the scenes to get entomology onto a serious footing, and over 2000 people have submitted information to the Invertebrate Site Register which has had an immense impact on site evaluation, management and defence. The ISR continues to run and after a lot of pressure, all four subsequent agencies have entomological

specialists, but they have not got the capacity to get involved on the ground in all the local issues that concern, or should concern us. When entomologists want action, they must take action.

If Butterfly Conservation emerges as the largest voluntary entomological organization, with a conservation constitution and professional entomological staff, and a national network of branches to co-ordinate and effect local action, is one to applaud or say how dreadful this day has become? In the real world, Butterfly Conservation is in the strongest position to take forward a coherent national action plan for Lepidoptera, indeed is already doing so, but this can only be fully effective if lepidopterists as a whole give their support to this venture. It is not a question of Butterfly Conservation taking over, for there has been little that other societies have done to take over. For instance at Wildlife Link in the last year or so, it is Butterfly Conservation representatives (as full members) that have been covering for invertebrates in the absence of a JCCBI representative for other societies. If Butterfly Conservation is invited into partnership with other leading conservation societies, as with *Biodiversity challenge*, this can only be to the wider good of increasing the profile and acceptability of the entomological cause; indeed all societies were invited to be part of the action through their names being up front as endorsing the document.

Hopefully other societies will be encouraged that it is possible to generate a large membership, and resources to take action, when conservation is given a high profile. Butterfly Conservation is not trying to take over but it is, for the present, finding itself in a position of opportunity to provide some cover whilst other societies develop their conservation groups. Butterfly Conservation has no current intention of becoming an all-invertebrates society, the Lepidoptera needing plenty of attention. In the longer term who can say, but all societies should even now be working more closely together in order to draw upon their strengths and cover for each other over any weakness, since the conservation battle does not wait for ideal structures.

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ANNOUNCEMENT

A National Pyralid Recording Scheme has recently been launched. The first newsletter, which contains full details of how to contribute to the scheme, is available from Tony Davis, The Rangers House, Cricket Hill Lane, Yateley, Camberley, Surrey, GU17 7BB. An SAE would be appreciated.

OBITUARY

BASIL JOSEPH MACNULTY Ph.D., B.Sc., F.R.I.C., F.R.E.S.

Basil MacNulty died suddenly on 12th April 1994 at his home in Rhossili, on the Gower Peninsula. He was born on 14th June 1915 and spent his early childhood in Leighton Buzzard. When he was ten the family moved to Wimbledon where he later attended Wimbledon College before going on to London University. Basil read chemistry and remained there until 1939 taking his Ph.D. and teaching. Shortly before the outbreak of war he joined the War Office, working in research and development of explosives, initially at Woolwich and later in South Wales when the establishment was evacuated from London.

It was while involved in this war work that Basil met and married his wife Dodo as well as developing his abiding love for the Gower Peninsula. After the war his career with the Ministry caused him to be posted at different times to The Woolwich Arsenal, Runcorn in Cheshire and Waltham Abbey where the family lived for 19 years, but perhaps the posting of most interest to him, certainly entomologically, was to Nigeria between 1952 and 1958. Here he worked in the Tropical Testing Establishment and was able to make an extensive collection of West African insects, especially Lepidoptera and Coleoptera. He was later to publish much material based on this period.

Basil's interest in insects had begun, as for so many of us, at a very early age, with the pursuit of butterflies, and there are family stories of his early collecting from the age of six. During the period that he lived in Waltham Abbey he had started collecting beetles as well as Lepidoptera and this added interest was to flourish. During the time he spent in London he worked the Home Counties extensively with, the then revolutionary, M.V. light and was rewarded on 13th June 1952 at Worth Forest with one of the very few *Lithacodia deceptor* Scop. ever taken.

Basil, who was an honorary member of our Society, first joined in 1931 and was prominent in our affairs for many years. He was a long-serving member of Council



Basil MacNulty, 1915–1994.

acting as Secretary between 1961 and 1968 and then as President in 1970. He will be especially well known to the majority of our members for his work over many years in organizing the annual dinner, and to those stalwarts who regularly attend for the introduction, after a long campaign, of the toast to "the founding fathers". This annual toast won against the prevailing tradition of no speeches will surely continue as an affectionate tribute to Basil. Over the years that Basil stood up to propose this toast it developed its own traditions with a feigned reluctance to rise, and the annual retelling of the story of the search for knotgrass by two of our founders.

Basil, was also a long-standing fellow of the Royal Entomological Society which he joined in 1957, and a keen supporter of the Amateur Entomologists' Society. Basil had two retirements, from his Ministry of Defence career in the mid-seventies when he moved on to research at Leeds University, and finally in 1983. Basil was able to join his wife in the house at Rhossili which they had bought in 1974 and assist her with running her guest-house.

He worked here on a list of the moths of the Gower as well as devoting much time to the, as yet unpublished, volume of *The moths and butterflies of Britain and Ireland* on geometers, drafting sections on Sterrhinae and Ennominae. Basil was keenly interested in the structure of pupae of Lepidoptera and encouraged his friends to let him have the exuviae of species they were breeding. Again his work on this area remained unpublished at his death. His presidential address to our Society was on the little-studied association of mites with insects. Amongst the numerous articles and notes which he contributed to the entomological press over the years may be mentioned in particular the series "Outline life histories of some West African Lepidoptera" which was published between 1966 and 1970 in our "Proceedings and Transactions" as then was, and a series published in the *Bulletin of the Amateur Entomologist's Society* entitled "So you want to study beetles".

All his notes and unfinished entomological research were passed to the National Museum of Wales together with the British part of his collection which numbered some twenty thousand specimens of Lepidoptera and beetles. The West African collections went to the Natural History Museum at South Kensington and contained 6000 specimens and much biological information.

Basil was a gregarious man with a love of good food and wine as well as company and could usually be found at the annual social gatherings of our society and its sisters deep in conversation. I well remember an occasion when my wife and I had been collecting with him on the Gower, a memorable night when we had watched phosphorescence on the sea, and carried generators nearly a mile over soft sand, returning to his home for him to open a bottle of Chateau Yquem at two in the morning!

Despite living so far from London, Basil kept involved with Society affairs to the end, always attending the Annual Exhibition and that of the AES as well as paying frequent visits to the Natural History Museum in connection with his research. He attended a Council Meeting to discuss dinner arrangements as recently as 1993. He did however feel somewhat cut off from other collectors and was always keen to go out collecting with those who visited him in Gower, confessing on the last such occasion I visited him that it was the first time that year that he had been out with the 'engine'.

Basil enjoyed a wide range of interests and was an accomplished actor and keen member of amateur dramatic societies in his younger days, on one occasion touring Ireland with a theatrical company. He wrote poetry and several plays for relaxation, one of which was produced in Croydon.

Basil was such a well known member of the entomological fraternity that he will long be remembered both for the work he performed and for his good fellowship and humour. We extend our sympathy to his family in their loss.

A. J. PICKLES



Plate II. ANNUAL EXHIBITION 1994

1994 ANNUAL EXHIBITION

Imperial College, London SW7—22 October 1994

The following account of exhibits has been compiled by R. D. G. Barrington (British butterflies), B. Elliot (British Macrolepidoptera), J. M. Chalmers-Hunt (British Microlepidoptera), B. Goater (Foreign Lepidoptera), P. J. Chandler (Diptera), P. J. Hodge (Coleoptera), R. A. Jones (Hemiptera), A. J. Halstead (Hymenoptera and other orders), and R. Dyke (illustrations). The photographs for the two colour plates were taken by D. E. Wilson and the cost of printing these plates was met by a grant from the Hammond Memorial Fund.

BRITISH BUTTERFLIES

BAILEY, K. E. J.—A bred series of what may prove to be a new aberration of *Eurodryas aurinia* Rott. in which the fulvous markings are darkened to deep red and the normally pale markings reduced to a grey colour. These characteristics are apparent on both surfaces. This form was first noticed in the pupal stage because those pupae that were to produce aberrations were 'black and white', lacking any orange markings at all. This makes it one of the very few recorded aberrations in Butterflies in which the gene/s involved affect the coloration of more than one stage in the life cycle (others have been found in *Pieris brassicae* L. and the American species *Colias philodoce* Godt.). The exhibitor is maintaining the stock to investigate the genetics.

Mr Bailey's experiments with temperature shocks on the pupae of butterflies has extended successfully now from the nymphalids to the smaller fritillaries. Included from the current year's work were a marvellous, almost entirely black, *Boloria selene* L. ab. *zeta* Mots. (Plate II, Fig. 7) and an extreme *B. euphrosyne* L. ab. *edna* Lobb with long silver streaks on the underside of the hindwings. These were produced by cold-shocking both late larvae and the new pupae. A series of *E. aurinia* ab. *sebaldu* Schultz were produced by cold-shock to the pupae only. Extreme, temperature-induced, forms of *Vanessa atalanta* L. ab. *klemsiewiczzi* Schille and *Ladoga camilla* L. ab. *nigrina* Weymer were also shown.

A series of variations of *Pararge aegeria* L. ab. *cockaynei* Goodson including several of a curious form having the third spot in the hindwing band enlarged and the rest absent or nearly so (in *cockaynei*, all the spots usually tend towards obsolescence).

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6	7 8
9	10 11
	12

PLATE II. ANNUAL EXHIBITION 1994

1: *Colias croceus*, male, ab. nov. bred Sawley, Hants, 9.x.1994, A. S. Harmer. 2: *Lycaena dispar* ab. *radiata*, bred 2nd brood, 1994, P. A. Standing. 3: *Pyronia tithonus* ab. *obsoletissima*, bred F₃, 1994, R. C. Dennis. 4: *Cynthia cardui* melanic, Uffington, Oxon, 7.viii.1994, E. W. Classey. 5: *Argynnis paphia* ab. *ocellata*, Hampshire, 1994, A. M. Jones. 6: *Ochlodes venata* ab. *fuscus*, Dorset, 15.vi.1994, P. Tebbutt. 7: *Boloria selene* ab. *zeta*, cold shock, bred 1994, K. E. J. Bailey. 8: *Eurodryas aurinia* ab. *virgata*, bred 1994, A. M. Jones. 9: *Polyommatus icarus* melanic, Isle of Skye, 27.vi.1993, W. G. Tremewan. 10: *Bittacomorpha clavipes*, Ontario, Canada, 8.viii.1994, A. E. Stubbs. 11: *Melanargia galathea*, Mt Venteux, Provence, France, 12.vii.1994, H. J. Elston. 12: *Pterostichus kugelanni*, Bicton Common, Woodbury, S. Devon, D. I. B. Hoare.

BARRINGTON, R. D. G.—Two forms of *Pararge aegeria* L. showing variation in the eye-spot size. A captured male ab. *parviocellata* Lempke had the hindwings spots almost entirely absent and a bred female ab. *schmidti* Dioz had them considerably enlarged. The latter was bred in the F₂ brood from an extreme female captured in Wiltshire in September 1993. Apart from the exhibited specimen only typical examples and minor forms were bred in both F₁ and F₂ broods. This would seem to be a multifactorial form.

Aberrations of *Lysandra coridon* Poda including males ab. *parallela* B. & L. and ab. *postdiscoelongata* B. & L. and females ab. *inaequalis* Cockayne, ab. *discreta* B. & L. and ab. *caeca* B. & L. A male *E. aurinia* ab. *virgata* Tutt and a bred aberration of *Aglais urticae* L. having the hindwing red band almost eliminated by dark scaling and with large blue lunules on all wings. This was the only aberration to emerge from a large brood reared under natural conditions.

BRITTON, M. R.—*Polyommatus icarus* Rott. and forms of *Aricia agestis* L. from Yorkshire.

CALLOW, M.—A female aberration of *Pararge aegeria* with enlarged areas of pale markings on the forewings (the same form as that illustrated on the Annual Exhibition plate for 1989 which has been shown to be controlled by a recessive gene). This specimen emerged in an F₂ generation of 81 insects from type stock. It was the only aberration in the brood.

Two male *Anthocharis cardamines* L. showing homoeosis, with thin streaks of underside hindwing coloration on the underside of one forewing. This is the most frequently recorded form of homoeosis in the species. Five specimens emerged from 300 pupae. Although homoeosis has been shown to be an inherited form in some other animals this has not yet been proved in butterflies. Attempts have been made to breed from homoeotic forms in both *Lycaena phlaeas* L. (up to the F₁ brood) and *Pieris brassicae* L. (up to the F₂), but no further aberrations were bred. It may yet be shown to have a heritable basis or it may occur due to a genetic imbalance between the parents. A bred *Strymonidia pruni* L. with a streak of orange on the underside of the right forewing. This had the appearance of a homoeotic form but was more likely to be an instance of uneven development of the pattern. A captured *Argynnis paphia* L. ab. *confluens* Spuler.

CLASSEY, E. W.—An aberration of *Cynthia cardui* L. taken at Uffington, 7.viii.1994 in which the outer third of the forewings was predominantly black (Plate II, Fig. 4).

DENNIS, R. C.—Specimens from an F₃ generation of *Pyronia tithonus* L. ab. *caeca* Tutt. Details of the first two broods were given in the report of exhibits for the 1993 Annual Exhibition. The parents for the F₃ lacked the double white pupils of the apical spots and had the hindwing spots obsolete. The F₃ included a male of the very rare *obsoletissima* Leeds with the forewing eyespot absent on one side and represented by just a pin-prick on the other. There are very few recorded examples of this form (Plate II, Fig. 3).

Some bred aberrations of *Anthocharis cardamines* L. from the collection of the late Reg Griffiths. This included two fine gynandrous examples, one a mainly female insect with a streak of male apical orange on each forewing, the other almost halved but with some female coloration in the apical area of the male side.

FENSOME, B.—Two male *Polyommatus icarus* Rott ab. *livida* Gillmer with grey uppersides but typical undersides bred from ab. *radiata* Courv. stock, and a selection of bred ab. *radiata* forms. A wild captured male showing *radiata* on the hindwings and a good male *radiata* on all wings from S. Lincs.

A captured male *Lysandra coridon* Poda ab. *striata* B. & L., a pale male *Lycaena phlaeas* L. ab. *cuprinus* Peyer taken in May 1994 and a curious *Pararge aegeria* L. with all markings darkened and indistinct, captured in Bedfordshire, March 1994.

HARMER, A. S.—A female *Thymelicus acteon* L. ab. *alba* Bolton taken in Dorset, August 1994 which was used for breeding, and a male ab. *virescens* Tutt from the same locality.

Three remarkable male examples of *Colias croceus* Geoff. showing a complete absence of yellow and pink pigmentation (Plate II, Fig. 1). The result is that the ground-colour of the uppersides is creamy white on the forewings and yellow-grey (similar to f. *helice* Hübn.) on the hindwings. The black borders are normal. On the underside forewings the ground-colour is again creamy-white and the border area yellow-grey. On the hindwings the normal greenish-yellow coloration is replaced by yellow-grey giving a blueish appearance. The hindwing discoidal spot is white on both surfaces. Yellow pigment is similarly lacking in the marginal hair, body hair, legs and antennae. These were bred from a typical female captured at Sawley, Hants on 4.viii.1994 by Arran Harmer. A crippled female of the same form emerged from this brood and other examples of the aberration coloured up but failed to emerge.

F. *helice* is a sex-linked form restricted to the female and the present insects represent a quite separate aberration. It bears a significant resemblance to an aberration of *Colias alfacariensis* Berger shown at the 1991 Annual Exhibition by D. Wedd, and photographed for the exhibition plate. There are also similarities with the well known ab. *coerulea* Gardiner of *Pieris brassicae* L. (a recessive).

A form equivalent to f. *helice* occurs in many species of *Colias* in different parts of the world, always restricted to the female. Very rare white male forms have been found in a few species in USA and Asia. When bred these have proved to be controlled by a recessive gene which affects both sexes equally and is unrelated to *helice*. If this form has been recorded before in *C. croceus* then it is certainly extremely rare. There do not appear to be any references to such an insect in the literature and it is likely to be a new aberration in this species.

HOUGHTON, D. W.—A male *Pieris brassicae* L. ab. *flava* Kane taken on the Thames Embankment near the power station at Dartford, Kent in August 1949. *Colias croceus* Geoff. and *Colias hyale* L. were common in the area and this very rare aberration was thought to be just another *croceus* f. *helice* Hübn. until it was in the net.

JONES, A. M.—A bred series of *Eurodryas aurinia* Rott ab. *virgata* Tutt (Plate II, Fig. 8) probably bred from a pair of *virgata* parents, although the strain was mixed in with type stock. Pairings between aberrations have been achieved and the stock carefully segregated. An extreme female ab. *sebaldis* Schultz from the same stock. K. E. J. Bailey has shown this to be a temperature-induced form, and as this specimen was reared in a greenhouse it is likely that it experienced unnatural temperatures.

A bred gynandromorph of *Quercusia quercus* L. being predominantly female but with half of the left forewing male and some male scaling in the borders of both right-hand wings. A female ab. *caerulescens* Lempke with an orange patch at the anal angle of the hindwing upper surface.

A good captured male *Argynnis paphia* L. ab. *ocellata* Frings (Plate II, Fig. 5) with very dark hindwings and a halved gynandromorph. The latter was spotted in the field when it was noticed that the visible upperside was of a different sex to the displayed underside. A credit to sharp observation. A male *Aricia agestis* L. ab.

pallidior Ober with cream lunules and an unusual male having the black centres to the lunules absent from the underside and so resembling *Lysandra coridon* ab. *fowleri* South.

KEMP, R.—*Lycaena phlaeas* L. ab. *radiata* Tutt having the hindwing orange band replaced with thin streaks. Taken near Aylesbury, Bucks in September 1994. This is a recessive form.

KNILL-JONES, S. A.—A female *Plebejus argus* L. ab. *nigrescens* Tutt from Hampshire, July 1994 and second brood examples of *Colias croceus* Geoff. from Compton Down, I.o.W., October 1994.

PAYNE, J. H.—The results of temperature experiments, including a good *Argynnis paphia* L. ab. *ocellata* Frings, *Aglais urticae* L. *semiichneusoides* Pronin and *Inachis io* L. ab. *belisaria* Ober.

PORTER, J.—Examples of *Pyronia tithonus* L. ab. *excessa* Leeds from S. Devon and a female ab. *postobscura* Leeds. Obsolete forms of *Aphantopus hyperantus* L. and a large female *Coenonympha pamphilus* L. with the outer part of the forewings distinctly pale. *Erebia aethiops* L. ab. *flavescens* Tutt with the orange bands paler than type and a male ab. *purpurea* Sibille having the hindwings spotting obsolete (Aviemoire).

Lysandra bellargus Rott. abs *parvipuncta* Tutt and *krodeli* Gillmer.

REVELS, R. C.—A captured female *Melanargia galathea* L. with extra black scaling, appearing to be transitional to ab. *nigricans* Culot; 40 ova were obtained. A good male *Polyommatus icarus* Rott. ab. *radiata* Courv.—one of several of this type seen in one locality in July and August 1994. A female *Maniola jurtina* L. ab. *pallidula* Leeds.

Further breeding from an aberration of *Pyronia tithonus* L. having broad borders to the forewings and the hindwing orange absent or nearly so. The F₁ and F₂ broods were exhibited in 1993 and the form was shown to be dominant. Further examples were shown, being the result of crossing female aberrations with wild males showing extra spotting. Two batches were reared. One produced a brood of 91 insects of which 60 were aberrations (11 showing extra spotting) and the other a brood of 72 insects comprising 34 type (two with some extra spotting) and 38 aberrations. Pairings have been obtained between some of the more extreme aberrations.

ROUSE, T.—A bred *Lysandra coridon* Poda ab. *i-nigrum* B. & L., from a type parent. A male *L. bellargus* Rott. bred in the F₅ generation from Folkstone, Kent with two streaked spots on underside of the left hindwing and a female ab. *striata* B. & L., both from type stock.

Aglais urticae L. ab. *semiichneusoides* Pronin captured flying around a Budleia bush with about 50 typical specimens at Densole, Kent on 10.x.1994.

STANDING, P. A.—Three ab. *wittei* Geest of *Melitaea cinxia* L. and a form with reduced black markings in the centre of the forewings.

A fine female *Lycaena dispar batavus* Ober ab. *radiata* B. & L. (Plate II, Fig. 2) bred in the second brood, August 1994. This developed under natural conditions. The spotting was streaked outwards on all wings on the underside and on the upperside forewings. This strain has shown tendencies towards this form over the years. Also shown was another transitional female. A captured female *Hipparchia semele* L. from Dorset, July 1994 being ab. *holonops* Brouwer on one side and *monocellata* Lempke on the other.

TEBBUT, P.—An outstanding melanic aberration of *Ochlodes venata* Br. & Grey (Plate II, Fig. 6). This was an extreme ab. *fuscus* Frohawk which was virtually black but with the patterning still visible. Captured in Dorset, June 1994. A male *Thymelicus lineola* Ochs ab. *antiordens* Lempke, with all darker markings replaced

with pale brown. This may be an albinistic form. Two *Ladoga camilla* L. ab. *obliterata* Robson & Gardner and one ab. *nigrina* Weymer.

A most unusual *Aricia agestis* L. ab. *glomerata* B. & L. very similar to the example of *Lysandra coridon* Poda illustrated on the exhibition plate for 1991. This is very possibly a unique aberration in *agestis*. *Hamaearis lucina* L. ab. *semibrunnea* Osthelder and a gynandromorph of *Pieris rapae* L. being a mainly female insect but with male streaks on the left side. A good *Coenonympha tullia* L. ab. *cockaynei* Hopkins and ab. *impupillata* Lempke, lacking the pupils to the spots. A female *Colias croceus* Geoff. lacking the yellow spots in the black border and having the hindwing discal lunule pear-shaped. A female *Plebejus argus* L. with the hindwings and base of forewings blue and no lunules.

TREMEWAN, W. G.—A further showing of the remarkable melanic variety of *Polyommatus icarus* Rott that was exhibited at the 1993 exhibition and figured on the exhibition plate. This form, which is equally aberrant on the underside (Plate II, Fig. 9), was taken on the Isle of Skye on 27.vi.1993.

TUBBS, R. S.—A drawer showing Mr Tubbs's researches into the genetics of *Hipparchia semele* L. abs *monocellata* Lempke/ *holonops* Brouwer. This is a recessive form also associated with a rayed effect in the orange markings. Three strains were shown. The first was representative of an F₂ from an original *holonops* female captured by R. C. Revels in Dorset in 1975. This included a full male *holonops* and others with reduced spotting. The other two strains were from parents with the spotting much reduced, both parents taken by R. S. Tubbs in Dorset in 1979. The offspring included *monocellata* males and 'rayed' females.

BRITISH MACROLEPIDOPTERA

BRADFORD, E. S.—Some moths taken from Penn Hill, Whitstable, Kent: *Archanara geminipuncta* Haw., 13.viii.94, *Mythimna albipuncta* D. & S., 12.viii.94; *Parascotia fuliginaria* L., 27.iii.94; *Rhodometra sacraria* L., 24.viii.94; *Apoda limacodes* Hufn., 28.vi.94. *Deltote bankiana* F., 14.vii.94; *Amphipoea fucosa* Freyer ssp. *paludis* Tutt, 29.vii.94. Also a further specimen of *R. sacraria* from Child's Forstal Wood, East Blean, Kent, 29.viii.94.

BRITTON, M. R.—A selection of characteristic Lepidoptera of Yorkshire limestone including both sexes of *Adscita geryon* Hübn. *Photedes captiuncula expolita* Staint., *Apamea furva britannica* Cockayne, *Epirrhoe galiata* D. & S., and *Eupithecia distinctaria* H.-S.

BROTHERIDGE, D. J.—An extreme melanic example of *Discestra trifolii* Hufn. from Wroughton, Wilts. on 9.viii.1992 (Plate III, Fig. 3).

BUTCHER, A. G. J.—A series of specimens comparing varieties and aberrations with typical examples. Included were, *Lasiocampa trifolii flava* Chalmers-Hunt ab. *obsoleta*, *Calliteara pudibunda* L., intermediate form, *Ochropleura plecta* L. ab. *rubricosta*., *Euproctis similis* Fuessl. with suffused forewings, *Diarsia mendica* F. resembling ssp. *thulei* Stoud., a pale form of *Melanchnra persicariae* L., a gynandromorph *Noctua pronuba* L., dark *Brachionychna sphinx* Hufn., a possible melanic *Mythimna conigera* D. & S. (Plate III, Fig. 11), *Xanthia icteritia* Hufn. ab. *flavescens*, *Acrionicta alni* L. ab. *suffusa*, an example of *Aporophyla lutulenta* D. & S. resembling ssp. *lunebergensis* Freyer, forms of *Acrionicta ramicis* L., *Charanyca trigrammica* Hufn., a yellow form of *Cryphia domestica* Hufn., and *Odontoptera bidentata* Clerk.

Amongst Geometridae shown were a var. of *Idaea dimidiata* Hufn., *Melanthia procellata* D. & S. with suffused forewings, four temperature-affected *Rhodometra sacaria* L., melanic forms of *Odontopera bidentata* Cl., *Apocheima pilosaria* D. & S. and *Alcis repandata* L. were shown. Two selected bred varieties of *Ennomos autumnaria* Wernb. were also shown.

CLANCY, S. P.—Migrants taken in the Dungeness area in 1994. These comprised *Scopula rubiginata* Hufn., 4.viii.94 (Lydd), *Scotopteryx peribolata* Hübn., 6.ix.94 (Greatstone), *Peribatodes manuelaria* H.-S., 4.viii.94 (New Romney), *Lymantria dispar* L., 4.viii.94, *Polia bombycina* Hufn., 25.vi.94 (Greatstone), *Chrysodeixis chalcites* Esp., 29.ix.94. In addition, five specimens of *Amphipoea lucens* Freyer were exhibited from the Dungeness area in 1992/1993.

A number of aberrations were also exhibited and included: *Malacosoma castrensis* L., lacking cross-lines; an aberrant *Xanthorhoe fluctuata* L., an *Arctia caja* L. with reduced dark scaling, a *Meganola albula* D. & S. with reduced markings (Plate III, Fig. 5), an obsolete example of *Agrotis exclamationis* L., a dark specimen of *Lacanobia oleracea* L., a melanic *Cerastis leucographa* D. & S., a striking semi-melanic aberration of *Acronicta rumicis* L., and a specimen of *Protodeltote pygarga* Hufn. with reduced scaling in the distal part of the forewing.

CLARKE, J.—A selection of Lepidoptera taken or bred in 1994 including: *Apamea furva britannica* Cockayne from Sychnant Pass North Wales; *Dyscia fagaria* Thunb.; *Chloroclysta concinnata* Steph from Arran, 27.vi.94; *Paradiarsia sobrina* Dup. from Carrbridge, Inverness-shire; *Xestia ashworthii* Doubl. at light, from Sychnant Pass, North Wales; *Agrotis cinerea* D. & S., a mixed gynandromorph from Swanage, Dorset (Plate III, Fig. 9); *Drymonia ruficornis* Hufn., a melanic example from Lingfield Surrey; *Orthosia cerasi* F., taken at Lingfield, Surrey on 3.xi.93; a variety of *Diarsia mendica* P. from Lingfield Surrey; from Norfolk, *Phragmataecia castaneae* Hübn. and *Pelosia obtusa* H.-S.; *Idaea dilutaria* Hübn. from Great Orme, North Wales; *Agrochola haematidea* Dup. bred from Sussex and an example of *Crocallis elinguaria* ab. *unicolor* Prout from Carrbridge, Inverness-shire.

Also exhibited was a case of Sesiidae bred in 1994 complete with larval workings. Species included were: *Synanthedon formicaeformis* Esp., *S. flaviventris* Staud., from southern Surrey and Ashdown Forest; *Bembecia muscaeformis* Esp. from Devon and *S. scoliaeformis* Borkh. from Rannoch Scotland.

In a separate exhibit, was the second adult British record of *Cucullia scrophulariae* D. & S. This was captured on 18.vi.94 in Dorset (Plate III, Fig. 12). For comparison, it was displayed alongside *C. lychnitis* Namb. and *C. verbasci* L.

COOK, R. R.—An exhibit of species taken or bred in 1994: *Chloroclysta concinnata* Steph. from Monamore Glen, Arran; *Synanthedon spheciiformis* D. & S., bred from Bastley Heath, Hants, vi.94; *Idaea dilutaria* Hübn. from Great Orme, North Wales; *Luperina nickerlii gueneei* Doubl. from Prestatyn, North Wales, viii.94; *Noctua orbona* Hufn., bred from larvae found at Icklingham, Suffolk; *Xestia ashworthii* Doubl., from Sychnant Pass, North Wales, vi.94; *Hadena perplexa* D. & S., bred from larvae, Hurst Castle, Hants, *Apamea furva britannica* Cockayne, from Sychnant Pass, North Wales; *Orthosia gothica* L., ab. *gothicina* H.-S., bred from larvae, Kincaig Inverness, iii.94.

Also exhibited were *Agrochola haematidea* Dup. from Sussex with photographs of larvae taken by P. Davey.

CORLEY, M. F. V.—A dull brown specimen of *Amphipyra berbera* Rungs with the hindwing lacking the normal copper coloration from Blandon Heath, Oxon on 22.vi.1993 (Plate III, Fig. 2).

CRAMP, P. J.—An example of *Mythimna pudorina* D. & S., from Godshill I.o.W. 12.vii.94, new to the island.

DOBSON, A. H.—Examples of *Cucullia asteris* D. & S., bred from larvae found at Calshot 17.viii.93; a melanic *Orthosia cerasi* F., from Penn Wood 28.iii.94; *Xanthorhoe biriviata* Borkh. from River Itchen; *Spodoptera exigua* Hübn., at m.v. light Greywell Moors, 16.viii.94; *Agrotis exclamationis* L., with black suffusion in the median area of the right forewing, from Yorkshire; *Photodes captiuncula expolita* Staint., from Grassington, Yorkshire; *Heliothis peltigera* D. & S., from Starcross, Devon; also several *Hypena obsitalis* Hübn., from Torbay including two live second brood females.

EMMET, A. M.—An example of *Scopula marginepunctata* Goeze from Saffron Walden Essex, taken at m.v. light, 20.viii.94. Also *Heliothis viriplaca* Hufn. from Saffron Walden Essex, taken at m.v. light 6.viii.94, probably a wanderer from Breckland.

Also, exhibited was a possible example of *Plusia putnami gracilis* Lempke from Ahakista, Co. Cork, taken at m.v. light, 16.vi.94.

FOSTER, A. P.—A specimen of *Eupithecia abietaria* Goeze, taken at m.v. light in a conifer plantation at Pontneddfechan, Breconshire, 18.vii.94.

GILL, N.—The following moths: *Odontognophos dumetata hibernica* Forder, *Hadena caesia manani* Gregson, *H. perplexa capsophila* Dup., *Zygaena purpuralis sabulosa* Trem., *Tethea or hibernica* Turner, and *Thera cognata* Thunb., were taken in, or bred from, Ireland in 1994.

Also, from Shetland, were *Hadena confusa* Hufn. and *Eupithecia venosata fumosae* Gregson, bred from larvae taken in 1992.

GOATER, B.—An exhibit of cases of *Luperina nickerlii* Freyer from Britain and Europe (Plate III, Figs. 15–18) with a varied series of *Luperina testacea* D. & S. This exhibit is to be the subject of a paper in the *Br. J. Ent. Nat. Hist.* that will demonstrate that the saltern race of Essex and Kent is a good sub-species.

Also exhibited were western European species of *Earias* to show that specimens of *E. insulana* Boisd. taken in southern England in 1992 were in fact *E. clorana* L. f. *flavimargo* de Joannis.

HALL, N.—Bred *Deileptinia ribeata* Cl. from Bernwood Oxon, 31.vii.94, the night of a B.E.N.H.S. field meeting. An aberrant *Agrotis exclamationis* L., from Earley Reading 24.vii.94. Normal and dark forms of *Thalpophila matura* Hufn. from Birmingham, 22.vii.94. Also two *Synanthedon culiciformis* L., exhibited plus their emergence stump from Dinton Pastures, collected 23.iv.94.

HARMAN, T. W.—Example of *Heliothis armigera* Hübn., Westbere, Kent, 2.x.94; *H. peltigera* D. & S., Turville Heath, Bucks. Also exhibited on behalf of F. Solly: *Chrysodeixis chalcites* Esp., Kingsgate, Kent, 14.x.94; *Euxoa cursoria* Hufn., Kingsgate, Kent, 13.viii.94 and *Pelosia muscerda* Hufn., Kingsgate, Kent, 31.vii.94, also one specimen of *Deltote bankiana* F., Dover, Kent 13.vii.94.

HART, C.—A noctuid larva found 7.x.94 in a packet of mange-tout purchased in a Supermarket in Horsham, West Sussex. Its origin was Zambia. The larva was probably of *Heliothis armigera* Hübn.

HAYWOOD, B.—Some immigrant Lepidoptera taken in 1994: *Spodoptera exigua* Hübn., from Abbotskerswell, Devon, 10.vii.94 and Lyme Regis, Dorset, 2.vii.94; *Orthonama obstipata* F., Abbotskerswell, Devon, 25.ix.94.

HAYWOOD, R.—A selection of Lepidoptera taken or bred in Slough mainly during 1994. These consisted of: *Rhodometra sacraria* L., to m.v. light, Slough, 6.viii.94; *Thera obeliscata* Hübn., a dark form of the first brood at m.v. light, 26.vi.94; *Colotois pennaria* L., with large white 'eyes' on the forewing and a pale right hindwing; *Mimas*

tiliae L., with two distinct shades of green in the central band; six *Lacanobia suasa* D. & S., bred from Slough parent of ab. *dissimilis* Knoch, April 1994; four specimens of *Cryphia domestica* Hufn. taken between 30.vii and 6.viii.94, demonstrating the wide variety of forms in Slough; two *Cosmia affinis* L., a welcome visitor to the garden trap this year; finally an example of *Heliothis armigera* Hübn. bred from a larva which probably emanated from a bunch of chrysanthemums in the house.

HOWTON, D. H.—*Paradarisa consonaria* Hübn f. *nigra* Banks, an example found on Ranmore Common, Surrey on a beech trunk, 10.v.86; an unknown sphingid found in a crate of grapes in August 1992, Hinckley Leicestershire; *Orthosia cruda* D. & S., ab. *haggarti* Tutt, taken 16.iii.91 on Geddington Chase, Northants, this was amongst 120 'normal' specimens.

JENKINS, A.—*Zygaena exulans subochracea* White, a series taken at Braemar. One specimen had yellow legs, yellow spots on thorax and yellow colouring to main vein in the upper wings. *Zygaena loti scotica* Rowl.-Br., a series from the Isle of Mull with one specimen having middle and inner spots united. A series of *Xestia alpicola alpina* Humph. & Westw., from Grampian, taken at m.v. light on two nights, none flying before 1 a.m. Bred *Archanara algae* Esp from Sussex, from pupae found. *Pelosia obtusa* H.-S., taken at m.v. light in Norfolk. *Photedes brevilinea* from Norfolk also at m.v. light. Also the following bred species: *Alcis repandata* L., of the *conversaria* form from South Wales; *Agrochola haematidea* Dup. from Sussex, and *Eriogaster lanestris* L. from Norfolk.

KNILL-JONES, S. A.—An exhibit largely of moths from Freshwater, Isle of Wight, consisting of *Eupithecia tripunctaria* H.-S., 3.vii and 4.viii.94; *Euchoeca nebulata* Scop., 2.vii.94, *Conistra vaccinii* L., a grey aberration, 10.ii.94; *Diarsia rubi* View., an aberration taken 17.viii.94; *Rhodometra sacraria* L., 1.viii and 12.x.94; *Apamea scolopacina* Esp., 31.vii.94; *Rhyacia simulans* Hufn., 18.vii.94; new to the Isle of Wight; *Trichoplusia ni* Hübn., new to the Isle of Wight; *Scopula nigropunctata* Hufn., 5.viii.94, new to Hampshire and the Isle of Wight; *Xestia agathina* Dup., 15.ix.94; *Ipomorpha retusa* L., 20.viii.94; *Autographa gamma* L., two aberrations taken 11.viii and 1.ix.94; a dwarf *Deilephila elpenor* L., with a wingspan of only 46 mm taken 30.vi.94; *Nonagria typhae* Thunb. ab. *fraterna* 15.viii.94; *Archanara dissoluta* Treits., typical and melanic, 25.vii and 6.viii.94; three *Agrotis exclamationis* L., aberrations; *Abraxas grossulariata* L., ab. *dohrnii*, 11.viii.94; *Heliothis armigera* Hübn., 14.x.94; *Mythimna straminea* Treits., 16.vi.94; a bred series of *Lasciocampa quercus* L., showing variation 1993–94. From other parts of the Isle of Wight, the following moths were shown: a series of *Eupithecia subumbrata* D. & S., Compton Down, vi.94; *Perizoma flavofasciata* Thunb., Redcliff Bay, 23.vi.94; *Scopula floslactata* Haw., Cranmore, 6.vi.94; *Idaea biselata* Hufn. ab. *fimbriolata* Steph., Afton Reserve, 8.vii.94; *Erannis defoliaria* Cl., Cranmore; *Scotopteryx luridata plumbaria* F., Cranmore, 9.vi.94; *Mythimna vitellina* Hübn., a dark form, Cranmore, 4.xi.93; *Colotois pennaria* L., a pale form, Cranmore, 5.xi.93. Also from further afield: *Xylena vetusta* Hübn., and *Entephria flavicinctata* Hübn from Bunnessan, Isle of Mull, 20–23.ix.94.

KOLAJ, A.—A sample of moths bred from larvae beaten from various plants in and around Aviemore including: *Entephria flavicinctata ruficinctata* Guen., *Thera cognata* Thunb., *Hydiomena furcata* Thunb., *Entephria caesiata* D. & S., *Eupithecia pusillata* D. & S., and an unusual form of *Eulithis populata* L.

A sample of moths taken during a very hot week in the Norfolk Broads including: *Eustrotia uncula* Cl., *Pelosia muscerda* Hufn., *P. obtusa* H.-S., *Archanara dissoluta* Treits., *Simyra albovenosa* Goeze, *Photedes brevilinea* Fenn., *Plusia putnami gracilis* Lempke and *Phragmataecia castaneae* Hübn.

In addition, also exhibited were: *Macroglossum stellatarum* L. and *Heliothis peltigera* D. & S. from Warwickshire; *Hydraecia osseola* Stdgr.; *Colocasia coryli* L., including melanic forms from Bucks.; *Thera cupressata* Geyer, from Dorset and *Agrotis clavis* Hufn., from Suffolk.

MACKENZIE REID, I.—A series of *Agrotis exclamationis* L. demonstrating its variability from Claverdon and Bearley, Warwickshire. A specimen of *Ennomos alniaria* L. from Warburg N. R., Bucks. Also a specimen of *Aplocera efformata* Guen., taken 18.viii.90 from Bearley, Warwickshire.

MANNING, D. V.—A specimen of *Rhodometra sacraria* L., without forewing streak taken 18.viii.94, Amphill Park, Bedfordshire.

MCCORMICK, R.—The following species bred or captured during 1993/94: *Synanthedon scoliaeformis* Borkh., from Rannoch; *Bembecia muscaeformis* Esp., from Start Point; *Colostygia olivata* D. & S., from Babbacombe; *Coenocalpe lapidata* Hübn., from Trinafour, Tayside where it was found commonly; *Eupithecia expallidata* Doubl., at light, Holne Chase and Dawlish Warren, Devon; *Alcis jubata* Thunb., Holne Chase; *Photedes morrisii* Dale, from Charmouth Dorset; *Hypena obsitalis* Hübn., several specimens from Dartmouth to Watcombe, Devon.

The following species considered to be unusual for Devon or near its borders were captured: *Hydriomena ruberata* Freyer from Teignmouth (and was also seen at Dawlish Warren); *Horisme vitalbata* D. & S., several seen Dawlish Warren; *Eilema sororcula* Hufn., from Teignmouth, Devon; *Meganola albula* D. & S., seen commonly at Dawlish Warren; *Mythimna obsoleta* Hübn. from Exminster Marshes, Devon; *Photedes pygmina* Haw., a striated specimen from Holne Chase; *Eremobia ochroleuca* D. & S., from Dawlish Warren; *Arenostola phragmitidis* Hübn., a pair from several seen at Dawlish Warren; *Chilodes maritimus* Tausch., from Dawlish Warren and Exminster Marshes including ab. *nigristriata* Stdgr., and ab. *bipunctata*, Haw.; *Calocula nupta* L., one specimen from Dawlish Warren; *Earias clorana* L. found commonly at Dawlish Warren.

The following migrants appeared in the garden trap at Teignmouth: *Rhodometra sacraria* L., *Spodoptera exigua* Hübn., *Heliothis peltigera* D. & S., and *Autographa gamma* L. ab. *gammina* Stdgr.

The following species were bred this year from various localities: *Chloroclysta truncata* Hufn., bred from larvae swept at Feshiebridge, Inv. *Hydriomena furcata* Thunb., bred from larvae swept at Feshiebridge; *Crocallis elinguarina* L., an ab. *unicolor* Prout bred from a larva also swept at Feshiebridge; *Xestia castanea* Esp., a pair of dark red specimens swept at Mooremore, Aviemore; *Egira conspicularis* L., part of a series of typical specimens bred from a female caught at Kynaston, Hereford.

Finally, a series of *Agrotis puta* Hübn., and *A. clavis* Hufn., showing the variety of forms occurring in South Devon.

MIDDLETON, H. G. F. & SCANES, J. J.—During a visit to Scotland 11–15.vii.1994, the following species were taken in the Isle of Skye: *Zygaena purpuralis caledonensis* Neiss, *Zygaena loniceræ jocelynae* Trem. and *Camptogramma bilineata bilineata* L.

From Perthshire, the following species were taken: *Entephria caesiata* D. & S., *Gnophos obfuscatus* D. & S., *Entephria flavicinctata* Hübn., *Xanthorhoe munitata munitata* Hübn., *Perizoma blandiata blandiata* D. & S., *Hydriomena ruberata* Freyer, *Eurois ocella* L., *Hyppa rectilinea* Esp. and *Apamea zeta assimilis* Doubl.

OWEN, D. F.—An exhibit to confirm the prediction of Owen and Clarke (*Oikos* 67: 393–402) that the *medionigra* phenotype of *Callimorpha dominula* L., was temperature-controlled. The studies were made in 1993 at the famous Cothill,

Oxfordshire colony and a similar result obtained at the nearby locality of North Hinksey.

Another exhibit highlighted the interesting parallel decline in frequency of melanism in *Biston betularia* L. in England and the U.S.A. where the North American subspecies *Biston betularia cognataria* occurs.

OWEN, J.—A specimen of *Acontia lucida* Hufn. taken at m.v. light at Dymchurch, Kent on 6.viii.94.

PARSONS, M.—The following specimens were exhibited: *Parascotia fuliginaria* L., Great Bookham Common, Surrey, 21.vii.94; *Minoa murinata* Scop., Sapperton, E. Glos., 3.vii.94. *Xanthorhoë fluctuata* L., Rayner Park, Surrey, 31.viii.94, a variety with reduced and suffused markings; *Paradarisa extersaria* Freyer, a dark example from Richmond Park, Surrey, 4.vi.94; two pale examples of *Gnophos obscuratus* D. & S. from Cow Gap, 29.vii.94; four examples of *Cryphia domestica* Hufn., showing the range in variation in this species in the capital.

PORTER, J.—A male *Thera cupressata* Geyer from Dorset, 15.x.94; a dark example of *Noctua comes* Hübn. and three forms of *Celaena leucostigma* Hübn. ssp. *scotica* Coch., from Argyllshire, 14.viii.94; two pairs of *Antitype chi* L. from Kinross-shire on 9 and 16.viii.94; a dark female *Eumichtis lichenea lichenea* Hübn. from the Essex coast, 1.x.94, and *Caradrina clavipalpis* Scop. with dark marginal areas from Surrey 22.x.94.

PHILLIPS, J. W.—A selection of Macrolepidoptera captured or bred during 1994 mainly as a result of a trip to North and South Wales. They comprised: *Abraxas sylvata* Scop., Tintern; *Discoloxia blomeri* Curt., Tintern; *Eriopygodes imbecilla* F., from South Wales, *Idaea dilutaria* Hübn., Great Ormes Head; *Apamea furva britannica* Coch., Great Ormes Head; *Apeira syringaria* L., bred from Tintern; *Entephria caesiata* D. & S., from North Wales. From other areas: *Heliothis peltigera* D. & S., bred ex. larvae, Pagham, W. Sussex and *Zygaena trifolii decreta* Ver. from Arne, Dorset.

PLANT, C.—Eleven examples of *Cryphia domestica* Hufn. showing a variation from typical to melanic. Six slightly differing examples were shown, three from Bishop's Stortford, Herts., 12.viii.88 and 18.vi.89, two from East Ham, S. Essex, 6.vii.82, and 4.vii.85 and one from Romford, S. Essex, 1982. Four differing examples approximating to ab. *suffusa* Tutt all from East Ham. Finally, a melanic form, the name of which has not been traced, in which the entire forewings are darkened except for a pale sub-basal fascia not reaching the dorsum and a pale pre-tonal patch taken at Enfield, Middx on 21.vii.1994 by Ms Anna Hughes.

Also exhibited were *Perizoma affinitata* Steph., a suffused dark form in which forewings are a suffused brown all over apart from the white part-median line and the upper sides of the hind wings are entirely grey with the whitish fascia barely discernible. This was captured in Rushey Mead Nature Reserve near Bishop's Stortford, 2.vi.94. Also from the same reserve, *Heliothis virescens* Hufn., a typical Breckland Moth, on 6.viii.94.

PRATT, C.—An aberration of *Dryobotodes eremita* F. from the Arundel area, in appearance being somewhat similar to a small *Lacanobia contigua* D. & S.

ROUSE, T.—The following species taken at Densole and Dungeness, Kent: *Peridroma saucia* Hübn., *Mythimna vitellina* Hübn., *Agrotis ipsilon* Hufn., *Heliothis armigera* Hübn., *H. peltigera* D. & S., *Autographa gamma* L., *Mythimna albipuncta* D. & S., *Agrius convolvuli* L.

The following species were bred during 1934–94: *Adscita statures* L., bred from a female taken at Odiham, Hants; *Adscita globulariae* Hübn., bred from a female taken at Whinless Down, Kent; *Diacrisia sannio* L., bred from a female taken at Whinless

Down, Kent; *Deltote bankiana* F., bred from a female taken at Whinless Down, Kent; *Rhodometra sacraria* L., bred from a female taken at the Warren Kent, lastly an example of *Trachea atriplicis* L., taken at Densole, Kent, being the first record for the British Isles since 1986.

SCANES, J. T.—A selection of macro moths from the summer of 1994; *Photedes morrisii morrisii* Dale from Charmouth Dorset; *Epirrhoe rivata* Hübn. and *Catarhoe rubidata* D. & S., from Seatown, Dorset; *Spodoptera exigua* Hübn. and *Mythimna favicolor* Burr. from Keyhaven, Hants; *Agrotis ripae* Hübn., from West Wittering; *Agrotis cinerea* D. & S., from Kings Somborne, Hants; *Spodoptera exigua* Hübn., from Tolworth, Surrey and an aberrant *Drymonia dodonaea* D. & S., from Ashtead Surrey, taken at m.v. light, 26.vi.94 (Plate III, Fig. 10).

Two moth aberrations were exhibited on behalf of Mr A. D. A. Russwurm. They were: *Diarsia mendica mendica* F. at m.v. light, 22.vi.94 and *Notodonta dromedarius* L. at m.v. light, 9.vii.94, both at Brockenhurst.

SIMMONS, M.—An exhibit of migrant moths taken in E. Sussex during 1994: *Heliothis armigera* Hübn., *H. peltigera* D. & S., (which was recorded three times on 15.vi, 7.vii and 7.viii.94), *Agrotis ipsilon* Hufn., *Peridroma saucia* Hübn., *Rhodometra sacraria* L., all taken at light in Crowborough. Another species, *Spodoptera exigua* Hübn. was taken at light in Normans Bay.

SIMPSON, A. N. B.—An example of *Mythimna obsoleta* Hübn., to m.v. light at Upton Warren, Worcestershire on 1.vii.94, the first VC37 record.

SIMS, I.—A varied exhibit of *Synanthedon tipuliformis* Cl., bred from *Ribes nigrum* emerging on 27.iv.90; *Ptilophora plumigera* D. & S., to m.v. light, Pheasant Wood, Habledon, Bucks., 26.xi.91; *Setina irrorella* L., an imago from Inishmore, Galway, Eire, 1.vi.91; *Cucullia lychnitis* Namb., bred from larvae from Medmenham, Marlow, Bucks., these emerged on 9.vi.93 after having been fed on Buddleia in 1992 in captivity. *Craniophora ligustri* D. & S., to m.v. light Medmenham, Marlow, Bucks., 16.vi.93; *Ipimorpha subtusa* D. & S., to m.v. light. Ashley Hill Forest, Knowl Hill, Reading, Berks., 21.vii.94.

SKINNER, B. F.—*Pelosis obtusa* H.-S., two males and two females from Catfield, Norfolk, July 1994; *Hoplodrina alsines* Brahm, an albino male from Dungeness, Kent, 8.vii.94 (Plate III, Fig. 13); *Nola aerugula* Hübn., a male from Greatstone, Kent, 12.vii.94, being the fifteenth Kentish record this century; *Agrotis crassa* Hübn., from Portland Bird Observatory, Dorset, 4.viii.94 being the sixth English record this century.

STERLING, M. J. & P. H.—An exhibit of *Zygaena loniceræ* Schev., from Cume Down, near Weymouth, Dorset, VC9, 6.vii.94, to demonstrate occurrence which is widespread in the County despite report in M.B.G.B.I. vol. 2.

TEBBUT, P.—An example of *Arctia caja* L. ab. *fumosa* Horhammer.

WARD, J. W.—An aberrant *Diarsia mendica* F. from Geddington Chase, Northants on 20.vi.1988 (Plate III, Fig. 1), a melanic specimen of *Orthosia cerasi* F. bred ex pupa, 1.iv.1976 from Warkton, Northants.

WARNE, B. J.—An aberration of *Selenia lunularia* Hübn., taken at Binstead, I.o.W., 2.vii.94.

WEDD, D.—An exhibit of species bred or captured 1993–4. From Henley-on-Thames, Oxon: *Heliothis peltigera* D. & S., two from a series bred from a female captured in May; *Apoda limacodes* Hufn., to actinic light in Henley; *Crocallis elinguarua* L., varied colour forms including a buttered ab. *restricta*, from Bude, Cornwall, normal and also several round-winged specimens which emerged from F₂ generation from Prawle Point, Devon, from a female captured by Brian Baker.

From Ireland, the following captured at Dromore Park, Co. Clare: *Amphipyra berbera svenssoni* Fletcher, *Ipimorpha retusa* L., *Apamea ophiogramma* Esp. and *Spilosoma lubricipeda* L. From Inch, County Kerry: *Hyles lineata livornica* Esp. from Duncormick, Co. Wexford: *Odonoptera bidentata* Cl., F₂ specimens, *Agrotis ripae* Hübn., examples of the S. E. Irish form.

From Scotland: *Eupithecia pusillata* D. & S. a varied series from Feshiebridge; *Polyphaenis maillardi assimilis* Doubl., two specimens from Achlean, Inv. and a dark female from Kilmahoy, near Cullander, Inv.; *Noctua comes* Hübn., from Findhorn, Morayshire—a range of colour forms.

From South Devon and North Cornwall, a series of *Hypena obsitalis* Hübn.

Finally, an exhibit of *Calamia tridens occidentalis* Cochyne, varying from wild-caught specimens from Aglish, Burren, Co. Clare to results of breeding the moth at different temperatures.

WOOLDRIDGE, D. B.—An example of *Thera cupressata* Geyer, taken Freshwater, I.o.W., 13.vii.94.

YOUNG, D.—From the New Forest, a *Lymantria dispar* L., captured 5.viii.94 along with other common migrant species; *Drymonia ruficornis* Hufn., an aberrant specimen with area between ante- and post-medial lines whitish yellow, taken 25.iv.94.

From Reading, *Sesia apiformis* Cl. boxed from a poplar trunk at Reading from 7.15–7.30 a.m. 27.vi to 1.vii.94. *Hydraecia osseola hucherardi* Mab., from Kent, 7.ix.94. *Catocala promissa* D. & S. from the New Forest. *Agrotis ripae* Hübn., a short-series bred from larvae from Wittering, W. Sussex. *Gortyna borelii lunata* Freyer, found to be reasonably common this year in Essex.

BRITISH MICROLEPIDOPTERA

BLAND, K. P.—*Stigmella continuella* Staint., vacated leafmines in birch, found 10.ix.1994 at Camghouran (NN5455), Rannoch, new to Perth. (VC88) and only third Scottish vice-county. *Kessleria saxifragae* Staint., Invernaver NNR (NC6960), Suther., 8.viii.1994, new to VC108. *Coleophora discordella* Zell., Bettyhill (NC7062), Suther., to light, 9/10.viii.1994, new to VC108. *Elachista orstadii* Palm, 3♂♂, 1♀, Williamshope, Glen Kinnon, Selk., taken 29.v.1994, new to VC79, the female appears to be the first British example taken. *Exaeretia ciniflonella* L. & Z., Camghouran (NN5455), Rannoch, Perth. (VC88), a rare species which is rarely captured; this specimen was on the wing in quite heavy autumn rain, 10.ix.1994. *Gelechia sororculella* Hübn., Apigill Wood (NC7157), Suther., taken by Tony Simpson, 11.viii.1994, new to VC108. *Epinotia maculana* F., near Persie House (NO1455), Perth., taken 24.ix.1994, new to VC89.

BRADFORD, E. S.—*Monopis weaverella* Scott, Childs Forstal Wood, East Blean, Kent, at light, 23.viii.1994. *Phyllonorycter leucographella* Zell., Pean Hill, Whitstable, Kent, specimens bred from *Pyracantha coccinea*, 20–25.iv.1994. The following all taken at light, Seasalter Marshes, Whitstable, Kent, 10.vii.1994: *Orthotelia sparganella* Thunb., *Schoenobius gigantella* D. & S., *S. forcicella* Thunb. The following 16 species all taken at light at Pean Hill, Whitstable, Kent: *Aspilapteryx tringipennella* Zell., 23.vii.94; *Parectopa ononidis* Zell., 24.vii.94; *Bedellia somnulentella* Zell., 29.viii.94; *Coleophora versurella* Zell., 27.vii.94; *C. lineolea* Haw., 20.vii.94; *Cnephasia pasiuana* Hübn., 22.vii.94; *Synaphe punctalis* F., 11.vii.94; *Dioryctria abietella* D. & S., 19.vii.94; *Sitochroa palealis* D. & S., 25.vii.94; *Amblyptilia acanthadactyla* Hübn., 4.ix.94; *Catoptria falsella* D. & S., 23.viii.94; *Oncocera*

formosa Haw., 15.vii.94; *Platytes alpinella* Hüb., 11.vii.94; *Bisigna procerella* D. & S., 12.vii.94; *Monochroa palustrella* Dougl., 4.vii.94; *Psoricoptera gibbosella* Zell., 31.vii.94. From Ellenden Wood, Whitstable, Kent, *Ancylys mitterbacheriana* D. & S., specimens bred from *Quercus petraea* L., 12-24.iv.94.

BRITTON, M. R.—Species from Yorkshire limestone. *Teleiodes sequax* Haw., Kilnsey, Grassington, Wharfedale, Yorks., bred ex spinnings in rock-rose, 13.vi.94, emerged 10.vii.94 onwards. *Pterophorus tridactyla* L., top of Dib Scar, Bastow Wood, Grassington, Wharfedale, Yorks., 4.vii.94. *Pyrausta cingulata* L., Dib Scar, Bastow Wood, Grassington, Yorks., 16.vii.94.

CLANCY, S. P.—The following taken in the Dungeness area: *Pediasia fascelinella* Hüb., 30.vii.1994; *Margaritia sticticalis* L., 31.vii.1994 (Greatstone); *Mussidia nigrivenella* Rag., 12.viii.1994 (Plate III, Fig. 7), and *Agriphila inquinatella* D. & S., 27.vii.1994 (Plate III, Fig. 8).

COLENUTT, S.—*Evergestis limbata* L., Chale Green, I.o.W., 23 and 30.vii.1994, new to Britain (Plate III, Fig. 4).

CORLEY, M. F. V.—*Monochroa lucidella* Steph., Pucketty Farm, Faringdon, Oxon., 13.vii.94, new to VC22. *Brachmia lutatella* H.-S., Lulworth, Dorset, 1994, netted in the evening; this was Waters' 1926 locality. *Aristotella brizella* Treits., Portland Bill, Dorset, 22.vii.1994, disturbed from *Armeria maritima* (Miller) Willd. *Caryocolum proximum* Haw., Pucketty Farm, Faringdon, Oxon., bred from *Stellaria media* (L.) Vill., 7.vii.1994, the first VC22 record since an undated Reading record in the Victoria County History (1906); this foodplant has been recorded on the Continent, but not previously in Britain, Spinings are inconspicuous—only one was found; *Phalonidia luridana* Gregs., Portland, Dorset, 22.vii.1994, netted at dusk flying over a trackside with abundant *Odontites*.

CRAMP, P. J.—*Evergestis pallidata* Hufn., Godshill, I.o.W., 24.viii.1994. *E. extimalis* Scop, Godshill, I.o.W., 10.viii.1994.

DOBSON, A. H.—*Homoeosoma sinuella* F., Torquay, 20.vii.94, an aberration with blackish median band (Plate III, Fig. 6). *Ephiphyas postvittans* Walk., Torquay, bred from larva swept from *Parietaria judaica* L. on 19.vii.94. *Blastobasis decolorella* Woll., Basingstoke, Hants (VC12), disturbed from vegetable refuse. *Sitochroa palealis* D. & S., Starcross, S. Devon, 5-7.viii.94. *Salebriopsis albicilla* H.-S., Welshbury Hill, Glos., at m.v. trap under *Tilia cordata* Miller during field meeting of 25.vi.94.

EMMET, A. M.—*Lampronia fuscata* Tengst., two reared from galls in twigs of birch from Mildenhall, W. Suff. (VC26), 18-20.iv.1994, the first specimens from Suffolk. Galls were found at the same locality in 1988, but no moth emerged. *Caloptilia azaleella* Brants, Saffron Walden, Essex, at m.v. light, 18.viii.1994, new to N. Essex (VC19). *Parectopa ononidis* Zell., Saffron Walden, Essex, at m.v. light, 5.viii.1994, the second record from north-west Essex. *Kessleria saxifragae* Staint., Baureenagh Mountain, Co. Kerry, reared 2-12.vii.1994. The locality, 1000 feet above sea-level, was discovered in the 1960s by the late R. M. Mere and E. C. Pelham-Clinton. *Ephiphyas postvittana* Walker, Saffron Walden, Essex, at m.v. light, 22.ix.1994, new to north-west Essex. Where it becomes established, this Australian species tends to become a pest. *Apotomis semifasciana* Haw., Monreith, Wig., at m.v. light, 15.vii.1994, the second record from Scotland. *Hypsopygia costalis* F., a typical specimen and two varieties, one from Wicken Fen, Cambs., 5.viii.1970, in which the yellow costal spots are greatly enlarged and another from Saffron Walden, Essex, at m.v. light, 8.vii.1994, in which the yellow costal spots are amalgamated.

FOSTER, A. P.—*Prochoreutis sehestedeana* F., Tretio Common, Pemb., 13.vii.94, sweeping wet heath with *Scutellaria minor* Hudson; first county record. *Pyralis lienigialis* Zell., Cricklade, Wiltshire, 24.vi.94, at m.v. light in garden.

HARPER, M. W.—*Teleiodes alburnella* Zell (Plate III, Fig. 23), Kincaig, Inv., a short series of specimens caught by day on 17.vii.1994, showing a very well-marked form and unlike the less well-marked form from England; distribution appears to be disjunctive with no records from midland and southern Scotland. *Caryocolum junctella* Dougl., specimens bred from mines in leaves of *Stellaria graminia* L., and a single tenanted mine in a species of *Cerastium*; larvae were also found in May/June with Dr A. N. Simpson in a meadow in Worcestershire, having first captured two post-hibernated moths in April 1994, which were flying by day in the same locality. *Biselachista utonella* Frey new to Scotland (gen. det. confirmed by Dr K. P. Bland), in June 1994 several tenanted mines found in *Carex vesicaria* L. in a small marsh near Kincaig, Inv., from which a short series of bred moths is shown, together with examples of the mines and a pupa.

HECKFORD, R. J.—*Epermenia insecurella* Staint., Portland, Dorset (VC9) bred from *Thesium humifusum* DC., 4.vii.1994 (locality courtesy of Dr P. H. Sterling). *Coleophora lassella* Staud., Slepe Heath, Dorset (VC9) bred from *Juncus bufonius* L., 7-27.v.1994; Hartland Moor, Dorset bred from same 15 & 22.v.1994 (both localities with Drs J. R. Langmaid and P. H. Sterling), Wytech Heath, Dorset 17.vi.1994. *Argolamprotes micella* D. & S., Lyme Regis, Dorset (VC9) 8.vii.1994, one at light. *Phthorimaea operculella* Zell., Plympton, Plymouth, new to Devon (VC3) (exhibitor's garden), 11.vii.1994, one at light. *Mompha bradleyi* Riedl, Stratford-upon-Avon (VC38) bred from galls on *Epilobium hirsutum* L., 4-22.ix.1993. *Piercea luridana* Gregs., Portland, Dorset (VC9), 30.vii.1994, Portland, bred from seeds of *Odontites verna* (Bellardi), 2-4.ix.1994, previously unrecorded foodplant. *Cochylis molliculana* Zell., Portland, Dorset 24.vi.1991, earliest known British specimen; Portland 24.vi.1994; Portland, bred from *Pieris echioides* L. 11 & 12.viii.1994, foodplant previously unknown (see also exhibit of Dr J. R. Langmaid). *Acleris umbrana* Hübn., Heybrook Bay, Devon (VC3) bred from *Prunus spinosa* L. 17-27.x.1993. *Cydia prunivorana* Rag., Plympton, Plymouth, Devon (VC3) (exhibitor's garden) 1.vii.1994, three at light.

HOARE, R. J. B.—*Stigmella pyri* Glitz, one bred from a mine on *Pyrus pyrastra* Burgsd. collected 8.ix.93 at Exeter University Campus, new to Devon VC3. A few vacated mines were found on the same tree later in the month, but they appeared to be confined to a single branch. *Choreutis diana* Hübn., one on *Cirsium arvense* (L.) Scop. flower in afternoon sun at its only known British locality, Glen Affric, Inv., 17.viii.94. *Dasytoma salicella* Hübn., two females bred from larvae on *Prunus spinosa* L., collected at Branscombe, new to Devon VC3 on 18.ix.93, the moths emerging on 24.iii.94. *Teleiodes scriptella* Hübn., two shown of five bred from larvae on *Acer campestre* L., found at Lillesdon near Taunton, Somerset VC5 on 5.ix.93. *Caryocolum blandelloides* Karsholt (Plate III, Fig. 22), three flying at dusk on sand dunes at Loch Fleet NR, East Sutherland VC107, 23.viii.94; determined on genitalia, new to Britain. *Epiblema incarnatana* Hübn., one flying at dusk, Stockbridge Down, Hants, VC12, 30.vii.94, the third Hampshire specimen, and the second from this locality, where the foodplant is presumably *Rosa canina* L. *Mecyna flavalis* D. & S., Stockbridge Down, one at dusk, 30.vii.94, an infrequent species on the mainland of Hampshire.

HOWTON, D. H.—First county records for Northamptonshire and Soke of Peterborough VC32. Species shown: *Athrips mouffattella* L., *Teleiodes alburnella* Zell., *Dichomeris marginella* F., *Trachysmia inopiana* Haw., *Cacocimorpha pronubana* Hübn., *Cnephasia longana* Haw., *Lobesia littoralis* Humphr. & Westw. For the most recent list of Microlepidoptera of VC32, it is necessary to go back to the records of Eustace Wallis published in the *J Northampton Nat. Hist Soc.* 1908 to

1912. David Manning is currently compiling a list, and some examples of new records for the county are shown. The exhibitors hope that anyone who is not already providing records for David Manning will do so.

KNILL-JONES, S. A.—All the following specimens were taken at m.v. light at Freshwater, I.o.W. unless stated otherwise. *Scoparia subfusca* Haw., uniform grey ab., 7.viii.94. *Udea fulvalis* Hübn., 17.viii.94. *Acleris sparsana* D. & S., 30.ix.94. *Pseudoswammerdamia combinella* Hübn., 13.vi.94. *Aphelia viburnana* D. & S., 3 & 5.vii.93, new VC record. *A. paleana* Hübn., 9.vii.94, new VC record. *Pempelia palumbella* D. & S., 4.vii.94. *Endothenia quadrimaculana* Haw., 6.viii.94. *Rhyacionia pinivorana* L. & Z., 24.vi.85. *Adela croesella* Scop., Tennyson Down, I.o.W., 15 and 21.vi.85, 19.vi.89. *Ancyliis achatana* D. & S., 9.vii.93. *Acleris hastiana* L., 21.i.94. *A. notata* Don. *Blastesthia turionella* L., 25.v.91, new VC record. *Cryptophlebia leucotreta* Meyrick, found indoors, 29.ix.89, new VC record. *Dioryctria schuetzeella* Fuchs, 16.vii.85, new county record. *Lathronympha strigana* F., 23.vi.92, new VC record. *Dichomeris marginella* F., 8.vii.89, new VC record. *Semioscopis steinkellneriana* D. & S., 12.iv.90. *Amblyptilia acanthadactyla* Hübn., found indoors, 9.x.94. *Gymnancyla canella* D. & S., St Helens, I.o.W., 26.vii.94. *Platytes alpinella* Hübn., 12.vii.94. *Oncocera genistella* Dup., Cranmore, I.o.W., 13.vii.94. *Pleuroptya ruralis* Scop. ab., Cranmore, I.o.W., 14.vii.94. *Sitochroa palealis* D. & S., Compton Down, I.o.W., 21.vii.94. *Pediasea contaminella* Hübn., three including one ab. *sticheli* Constant, St Helens, I.o.W., 26.vii.94. *Phycitodes maritima* Tengst., St Helens, I.o.W., 26.vii.94. *Parapoynx stratiotata* L., 4.viii.94.

LANGMAID, J. R.—*Coleophora lassella* Staud., a series of four bred from *Juncus bufonius* L. together with larval cases, Hartland Moor, Dorset; cases appeared from foodplant randomly gathered 26.vii.93, moths emerged 17.v–4.vi.94 and another on 23.vii.94, the first time the species has been bred in this country (see also exhibits by R. J. Heckford and P. H. Sterling). *Tachystola acroxantha* Meyrick, a specimen taken in an m.v. trap belonging to M. T. M. Roberts at Portsmouth, 1.vii.94; new to Hampshire. *Ethmia bipunctella* F., Southsea, one taken at m.v. light, 31.vii.94; fourth Hampshire record. *Blastobasis decolorella* Woll., Portsmouth, one of several specimens taken at light, 8.vii.94; new to Hampshire. *Cochylis molliculana* Zell. (Plate III, Fig. 21) a series of four bred from *Picris echioides* at Portsmouth in 1994; larvae and pupae were found in the seedheads of the foodplant on 1.viii and moths emerged 4–27.viii; a specimen which was not exhibited was taken at m.v. light at Southsea, Hampshire, 21.viii.93, and found, on dissection of the genitalia to be this Mediterranean species, new to Britain.

PARSONS, M.—E. Sussex: *Agonopterix bipunctosa* Curt., Milton Hide, larvae 27.v.1994; *Pammene germmana* Hübn., Milton Hide, 27.v.1994; *Oxyptilia distans* Zell., Camber Sands, 25.v.1994. E. Kent: *Aristotelia brizella* Treits., Nagden Marshes, 22.viii.1994; *Acleris permutana* Dup., singletons from Hythe Ranges, 6.vii.1993 and Dungeness 8.vii.1993. Surrey: *Bucculatrix thoracella* Thunb., Richmond Park, 29.iv.1994; *Nemaxera betulinella* F., Great Bookham Common, 21.vii.1994; *Caloptilia populetorum* Zell., Richmond Park, 6.viii.1994; *Athrips rancidella* H.-S., Raynes Park, 15.vii.1994 and Richmond Park, 15.vii.1994; *Gelechia senticetella* Stgr. Raynes Park, 13.vii.1994, 3.viii.1994; *Glyphipteryx linneela* Clerk, Raynes Park, 22.vi.1994; *Pediasia contaminella* Hübn., Richmond Park, 6.viii.1994; *Sitochroa palealis* D. & S., Richmond Park, 21.vii.1994; *Aphomia sociella* L. and *Ephestia elutella* Hübn., bred from larvae found feeding on the remains of dead insects from the base of an "insect-o-cutor", Richmond Park, viii.1994. E. Glos.: *Bryotropha basaltinella* Zell., Hilcot End, 2.vii.1994.

PORTER, J.—*Evergestis extimalis* Scop., 24.ix.1994; *Anania verbascalis* D. & S., 18.vii.1994; *Palpita unionalis* Hüb., 24.ix.1994 all from the Kent coast, and another *P. unionalis* from Dorset on 5.x.1990.

ROBBINS, J.—An album containing specimens of the leaf mines of the families Eriocraniidae, Nepticulidae, Tischeriidae, Incurvariidae, Heliozelidae, Bucculatricidae, Lyonetiidae, Gracillariidae, Coleophoridae and Momphidae. The mined leaves were collected between 1988 and the current year exclusively from within the boundaries of the Exmoor National Park. A total of 138 species were represented and an index was included in a pocket within the back cover of the album.

SIMMONS, M.—Pyrilid moths from E. Sussex, 1994. From Norman's Bay: *Schoenobius gigantella* D. & S., *Evergestis extimalis* Scop., *Pyrausta cespitalis* D. & S., *Numonia marmorea* Haw. From Crowborough: *Agriphila inquinatella* D. & S., *Catoptria falsella* D. & S.

SIMPSON, A. N. B.—*Eudonia delunella* Staint., Tregroes, near Llandysul, Ceredigion, Dyfed, 29.vii.94, at light. *Capperia britanniodactyla* Gregs., Hartlebury Common, Worcs. VC37, bred from larvae collected 30.v.94. *Leioptilus lienigianus* Zell., Upton Warren, new to Worcs., VC37, 1.vii.94. *Cydia molesta* Busck, bred from nectarine purchased in Worcester ix.94. *Epinotia signatana* Dougl., Mill Meadow, Drakes Broughton, new to Worcs., VC37, 14.vi.94. *Caryocolum junctella* Dougl., Wyre Forest NNR, female caught flying in evening 27.iv.94; three bred from *Stellaria graminea* L. v. 94 from same site; first VC record. *Coleophora cratipennella* Clemens, bred from cases collected from *Juncus articulatus* L., River Cole, Sparkhill, Birmingham on 10.ix.93; first record for VC37.

SIMS, I.—*Adela fibulella* D. & S., River Lodden, Lower Earley, Reading, Berks., adults 30.v.94. *Diplodoma herminata* Geoff., Hainault Forest, Chigwell Row, Essex, adult and case, oak trunk, 11.iv.93, hatched 30.iv.93; case, hornbeam trunk, 13.ii.93. *Narycia monilifera* Geoff., Medmenham, Marlow, Bucks., adults and cases, fence post, 18.iii.92, hatched 3.v.92; Lower Earley, Reading, Berks., 14.iv.90, oak trunk adults hatched 10.v.90. *Luffia ferchaultella* Steph., Lower Earley, Reading, Berks., adults end cases on oak trunk 12.iv.90, hatched 16.vi.90. *Morophaga choragella* D. & S., Burnham Beeches, Slough, Berks., mining in the fungus *Ganoderma adspersum* (Schulz) Donk, growing on beech trunk, 14.x.90, hatched (forced) 31.xii.90; Hainault Forest, Chigwell Row, Essex, mining in the fungus *Polyporus squamosus* (Huds.) Fr. (dryad's saddle) on ash trunk, 3.xi.92, hatched 6.i.93 (forced); Medmenham, Marlow, Bucks., mining in the fungus *Pseudotrametes gibbosa* on dead wood, 9.ix.94, hatched 12.xi.94. *Psychoides filicivora* Meyrick, Woody Bay, Martinhoe, Devon, on *Dryopteris filix-mas* (L.) Schott, 15.viii.93, hatched 20.viii.93; Great Torrington, Devon, 20.ix.90, hatched 12.xi.90 (forced). *Nemapogon personella* P. & M., Burnham Beeches, Slough, Bucks., mining in the fungus *Piptoporus betulinus* (Bull) Karsten, 14.x.90, hatched 29.xii.90 (forced). *N. cloacella* Haw., Ashley Hill Forest, Knowl Hill, Reading, Berks., mining in the fungus *Piptoporus betulinus* 27.ii.94, hatched 17.vi.94; Hainault Forest, Chigwell Row, Essex, in dead wood and the fungus *Tyromyces stipticus*, 6.xi.92, hatched 12.iii.93 (forced). *N. ruricolla* Staint., Hainault Forest, Lambourne End, Essex, mining in the fungus *Coriolus versicolor* (L.) Quél., 30.xii.93, hatched 25.ii.94 (forced); Hainault Forest, Chigwell Row, Essex, in fungus *Coriolus versicolor*, 28.xii.93 hatched 20.ii.94 (forced). *Nemaxera betulinella* Fabr., Hainault Forest, Chigwell Row, Essex, 28.xii.93, hatched 20.ii.94 (forced). *Triaxomera parasitella* Hüb., Ashley Hill Forest, Knowl Hill, Reading, Berks., mining in the fungus *Piptoporus betulinus*, 27.iii.94, hatched 19.iv.94; Hainault Forest, Chigwell Row, Essex, mining in the fungus *Bjerkandera adjusta*, 28.xii.93, hatched 16.ii.94 (forced). *Monopis weaverella* Scott., Savernake Forest, Wiltshire, at

m.v., 20.v.91. *Bucculatrix nigricomella* Zell., Lower Earley, Reading, Berks., cocoons 26.iv.94 on *Leucanthemum vulgare* Lam., hatched 13.vii.94, heavily parasitized with 50 larvae producing 12 moths and 30 Hymenoptera. *Caloptilia cuculipennella* Hübn., Medmenham, Marlow, Bucks., mine on *Ligustrum vulgare* L., 7.ix.94, hatched 15.ix.94. *C. rufipennella* Hübn., Medmenham, Marlow, Bucks., on *Acer pseudoplatanus* L. 18.viii.94, hatched 7.ix.94. *C. azaleella* Brants, Rosemoor RHS Gardens, Great Torrington, Devon, mines on Azalea (*Rhododendron simsii*), 20.ix.90, hatched 20.x.90. *C. falconipennella* Hübn., Medmenham, Marlow, Bucks., mines 10.x.94, hatched 14.x.94. This appears to be a new record for VC24. Field-work and subsequent rearing has also shown it to be present in VC22 (Berks., at Twyford and Lower Earley), VC12 (N. Hants., at Eversley) and VC23 (Oxon., at Henley-on-Thames). All appear to be new county records, and located in the valleys of the River Thames and its tributaries. Perhaps it is extending its range, or maybe it has always been present here and has had a good year. It would be a good one to look out for at Dinton Pastures, the Lower Earley site is within 2 miles. *C. semifascia* Haw., Pheasant Wood, Hambleden, Marlow, Bucks., on *Acer campestre* L., 10.vii.94, hatched 22.vii.94. *Aspilapteryx tringipennella* Zell., Lower Earley, Reading, Berks., on *Plantago lanceolata* L., 23.vii.94, hatched 30.vii.94; very heavily parasitized with 200 mines producing two moths and 185 Hymenoptera. *Parornix fagivora* Frey, Pheasant Wood, Hambleden, Marlow, Bucks., on *Fagus sylvatica* L. 19.x.91 and 9.x.93, hatched 14.ii.92 and 12.ii.94 (both forced). *Acrocercops brongniardella* F., River Lodden, Lower Earley, Reading, Berks., on *Quercus* sp. 17.viii.91, hatched 3.ix.91 (still present here, and in Essex in 1994). *Phyllonorycter leucographella* Zell., Wickford, Essex, mines on *Pyracantha coccinea* Roemer, 26.iii.89 and 25.ii.90, hatched 23.iv.89 and 11.iv.90 (heavily parasitized in this area, with 100 mines producing four moths and 70 Hymenoptera; as a result far less common here in 1994). *P. salicolella* Sirc., Ashley Hill Forest, Knowl Hill, Reading, Berks., on *Salix caprea* L., 2.xii.90, hatched 21.iii.91 (forced); Burnham Beeches, Slough, Bucks., 14.x.90, hatched 22.iii.91 (forced). *P. dubitella* H.-S., Medmenham, Marlow, Bucks., on *Salix caprea*, 26.x.92, hatched 16.ii.93 (forced); Pheasant Wood, Hambleden, Marlow, Bucks., on *Salix*, 31.x.92, hatched 8.ii.93 (forced). *P. hilarella* Zett. Ashley Hill Forest, Knowl Hill, Reading, Berks., on *Salix caprea*, 2.xii.90, hatched 15.iv.91; Burnham Beeches, Slough, Bucks., on *Salix*, 14.x.90, hatched 16.iv.91. *P. quinqueguttella* Staint., Braunton Burrows, Devon, on *Salix repens* L., 29.ix.90, hatched 15.iv.91. *P. emberizaepennella* Bouche, Wangles Copps, Woodly, Reading, Berks., on *Lonicera periclymenum* L., 23.ix.89, hatched 3.iv.90; Chigwell Row, Essex, cocoon, 3.x.88. *Phyllocnistis saligna* Zell., Medmenham, Marlow, Bucks., on *Salix fragilis* L., 17.vii.92 and 4.viii.94, hatched 1.viii.92 and 8.viii.94; mine on *S. fragilis* 11.x.89 (unusual in being on upper-side). *Choreutis pariana* Cl., on *Crataegus monogyna* Jacq., River Lodden, Lower Earley, Reading, Berks., 30.v.94, hatched 19.vi.94.

SKINNER, B.—*Udea fulvalis* Hübn., Highcliffe, Hampshire, three bred specimens ex female vii.1993 together with photographs illustrating life history. *Salebriopsis albicilla* H.-S., Welshbury Hill, Glos., caught males, vi.1994, together with photographs illustrating life history. *Melissoblastes zelleri* Joannis, male with discal spots united, Greatstone, Kent, 14.vii.94. *Homoeosoma sinuella* F., male with banded forewing, Stoke Saltings, Kent, 24.vii.94. *Acrobasis repandana* F., melanistic male, Ham Street, Kent, 13.vii.94. *Sciota adelphella* F.v.R., short series bred from southeast Kent. *Schoenobius gigantella* D. & S., melanistic male, Stoke Saltings, 24.vii.94. *Perinephele lancealis* D. & S., albino male, Ham Street, 13.vii.94.

STERLING, M. J. & P. H.—*Nemapogon ruricolella* Staint., Charborough Park, new to Dorset VC9, bred from larvae feeding in *Stereum hirsutum* on oak bark, collected 28.iv.94, emerged from 26.v.94. *Ypsolopha lucella* F., Stoke Common, Bucks., VC24, one bred from larva on oak collected 30.v.94, and one adult (of many) beaten from oak 16.vii.94. *Coleophora lassella* Stdgr., Arne, Dorset, VC9, bred from cases made from *Juncus bufonius* L., collected 26.vii.93, emerged v.94. *C. clypeiferella* Hofm., Weymouth, new to Dorset VC9, at light 3/4.viii.94. *Ethmia bipunctella* F., Weymouth, at light, 3/4.viii.94. *Bryotropha mundella* Dougl., Fanore, Co. Clare VC H9, smoked out 13.vi.94. *Dichomeris juniperella* L. (Plate III, Fig. 20), Achlean, Cairngorms, vi.77, det. K. Sattler. *Brachmia inornatella* Dougl., Wicken Fen, Cambs., at light 17.vi.94. *Mompha bradleyi* Reidl, Stapleford, Herts. (collected 21.viii.93) and Woodwalton Fen, Hunts. (collected 3.ix.93), bred from flower stem galls on *Epilobium hirsutum* L. *Acleris permutana* Dup., Leagh South, Co. Galway, VC H15, 18 & 21.viii.94, at light. *Epiblema cnicolana* Zell., Charmouth, Dorset, VC9, 7.vii.94, two of many at rest on fleabane.

FOREIGN LEPIDOPTERA

THE NATURAL HISTORY MUSEUM—(1) Two drawers of Noctuidae recently received by the Museum, one containing material from Argentina, the other with material from Mongolia, Turkey, Turkmenia and parts of the former USSR, all in very fine condition. (2) Three drawers from the Inoue Collection of South-East Asian Lepidoptera, presented to the Museum in 1992. (3) Two drawers of *Alcis repandata* L. and two drawers of *Callimorpha dominula* L. from the National Collection of British Lepidoptera (R.C.K.). These species are currently the subject of research projects funded by the Cockayne Fellowship.

The Entomology Department of the Natural History Museum receives approximately 25 000 specimens annually. Since January 1994, the start of the Museum's electronic registration system, the Lepidoptera collections have received over 4000 pinned specimens. The majority of these have been collected by staff of the Museum's research divisions for particular projects. Two drawers of specimens shown at this Exhibition were a representative sample of some of the material obtained by staff of the Collections Management Division, either by exchange or for assistance with research projects for colleagues abroad. Part of the Museum's vital role is the enhancement of collections by obtaining well documented, legally collected material from areas that are inaccessible to Western collectors, too distant to be economically viable, or regions in which the Museum has no current research priorities. The material from Argentina was presented in return for colour transparencies of some type material which was needed for identification purposes. The other drawer consisted of part of a larger collection of specimens presented by fellow noctuid workers at the Hungarian Natural History Museum, Budapest, in return for assistance given on their last visit to the Natural History Museum.

CORLEY, M. F. V.—(1) Tineidae from Portugal. Eighteen species of Tineidae collected in Algarve, Portugal in recent years: *Morphaga morellus* Dup., *Ateliotum insulare* Rebel, *Peristomastix agenjoii* Petersen, *Myrmecozela ataxella* Chrét., *Novotinea muricolella* Fuchs, *Infurcitinea marcunella* Rebel, *I. atrifasciella* Stdgr., *Stenoptinea cyaneimarmorella* Mill., *Nemapogon nevadellus* Caradja, *Neurothaumasia ankerella* Mann, *N. ragusaella* Wocke, *Monopis nigricantella* Mill., *M. imella* Hübn., *Trichophaga bipartitella* Rag., *Proterospastix merdella* Zell., *Niditinea fuscella* L., *Tinea translucens* Meyr., *T. basifasciella* Rag.

Most of these were taken at mercury vapour light, but *Tinea translucens* (a southern species only recently recorded in the Iberian Peninsula from near Seville) and *Niditinea fuscella* were taken indoors. *Novotinea muricolella* was flying in late afternoon in March on a rocky hilltop.

Stenoptinea cyanaemarmorella is a poorly known species. MBGBI mentions only four British specimens and illustrates it badly. This is the first record for the Iberian Peninsula. In life, the recorder did not at first recognize it as a tineid: although the head is tineid-like, the scale-tufts and resting position, with wings held flat and only partly overlapping, are not.

Besides the last species and *T. translucens*, several other species were new records for Portugal: *A. insulare*, *M. ataxella*, *I. marcunella*, *N. ankerella*, *N. ragusaella*, *M. nigricantella* and *P. merdella*. At present, only seven other species of Tineidae have been recorded from Algarve, namely *Reisserita zernyi* Petersen, *R. chrysopterella* H.-S., *Tenaga nigripunctella* Haw., *Nemapogon granella* L., *N. cloacella* Haw., *N. agenjoi* Petersen and *Tinea murariella* Stdgr. Records of *Trichophage tapetzella* L. probably all refer to *T. bipartitella*.

(2) Oecophoridae from Portugal. Twenty-four species of Oecophoridae *sens. lat.* taken in Algarve: *Denisia augustella* Hübn., *Batia lunaris* Haw., *Epicallima formosella* D. & S., *Esperia sulphurella* F., *Carcina quercana* F., *Pleurota ericella* Dup., *P. amaniella* Mann, *Pseudatamelia xanthosoma* Rebel, *P. amparoella* Vives, *Agonopterix thapsiella* Zell., *A. c.f. adpersella* Koll., *A. nanatella* Staint., *A. scopariella* Hein., *A. purpurea* Haw., *A. subpropinquella* Staint., *A. rotundella* Dougl., *Exaeretia lutosella* H.-S., *Depressaria marcella* Rebel, *D. badiella* Hübn., *D. douglasella* Staint., *D. adustatella* Turati, *D. erinaceella* Stdgr, *Kasyniana xenias* Meyr. and *Odites kollarella* Costa.

In Vives Moreno's 1991 catalogue of Iberian Microlepidoptera these species are assigned to Oecophoridae, Xylorictidae and Depressariidae. The exhibitor does not argue the rights and wrongs of this arrangement, but points out that Vives Moreno includes only one species (*Odites kollarella*) in Xylorictidae, although three other Iberian species belong to this family: two are placed by him in a new genus *Kasyniana* in Oecophoridae *sens. str.*, and one is left in *Brachmia* in Gelechiidae! It has not yet proved possible to name all the *Agonopterix* species.

Of the species exhibited, *Esperia sulphurella* is day-flying. One of the *Pseudatamelia amparoella* specimens was also taken by day. *P. xanthosoma* comes to light readily, but also has a flight at sunrise. The remainder were taken at light or reared from larvae or pupae.

There is an old unlocalized record of *Pleurota amaniella* from Portugal. Vives Moreno rejected this and omitted the species from his list. *Agonopterix nanatella* is given only for the Balearic Islands in his list. Both species of *Pseudatamelia*, *Agonopterix thapsiella*, *A. adpersella* (if correct), *A. purpurea*, *A. rotundella*, *Depressaria douglasella*, *D. adustatella* and *D. erinaceella* are new records for Portugal. There are records from Algarve of 12 other species: *Epicallima mercedella* Stdgr, *Alabonia herculeella* Wals., *Pleurota bicostella* Clerck, *P. protasella* Stdgr, *P. honorella* Hübn., *P. hebetella* Rag., *P. planella* Stdgr, *Pseudatamelia detrimentella* Stdgr, *Agonopterix rutana* F., *A. nervosa* Haw., *Depressaria pulcherrimella* Staint. and '*Brachmia*' *ternatella* Stdgr.

ELSTON, H. J.—A selection of Lepidoptera taken in July 1994 in the Alpes Maritimes and Luberon areas of Provence in Southern France including a dark *Melanargia galathea* L. (Plate II, Fig. 11).

HACKETT, D.—A drawer illustrating problems in identification on external features of African species of *Helicoverpa* Hardwick closely related to *H. armigera* Hübn.

HALL, N.—Heterocera from France and Spain, selected for exhibition because of their taxonomic interest or because they are on the British List. (1) *Dicycla oo* L. bred from a female obtained at St. Laurent du Pape, Ardèche. On two occasions French *oo* had been kept for eggs, and each time a mere 4 were laid after keeping the moths in darkness in a pill-box, offering them diluted honey solution every 24 h for 2–3 days. The eggs were laid on the sides of the boxes, not in the corners, and were easy to see. They were kept through the winter out of doors, in their boxes, in a meat safe. The first batch was lost through predation by other insect larvae, but the second lot, kept in a tighter fitting box, survived, and hatched on 26–27.iv.1994. All four were kept separate. They were provided with opening oak buds, into which they bored, and three were lost because they literally disappeared, and could not be found even by dissecting the buds under a binocular microscope. After a while, both buds and the larvae within succumb to mould fungus. In retrospect, it would have been better to search for precociously opened oak foliage on which to feed the larvae. The surviving larva took to such foliage, and promptly made a spinning in one of the leaves, while still in its first instar. Thence it was easy to re-find and transfer to fresh food, and was reared without trouble. (2) Two other specimens of *D. oo*, from Arlanzón. Prov. Burgos, Spain, one of the plain yellow form *sulphurago* Stögr and the other yellow with very faint markings. (3) Very dark specimens of *Thalpophila matura* Hufn. f. *provincialis* Culot from Osse-en-Aspe, Pyr. Atl., France, 4.viii.1994. Other specimens from Britain, including dark ones, were shown for comparison. (4) Four specimens of *Acosmetia caliginosa* Hübn. from sea cliffs near Llanes, Prov. Asturias, Spain, between 9 & 13.viii.1987, and two others from Osse-en-Aspe, an inland site at c. 800 m altitude on 4.viii.1994. It was suggested that the species is probably double-brooded in Spain and Southern France. (5) Two specimens of *Mythimna c.f. ferrago* F. from Beniarrés, Prov. Alicante, Spain, 10.viii.1994 and Simat, Prov. Valencia, on 16.viii.1994. Two British specimens of *M. ferrago* and two others from Southern France and Northern Spain, of the pale f. *argyristis* Ramb. usual in southern Europe were shown for comparison. The specimens from Southern Spain looked like neither, but it is difficult to see what else they can be. (6) Five species of *Euchromius* Guen.: *E. ocella* Haw., St Martin de Londres, Hérault, France, 26.vi.1994; *E. vinculellus* Zell., Beniarrés, 10.viii.1994; *E. gozmanyi* Blesz., La Albufera, Prov. Valencia, Spain, 28.vi.1994; *E. cambridgei* Zell., La Albufera, 28.vi.1994, and *E. ramburiellus* Dup., St Martin de Londres, 26.vi.1994. (7) Four Scopariinae: *Anarpia incertalis* Dup., Sierra Nevada, Prov. Granada, Spain, 2700 m, 3.vii.1994; *Eudonia mercurella* L., Pradena, Prov. Segovia, Spain, 5.vii.1994; *E. delunella* Staint., St Laurent du Pape, Ardèche, France, 25.vi.1994, and an unidentified species from Sierra de Baza, Prov. Almería, Spain, 2000 m, 1.vii.1994. (8) *Lepidogma tamaricalis* Mann, from Ontiñena, Prov. Huesca, Spain, 5.vii.1991, apparently not previously recorded from Spain. (9) *Actenia vulpecalis* Rag. from Pto de la Mora, Prov. Granada, Spain, 12.vii.1991, det. M. Shaffer. These were exhibited for reference when considering other similar or related specimens from both France and Spain that were exhibited for the purpose of discussion. Two of these were identified with certainty as *Orthopygia rubidialis* D. & S. and *O. incarnatalis* Zell., the others probably *A. vulpecalis* and *A. honestalis* Treits., with some narrow-winged females presenting particular problems. It was pointed out that *A. honestalis* was not in Leraut's Checklist (1980) for France, and that *A. vulpecalis* appears in neither the French nor Spanish checklists, but should be in the latter as there are specimens from Spain in the B.M. (N.H.). (M. Shaffer, pers. comm.). (10) A selection of other species from localities in France and Spain.

HARMAN, T. W.—A selection of exhibits of Lepidoptera from around the World. (1) Australia. *Syntherata janetta* White (Saturniidae), a series to show variation within the species; bred from cocoons found on small shrubs growing on the beach at Holloways Beach, Cairns, Queensland, April 1993. (2) Nepal. Some interesting moths, including the following. Zygaenidae: *Chalcosia auxo albata* Moore, *Eterusia tricolor* Hope, *Soritia pulchella* Koll.; Geometridae: *Iotaphora iridicolor* Butl., *Xandrames albofasciata* Moore, *Arichanna flavinigra* Hamps., *Pachyodes varicoloraria* Moore, *Psyra annulifera* Walk., *Problepsis crassinotata* Prout, *Plutodes lamisca* Swin., *P. subcaudata* Butl.; SpHINGIDAE: *Cephonodes hylas* L., *Marumba decoratus* Moore (the second record for Nepal and the most westerly record of this species); Notodontidae: *Ginshachia gemmifera* Moore; Lymantriidae: *Numenes siletti* Walk. Arctiidae: *Asota tortuosa* Moore, *Aglaomorpha plagiata* Walk., *Nyctemera lactinicina* Cram., *Miltochrista linga* Moore, *Alphaea imbuta* Walk.; Noctuidae: *Baorisa hieroglyphica* Moore, *Grammodes geometrica* F., *Parallelia maturata* Walk., *P. praetermissa* Warr., *P. analis* Guen. and *Gaurena floescens albomaculata* Werny. (3) A specimen of *Baorisa hieroglyphica* (Plate III, Fig. 19) 'twinning' with a copy in sugar-icing by Anne Finch!

KING, G.—Over 30 specimens of F₁ and F₂ generations of the Indian arctiid, *Estigmene perotteti* Guerin. The original female was found in Bombay, Western India, in June 1994. Several ova were laid, and the subsequent larvae fed on a wide range of plant species. The original specimen was identified by the B.M. (N.H.) as *E. nigricans* Moore, but as a result of breeding out three different forms in the F₁ generation, an examination of the male genitalia was deemed necessary. In September, 1994, an additional form was observed: the cream-striped form is the most frequent, but these specimens were black and grey, the usual pink areas being replaced by grey. Only four examples were bred, and unfortunately no pairings were obtained. A female was exhibited. In the most recent emergence, October 1994, specimens have appeared with irregularly shaped or broken stripes. In addition to set examples, 3rd instar larvae were shown, feeding on hawkweed (F₃), and two live imagines were also exhibited.

MIDDLETON, A. P.—A selection of butterflies obtained during visits to Portugal (Sintra region) in 1993 and Poland (Bydgoszcz region) in 1994.

TREMBATH, D. A.—Five drawers of butterflies collected in the south-eastern and western Andean region of Venezuela during June, 1993, illustrating the wonderful diversity and colour of the butterflies of the Neotropical region. Relatively little serious work has been done on the fauna of Venezuela, and some of the species shown were of unusual interest. Drawer 1 contained 29 species of ithomids, many of which can be collected in dull weather along paths in the forest. Sometimes they occur in great abundance, with several species occurring together: the exhibitor found 11 species within a few minutes in one area at Rio Frio in the Andean region. Drawer 2 was devoted to heliconids, including some rare and local forms; there is still controversy over the status of some forms and subspecies. Drawer 3 contained *Acraea* and nymphalids, showing the tremendous range of shape and colour among these butterflies; included were *Baeotus amazonicus* Riley, male and female, a very rare subspecies of *Agrias amydon* Hewitson female, *Callicore maronesis* Oberthür and the brilliantly coloured *Doxocopa lavinia* Butler—a very rare un-named subspecies. Drawer 4 showed 29 species of pierid, a fascinating group of great interest to collectors, especially many of the little-known high-altitude species. Unfortunately, bad weather hindered collecting during the exhibitor's stay in the high-altitude region of San Cristobel. One notable species taken there was *Hesperocharis nera* Fruhstorfer, thought to be a rarity in Venezuela. Drawer 5 contained Papilionidae

and *Morpho*, the latter particularly magnificent. The large *Morpho* species fly at canopy height across the valleys until they meet wide paths or roads which they then invariably follow, flying at a height of between 7 and 10 metres. Very considerable skill and fitness are then required to capture them, aided by the use of shiny blue lures. The sight of them is unforgettable.

WARING, P.—(1) A reference collection of moths found in the Pyrenees and southern Spain during October. In the south, there are numerous semi-desert species which fly in late autumn, avoiding the intense heat of the summer, such as *Lasiocampa serrula* Guen., *Powellinia lasserrei* Oberthür and *Saragossa seeboldi* Stdgr. (2) Some interesting moths from the Palava Protected Landscape area in the Czech Republic, 4–9.ix.1994, during the biennial SEL Congress which was held at Lednice, near Brno, including the Geometridae *Rhodostrophia vibicaria* Clerck, widespread in Europe but absent from the British Isles; *Cataclysmes riguada* Hübn., a southern and central European species associated with xerothermic habitats where the larvae feed on species of Rubiaceae (bedstraws); *Therapis flavicaria* D. & S., a south-east European species which resembles *Pseudopanthera macularia* L. The larva feeds on *Lamium album* L. The one specimen seen came to m.v. light on the edge of riverine woodland just north of Lednice on 9.ix.; *Artiora evonymaria* D. & S. is an eastern European relative of the 'thorns', which extends into Austria and Germany but not further west. It was common locally on the Palava hills; the moths could be found at night fluttering round spindle (*Euonymus*) bushes, or settled upon them, more rarely at light. Noctuidae were represented by *Chersotis margaritacea* Vill., one of a rather large and diverse genus without a single representative in Britain which was fairly common at light in the Palava hills; *Agrochola nitida* D. & S., widely distributed in central Europe. The individual shown came to a wine rope hung on a riverside willow (*Salix* sp.) just north of Lednice on 5.ix.; *Emmelia trabealis* Scop., formerly resident in the Breckland of East Anglia, but no evidence of breeding since 1960. Widespread in warm, dry habitats in Europe and abundant in the Palava hills. The one shown came to light there on 4.ix. A map was displayed alongside the exhibit,, indicating the location of sites worked.

DIPTERA

Among the wide range of species exhibited, it was evident that the tephritids *Achanthophilus helianthi* (Rossi) (4 exhibitors) and *Orellia falcata* (Scop.) (3 exhibitors) must have been on the increase in 1994; both are usually rarely seen but are closely tied to their food plants, *Centaurea nigra* L. and *Tragopogon* respectively. A third British record of *Pseudopomyza atrimana* Meig. (Pseudopomyzidae) from a new locality was particularly encouraging. The platypezid *Agathomyia wankowiczii* (Schnabl) appears to be a recent introduction; the galls exhibited confirm that it has become established at one Kentish site but British examples of the insect itself have yet to be seen.

ALEXANDER, K. N. A. & FOSTER, A. P.—Flies found in 1994 by the National Trust's Biological Survey: *Ctenophora flaveolata* (F.) (Tipulidae), open beech pasture woodland, Ebworth Farm, Glos., 9.v; *Oxycera pardalina* Meig. (Stratiomyidae), tufa spring, Dinefwr Deer Park, Carms., 18.vii; *Dioctria oelandica* (L.) (Asilidae), Colby Lodge, Pembs., woodland glade, 13.vi; *Scenopinus niger* (Deg.) (Scenopinidae), dead standing oak, Dinefwr Park, Carms., 27.vi; *Brachyopa pilosa* Collin (Syrphidae), fallen beeches, Aldbury Common and commonly at Frithensden Beeches, Herts., 11.vi; *B. scutellaris* R.-D., woodland ride, Woodchester Park, Glos., 6.vi; *Eumerus*

sabulorum (Fall.) (Syrphidae), St David's Head, Pembs., 22/23.vi and Nicholaston Burrows, Gower, 19.vii; *Brachypalpus laphriformis* (Fall.) (Syrphidae), Aldbury Common, Herts., 11.vi; *Myopa extricata* Collin (Conopidae), Ebworth Farm, Glos., 6.v; *Ochthera mantis* (Deg.) (Ephydriidae), wet heath, Mynachdy'r-Graig, Cards., 28.vi.

BOYD, G.—A selection of Syrphidae, Stratiomyidae and Conopidae collected in 1994, among them the following Syrphidae: *Xylota xanthocnema* Collin, Aldbury Common, Herts., 11.vi; *Pyrophaena rosarum* (F.), Dinton Pastures, Berks., 4.vi; *Chrysotoxum verralli* Coll, Cambridge, in garden, 30.vii; *C. cautum* (Harris), 30.v.

CHANDLER, P. J.—(1) *Agathomyia wankowiczii* (Schnabl) (Platyezidae), male, female from Denmark (previously exhibited at 1992 Annual Exhibition) and brackets of the perennial fungus *Ganoderma applanatum* (Pers.) Pat. galled by its larvae, from Beechen Wood, Lullingstone, Kent, 19.vi.1994; it had been found there in 1993 by Joyce Pitt who had recorded fungi there for 20 years and had not seen it there before; one bracket had 3 years of galled layers, but it is probably a recent introduction—the first and only other British record was from Bouldermerre, Wisley, Surrey, 23.ix.1990 (Spooner, B. M., 1991, *Cecidology* 6(2): 80–81).

(2) Diptera newly recorded from Dinton Pastures in 1994: *Acrocer orbicula* (F.) (Acroceridae), Mortimer's Meadows, 3.vii; *Teuchophorus calcaratus* (Macq.) (Dolichopodidae), Sandford Copse, 19.vii, abundant by muddy creek; *Agathomyia elegantula* (Fall.) (Platyezidae), Sandford Copse, 30.vii; *Spiniphora maculata* (Meig.) (Phoridae), Mungell's Pond, 9.iii and Sandford Copse, 27.iii; *Cheilosia grossa* (Fall.) (Syrphidae), Mungell's Pond, 19.iii (collected by Roger Morris); *Anasimyia contracta* Torp & Claussen (Syrphidae), Mungell's Pond, 25.vi; *Achanthiophilus helianthi* (Rossi) (Tephritidae), Mortimer's Meadows, 30.vii; *Orellia falcata* (Scop.) (Tephritidae), Mortimer's Meadows, 25.vi; *Typhamyza bifasciata* (Wood) (Anthomyzidae), on *Typha* stems at Mungell's Pond, 24.vii; *Ornithomyia avicularia* (L.) (Hippoboscidae), hedge south of Black Swan Lake, 9.vii; *Phytoliriomyza melampyga* (Loew) (Agromyzidae), Sandford Copse, 10.vii, its leaf mines on *Impatiens glandulifera* Royle are common in the Park.

(3) *Nematoproctus distendens* (Mg.) (Dolichopodidae), the first male found in Sandford Copse, 16.vii.1994; only 2 females were found in 1993 but in 1994 many females were found around the shady creek in the wood (Fig. 5 in Chandler, P. J., 1994, *Br. J. Ent. Nat. Hist.* 7: 118–126).

COLLINS, G. A.—Three Syrphidae found in 1994: *Doros profuges* (Harris), Mickleham, Surrey, 12.vi; *Microdon devius* (L.), Chipstead Valley, Surrey, 12.vi; *Brachypalpus laphriformis* (Fall.), Underlaid Wood, Westm., 28.v.

GODFREY, A.—Diptera found in 1994: *Tanyptera atrata* (L.) (Tipulidae), Brown Moss, Chesh., 23.v and Boveney Brook/Sturt Common, Wyre Forest, Worcs., 22.v; *Dictenidia bimaculata* (L.) (Tipulidae), male, female reared ex rotten oak debris, Ashted Common, Surrey, collected 19.iv, emerged in v and vi; *Mycetobia pallipes* Meig. (Anisopodidae), male reared from pupa in sap runs on horse chestnut, Hognaby, Spilsby, Lincs., collected 2.vi, emerged 21.vi; *Oxycera pardalina* Meig. (Stratiomyidae), female swept from turfaceous seepage, Moccas Park, Heref., 1.vii; *Systemus scholtzii* (Loew) (Dolichopodidae), 2 males, 2 females reared ex rot hole in cleft of twin trunked sycamore, Pot Riding Wood SSSI, W. Yorks., collected iii, emerged iv–v; *Mallota cimbiciformis* (Fall.) (Syrphidae), female reared 15.vi from rot hole in alder, Shrawardine Pool, Salop; *Arctophila superbiens* (Müller) (Syrphidae), male on *Centaurea* flowers, former railway line, Smytham, Great Torrington, Devon, 4.vii; *Dichetophora finlandica* Verbeke (Sciomyzidae), apparently first rearing from outside laboratory, ex puparia found in empty shell of *Cernuella* species, collected iv

from fore dunes, Gibraltar Point, Lincs., male, female emerged 7.vi; *Colobaea distincta* (Meig.) (Sciomyzidae), Stanley Bank Nature Reserve, St Helens, Merseyside, 29.ix; *Aulacigaster leucopeza* (Meig.) (Aulacigastriidae), v-vii at horse chestnut sap, Chatsworth Park, Derbys., Moccas Park, Heref. and Powis Castle Park, Wales; *Odinia xanthocera* Collin (Odiniidae), Devil's Spittleful, Kidderminster, Worcs., female, 26.v.; *O. boletina* (Zett.), Bretton Park, W. Yorks., 25.vi; *Cnemacantha muscaria* (Fall.) (Lauxaniidae), grassland, Roundton Hill Nature Reserve, Wales, 25.v; *Sarcotachinella sinuata* (Meig.) (Sarcophagidae), male, Stowford Moor, Great Torrington, Devon, 4.viii; *Phaonia cincta* (Zett.) (Muscidae), 2 males reared from rot hole in alder, Shrawardine Pool, Salop, emerged 24.vi; *Thricops aculeipes* (Zett.) (Muscidae), 2 males on *Trollius* flowers, Arncliffe, N. Yorks., 11.vi.

HACKETT, D.—A selection of Syrphidae and other flies, mainly associated with dead wood, including: *Ctenophora pectinicornis* (L.) (Tipulidae), reared from under poplar bark, Trent Park, Middx, collected 15.x.93, emerged 23.xii.93; *Dictenidia bimaculata* (L.) (Tipulidae), reared ex rotten beech stump in vi.94; *Epiphragma ocellare* (L.) (Limoniidae), reared 26.ii.94 ex rotten birch trunk, Queen's Woods, N. London; *Mallota cimbiciformis* (Fall.) (Syrphidae), at *Rubus*, Totteridge Fields, Barnet, 18.vi; *Brachyopa pilosa* Collin (Syrphidae), on beech log, Frithstone Beeches, Herts., 11.vi; *Thereva nobilitata* (F.) (Therevidae), reared 24.vi, from larva under loose bark of standing dead oak, Hampstead Heath, N. London, collected 1.vi.94.

HALSTEAD, A. J.—Ten species of Diptera found in 1994: *Leptogaster guttiventris* Zett. (Asilidae), Zealand Cross, Salisbury Plain, Wilts., 22.vii; *Nyctia halterata* (Panz.) (Sarcophagidae), Mungell's Pond, Dinton Pastures, Berks., 25.vi; *Ulidia erythrophthalma* Meig. (Otitidae), Cheverell Down, Salisbury Plain, Wilts., 19.vii; seven species of Tephritidae from Salisbury Plain, Wilts.: *Achanthiophilus helianthi* (Rossi), 1 female, Netherhaven Down, 18.vii; *Chaetorellia loricata* (Rond.), Haxton Down, 19.vii; *Orellia falcata* (Scop.), Haxton Down, 19.vii; *Terellia longicauda* (Meig.), on flowers of *Cirsium eriophorum* (L.) Scop., its food plant, Alton Down, 18.vii; *T. vectensis* (Collin), Netherhaven Down, 18.vii and Orcheston Down, 21.vii; *Urophora spoliata* (Hal.), Netherhaven Down, 18.vii (two latter on their food plant *Serratula*); *U. cuspidata* (Meig.), Robin's Hood Ball, 18.vii.

HARMAN, T. W.—*Callicera aurata* (Rossi) (Syrphidae), in office of Canterbury Environmental Education Centre, Kent, 21.ix.1994.

HARVEY, P. R.—Insects from sites in south Essex, threatened by housing development: (1) from Mill Wood Pit, Thurrock: *Eutolmus rufibarbis* (Meig.) (Asilidae) and *Stratiomys longicornis* (Scop.) (Stratiomyidae); (2) from Ferry Fields, near Tilbury: *Asilus crabroniformis* L. (Asilidae) (other recent Essex records of the latter were mentioned, from the nearby horse-grazed Broom Hill and Ferry Fields).

HAWKINS, R. D.—*Ferdinandea ruficornis* (F.) (Syrphidae), in a green lane alongside woodland, Driver's Green, near Outwood, Surrey, 21.iv.1994; the commoner species *F. cuprea* (Scop.) was exhibited for comparison.

HODGE, P. J.—*Achanthiophilus helianthi* (Rossi) (Tephritidae), Crade Hill, Alfriston, E. Sussex, 23.vii.1994, on *Centaurea nigra* L. at margin of arable field.

PERRY, I.—Diptera found in 1994: *Anthalia beatricella* Chandler (Hybotidae), at *Crataegus* flowers, Denny Wood, New Forest, 23.v; *Empis woodi* Collin (Empididae), Wandlebury, Cambs., 12.v; *Hilara morata* Collin (Empididae), shaded ditch on Cavenham Heath, Suff., 18.vi; *Sciapus laetus* (Meig.) (Dolichopodidae), Pennard Hill, Glam., freshwater seepages flowing onto saltmarsh, 8.vii; *Brachyopa bicolor* (Fall.) (Syrphidae), male hovering by sap flow on birch, Cavenham Heath, Suff., 14.v; *Orellia falcata* (Scop.) (Tephritidae), around the food plant *Tragopogon*, Kenfig Burrows, Glam., 30.vi; *Achanthiophilus helianthi* (Rossi) (Tephritidae), Rhossili,

Glam., 2.vii; *Pseudopomyza atrimana* Meig. (Pseudopomyzidae), Denny Wood, New Forest, 22.v, third British record; *Sapromyza basalis* Zett. (Lauxaniidae), Millwoods, Glam., 5.vii; *Parallelomma vittatum* (Meig.) (Scathophagidae), Cwm Ivy Woods, Glam., 29.vi; *Fannia ringdahlena* Collin (Fanniidae), first English records from the New Forest: Denny Wood, 22.v and Millyford Bridge, 23.v; *Coenosia albatella* (Zett.) (Muscidae), Whiteford Burrows, Glam., 29.vi and Oxwich, 5.vii, swept from bare sand on dunes.

PLANT, C. W.—Twelve species of Syrphidae from Malta, iv.1994, including a possibly new species of *Eumerus*; 3 other species of *Eumerus* and 3 species of *Paragus* were included in the exhibit, with 1 species each of *Scaeva*, *Chrysotoxum*, *Eristalinus* and *Platynochaetus*—*P. rufus* Macq., noted for its “incredibly long arista”.

ROBBINS, J.—An album containing specimens of leaf mines caused by larvae of Diptera, collected from 1989 to 1994 in Exmoor National Park, mostly identified (in some cases provisionally) from their mines: 101 species of Agromyzidae, 6 species of Anthomyiidae, 2 species each of Tephritidae and Drosophilidae, and 1 species of Cecidomyiidae.

SIMMONDS, M. J.—Six species of Conopidae from E. Sussex and Kent.

STUBBS, A. E.—*Bittacomorpha clavipes* (Ptychopteridae) (Plate II, Fig. 10), a “phantom crane-fly” from Canada, collected in viii.1994; this has white banded tarsi which detract attention from the dark body while the insect is flying along shaded woodland streams. The British *Dolichozepe albipes* (Ström) (Tipulidae), which occurs in the same habitat and which uses a similar ploy, was exhibited for comparison.

COLEOPTERA

ALEXANDER, K. N. A. & FOSTER, A. P.—A selection of the more interesting beetles found during the work of the National Trust's Biological Survey in 1994. *Cicindela maritima* Lat. & Dej. (Carabidae), Nicholaston Burrows, Gower, W. Glam., 19.vii.1994; *Georissus crenulatus* (Rossi) (Hydrophilidae), St David's Head, Pemb., 16.vi.1994, cliff seepage; *Helophorus dorsalis* (Marsh.) (Hydrophilidae), Woodchester Park, Glos., 7.vi.1994, woodland rut puddle; *Plegaderus dissectus* Er. (Histeridae), Hardwick Hall, Derbys., 8.viii.1994, moist oak bark; *Deleaster dichrous* (Grav.) (Staphylinidae), Cwm Hoffnant, Card., 30.vi.1994, streamside stones; *Amphimallon ochraceus* (Knoch) (Scarabaeidae), Paviland Cliff, Gower, W. Glam., 22.vii.1994, limestone grassland; *Dirhagus pygmaeus* (F.) (Eucnemidae), Bishopston Valley, Gower, W. Glam., 22.vii.1994, male and female swept, new to Wales; *Tillus elongatus* (L.) (Cleridae), Aldbury Common, Herts., 11.vi.1994, on dead standing beech trunk; *Coccinella quinquepunctata* L. (Coccinellidae), Dinefwr, Carm., 18.vii.1994, river shingle; *Mycetophagus piceus* (F.) (Mycetophagidae), Williams Clough, Kinder Estate, Derbys., 11.viii.1994, red-rotten oak; *Hallomenus binotatus* (Quen.) (Melandryidae), Peter Nook Wood, Kinder Estate, Derbys., 10.viii.1994, and Graigllech Woods, Brecons., 26.vi.1994, new to Wales, in both cases from bracket fungus *Laetiporus sulphureus* (Bull.) Bond & Singer on oak; *Phyllobrotica quadrimaculata* (L.) (Chrysomelidae), Tretio Common, Pemb., 13.vii.1994, lesser skullcap on wet heath; *Apteropeda globosa* (Ill.) (Chrysomelidae), Bishopston Valley, Gower, W. Glam., 22.vii.1994, swept and Woodchester Park, Glos., 22.vii.1994, swept in shady ride; *Trachyploeus aristatus* (Gyll.) (Curculionidae), Pwll Caerog, Pemb., 12.vii.1994, at roots of sea plantain; *Microplontus triangulum* (Boh.) (Curculionidae), Woodchester Park, Glos., 31.v.1994 swept from limestone grassland; *Miarus micros* (Germ.) (Curculionidae),

Letcha Cliff, Cornwall, 16.v.1994, on sheep's-bit; *Ernoporus fagi* (F.) (Scolytidae), Aldbury Common, Herts., 11.vi.1994, beech bark.

ALLEN, A. W. J.—Nine species of Coleoptera collected in Dorset between 1992 and 1994. *Plegaderus vulneratus* (Panz.) (Histeridae), Chetterwood near Manswood, ST 90, x.1992 one under bark of dead conifer; *Heterothops niger* Kraatz (Staphylinidae), Cranbourne, SU 01, iii.1994, one in a mole's nest; *Trachys scrobiculatus* Kiesenwetter (Buprestidae), in a wood near Ashmore, ST 91, vi.1993, one swept from a grassy clearing, first post-1969 record for Dorset; *Dirhagus pygmaeus* (F.) (Eucnemidae), Chetterwood near Manswood, ST 90, vi.1993, one swept in a clearing, new to Dorset; *Colydium elongatum* (F.) (Colydiidae), near Alderholt, SU 01, vi.1992, under bark of dead beech; *Lissodema quadripustulata* (Marsh.) (Salpingidae), Chetterwood near Manswood, ST 90, vi.1992, one swept; *Tomoxia bucephala* Costa (Mordellidae), near Alderholt, SU 01, vi.1992, on a dead oak; *Psylliodes luteola* (Müller, O. F.) (Chrysomelidae), Tadden near Wimbourne, ST 90, viii.1993, one swept from vegetation beside grassy field, and near Wimbourne, SU 00, viii.1993, plentiful at the edge of a wheat field, and ix.1994, in the hedge beside the same field, the first post-1969 record for Dorset; *Cassida nebulosa* L. (Chrysomelidae), Crichel, SU 00, vi.1992, one swept.

COPESTAKE, D. R.—Eleven species of British Coleoptera collected between 1992 and 1994. *Calathus cinctus* Mots. (Carabidae), Hitchcopse Pit, Oxon., 5.x.1994; *Harpalus honestus* (Dufts.) (Carabidae), St Bee's Head, Cumbria, 22.v.1994; *Drypta dentata* (Rossi) (Carabidae), Eypesmouth, Dorset, 31.viii.1994; *Amauronyx maerkeli* (Aubé) (Pselaphidae), Wisely Common, Surrey, 17.ii.1994, in grass tufts by pond; *Gnorimus variabilis* (L.) (Scarabaeidae), Windsor, Berks., emerged vi.1994, bred from larva; *Agrilus sinuatus* (Ol.) (Buprestidae), Bushy Park, Middlesex, 21.vii.1994; *Dasytes niger* (L.) (Melyridae), Brinken Wood, New Forest, South Hampshire, 9.vi.1994; *Oxyaemus variolosus* (Duf.) (Colydiidae), Windsor, Berks., 18.vi.1994; *Lissodema quadripustulata* (Marsh.) (Salpingidae), Windsor, Berks., 18.vi.1994; *Bagous brevis* Gyll. (Curculionidae), Brockenhurst, S. Hants, 9.vi.1993; *Rhynchaenus avellanae* (Don.) (Curculionidae), Windsor, Berks., 9.vi.1992, a specimen with black tarsi and antennae.

EVERSHAM, B. C. & TELFER, M. G.—Coleoptera recorded from a Breckland road verge near Lakenheath Warren during 1993 and 1994.

(1) Seed-eating Carabidae of the genera *Amara* and *Harpalus*. *A. anthobia* Villa; *A. apricaria* (Payk.); *A. bifrons* (Gyll.); *A. consularis* (Dufts.); *A. equestris* (Dufts.); *A. eurynota* (Panz.); *A. fulva* (Müller, O. F.); *A. fusca* Dej.; *A. lucida* (Dufts.); *H. affinis* (Schr.); *H. anxius* (Dufts.); *H. attenuatus* Steph.; *H. froelichi* Sturm; *H. puncticeps* (Steph.); *H. rufibarbis* (F.); *H. rubripes* (Dufts.); *H. rufitarsis* (Dufts.); *H. smaragdinus* (Dufts.); *H. vernalis* (Dufts.).

(2) Other notable Coleoptera. *Calathus ambiguus* (Payk.) (Carabidae); *Laemos-tenus terricola* (Herbst) (Carabidae); *Licinus depressus* (Payk.) (Carabidae); *Panagaeus bipustulatus* (F.) (Carabidae); *Masoreus wetterhali* (Gyll.) (Carabidae); *Metabletus truncatellus* (L.) (Carabidae); *Silpha laevigata* F. (Silphidae); *Ocyopus ophthalmicus* (Scop.) (Staphylinidae); *Aphodius distinctus* (Müller, O. F.) (Scarabaeidae); *Amphimallon solstitialis* (L.) (Scarabaeidae); *Euchlora dubia* (Scop.) (Scarabaeidae); *Cardiophorus asellus* Er. (Elateridae); *Melanimon tibialis* (F.) (Tenebrionidae); *Crypticus quisquilius* (L.) (Tenebrionidae); *Cteniopis sulphureus* (L.) (Tenebrionidae); *Notoxus monocerus* (L.) (Anthicidae); *Phytoecia cylindrica* (L.) (Cerambycidae); *Chrysolina sanguinolenta* (L.) (Chrysomelidae); *Galeruca tanaceti* (L.) (Chrysomelidae); *Psylliodes sophiae* Heikertinger (Chrysomelidae); *Cassida nebulosa* L. (Chrysomelidae); *Cleonus piger* (Scop.) (Curculionidae).

HACKETT, D.—Thirteen species of Coleoptera found during 1994. *Brosicus cephalotes* (L.) (Carabidae), Southgate, Gower, W. Glam., 17.vii.1994, under stone; *Typhaeus typhoeus* (L.) (Geotrupidae), Hampstead Heath, Middx, 18.x.1994, female in sandy soil under rabbit midden; *Aphodius contaminatus* (Herbst) (Scarabaeidae), Hampstead Heath, Middx, 24.ix.1994, in soil; *Agrilus laticornis* (Ill.) (Buprestidae), Queen's Wood, Middx, 29.vii.1994, in light trap; *Stenagostus villosus* (Fourc.) (Elateridae), Coldfall Wood, Middx, emerged 24.iv.1994, bred from larva found under oak bark; *Athous campyloides* Newm. (Elateridae), Railway Fields Nature Park, Harringay, Middx, 6.vii.1993; in light trap; *Aplocnemus pini* Redt. (Melyridae), Queen's Wood, Middx, 22.ii.1994, under oak bark; *Helops caeruleus* (L.) (Tenebrionidae), Lesnes Abbey Wood, W. Kent, iii.1994, under bark; *Pyrochroa serraticornis* (Scop.) (Pyrochroidae), Astonbury Wood, Herts., 5.vi.1994; *Oedemera nobilis* (Scop.) (Oedemeridae), near Park Mill, Dinton Pastures C. P., Berks., 25.vi.1994, on hogweed; *Arhopalus rusticus* (L.) (Cerambycidae), Graffham, W. Sussex, emerged 24.iv.1994, bred from pine log; *Phloeophagus lignarius* (Marsh.) (Curculionidae), Hanger Lane Hill, Middx, viii.1994, from beech heart rot; *Platypus cylindrus* (F.) (Platypodidae), Hampstead Heath, Middx, 19.v.1994, from oak.

HALSTEAD, A.—Some local Coleoptera taken in 1994. *Paralister purpurascens* (Herbst) (Histeridae), RHS Garden, Wisley, Surrey, 29.iv.1994, in water trap; *Conopalpus testaceus* (Ol.) (Melandryidae), Richmond Park, Surrey, 6.viii.1994, at m.v. light; *Metoeus paradoxus* (L.) (Rhipiphoridae), Richmond Park, Surrey, 6.viii.1994, at m.v. light; *Molorchus umbellatarum* (v. Schreb.) (Cerambycidae), Mortimer's meadow, Dinton Pastures C. P., Berks., 22.v.1994, swept; *Anaglyptus mysticus* (L.) (Cerambycidae), Mortimer's meadow, Dinton Pastures C. P., Berks., 22.v.1994, swept; *Agapanthia villosoviridescens* (Deg.) (Cerambycidae), Therfield Heath, Royston, Herts., 31.v.1994, swept; *Orsodacne cerasi* (L.) (Chrysomelidae), Therfield Heath, Royston, Herts., 31.v.1994, swept; *Cryptocephalus biguttatus* (Scop.) (Chrysomelidae), Wisley Common, Surrey, 23.vi.1994, swept; *C. moraei* (L.), White Downs, Surrey, 26.vi.1994, swept; *Chrysolina americana* (L.) (Chrysomelidae), RHS Garden, Wisley, Surrey, one of three adults found singly on *Rosmarinus officinalis* L. between 12.v and 1.vi.1994; *Polydrusus sericeus* (Schall.) (Curculionidae), RHS Garden, Wisley, Surrey, 2.vi.1994, male and female swept.

HENDERSON, M.—(1) Thirteen species of beetles from Wimbledon Common, Surrey. *Cychrus caraboides* (L.) (Carabidae), west of site of Brickfields Cottage, 18.iii.1994, one over-wintering in rotten wood; *Helochares punctatus* Sharp (Hydrophilidae), Seven Posts Pond, 2.vi.1991; *Dorcus parallelipedus* (L.) (Lucanidae), woodland just north of the windmill, 16.vii.1994, at lepidopterist's sugar; *Onthophagus coenobita* (Herbst) (Scarabaeidae), Farm Bog, 23.iv.1989, in carrion in pit-gall trap; *Agrilus laticornis* (Ill.) (Buprestidae), north of windmill, 1.viii.1992, beating oak; *Leptura livida* F. (Cerambycidae), near Brook Cottage, 29.vi.1991, on umbelliferae; *Clytus arietis* (L.) (Cerambycidae) 2.vii.1987, on umbelliferae; *Tetrops praeusta* (L.) (Cerambycidae), near windmill, 19.v.1991, beating willow; *Chrysolina orichalcea* (Müller, O. F.) (Chrysomelidae), in neighbouring Cannizaro Park, 25.vi.1992, on *Heracleum sphondylium* L., *Chrysomela populi* L. (Chrysomelidae), near King's Mere, 9.vii.1994, feeding on willow; *Attelabus nitens* (Scopoli) (Attelabidae), near Seven Posts Pond, 2.vi.1991, beating oak; *Magdalis cerasi* (L.) (Curculionidae), near Seven Posts Pond, 2.vi.1991, beating oak; *Curculio villosus* F. (Curculionidae), north of windmill, 1.v.1991, swept.

(2) A selection of beetles collected by Dr A. S. Henderson in Provence, France, in 1992 or on a joint collecting trip to Nanteuil-en-Vallee, near Poitiers, and the Central

Massif, France, in July 1993. *Carabus auratus* L. (Carabidae), Le Mont Dore, Central Massif, 14.vii.1993; *Cicindela campestris* L. (Carabidae), Pueche der Dardailla, Provence, 28.iv.1992, a specimen with unusual bronzed colour from heathland; *Silpha carinata* Herbst (Silphidae), Col de la Croix St Robert, Central Massif, 14.vii.1993, at altitude of 1451 m; *Typhaeus typhoeus* (L.) (Geotrupidae), Provence, iv.1992; *Copris lunaris* (L.) (Scarabaeidae), Verdun sur Gorrone, Goronne Valley, 2.v.1992; *Gnorimus nobilis* (L.) (Scarabaeidae), La Folatiere, Nanteuil-en-Vallee, 12.vii.1993, on dwarf elder flower; *Trichius zonatus* Germ. (Scarabaeidae), La Folatiere, Nanteuil-en-Vallee, 16.vii.1993, on dwarf elder flower; *Oncomera femorata* (F.) (Oedemeridae), near Fontevraud l'Abbeye, 10.vii.1993, male and female; *Strangalia aurulenta* (F.) (Cerambycidae), La Folatiere, Nanteuil-en-Vallee, 16.vii.1993.

HOARE, D. I. B.—A selection of scarce ground beetles (Carabidae) taken during 1994. *Elaphrus uliginosus* F., Lower Test Marshes, S. Hants, 2.iv. 1994, under log; *Bembidion bipunctatum* (L.), Loch-na-Chait, Inv., 27.v.1994, under stone; *B. pallidipenne* (Ill.), Constantine Bay, W. Corn., 6.vii.1994, on sand; *Pterostichus kugelanni* (Panz.) (Plate II, Fig. 12), Bicton Common, S. Devon, 28.iv.1994, under stone; *Platyderus ruficollis* (Marsh.), Fleet, N. Hants, 5.iii.1994, under log; *Agonum ericeti* (Panz.), Rothiemurchus, Inv., 23.v.1994 on track; *Stenolophus teutonius* (Schr.), Milford-on-Sea, S. Hants, 15.vii.1994, under stone near cliff trickle; *Oodes helopioides* (F.), Emer Bog, S. Hants, 19.iii.1994, hibernating in rotten wood.

HODGE, P. J.—A selection of notable Coleoptera taken during 1994 including two species new to Somerset and one species new to Sussex (*). *Agonum sexpunctatum* (L.) (Carabidae), Chailey Common, E. Sussex, TQ 3720, 1.vi.1994; *Panagaeus cruxmajor* (L.) (Carabidae), Lough Mask, Co. Galway, M 0966, 20.v.1994, under stone; *Helophorus longitarsis* Woll. (Hydrophilidae), Lewes, E. Sussex, TQ 4211, 6.x.1994, abundant in clay-bottomed dew-pond; *Ochthebius pusillus* Steph. (Hydraenidae), Lewes, E. Sussex, TQ 4211, 15.x.1994, in clay-bottomed dew-pond; *Hydnobius punctatus* (Sturm) (Leiodidae), The Coombe, Lewes, E. Sussex, TQ 4310, 15.x.1994, several swept from chalk grassland; *Rugilus subtilis* (Er.) (Staphylinidae), The Coombe, Lewes, E. Sussex, TQ 4210, 30.iv.1994, one swept from chalk grassland; *Philonthus rubripennis* Steph. (Staphylinidae), River Barle near Dulverton, S. Som., SS 8730, 16.vi.1994, on shingle bank; *Gyrophaena angustata* (Steph.) (Staphylinidae), Barle Valley near Dulverton, S. Som., SS 8730, 16.vi.1994, in fungus on old ash stump; *Bolitochara mulsanti* Sharp (Staphylinidae), Barle Valley near Dulverton, S. Som., SS 8730, 16.vi.1994, in fungus on old ash stump; *Selatosomus bipustulatus* (L.) (Elatерidae), Barle Valley near Dulverton, S. Som., SS 8730, 15.vi.1994, one beaten from blackthorn; *Meligethes viduatus* (Heer) (Nitidulidae), Pulborough Brooks RSPB Reserve, W. Sussex, TQ 0516, 20.vii.1994, plentiful on flowers of *Galeopsis tetrahit* L.; *Liliocercis lilii* (Scop.) (Chrysomelidae), Ringmer, E. Sussex, TQ 4412, 3.vii.1994, on *Lilium pyrenaicum* Gouan; *Chrysolina fastuosa* (Scop.) (Chrysomelidae), Pulborough Brooks RSPB Reserve, W. Sussex, TQ 0516, 20.vii.1994, plentiful on *Galeopsis tetrahit*, *Choragus sheppardi* Kirby (Anthribidae), The Coombe, Lewes, E. Sussex, TQ 4210, 16.vii.1994, one swept from chalk grassland; *Apion genistae* Kirby (Apionidae), Chailey Common, E. Sussex, TQ 3720, 1.vi.1994; several swept off *Genista anglica* L.; *Tropiphorus terricola* (Newm.) (Curculionidae), yateley Common, N. Hants, SU 8159, one swept from long grass; *Hypera meles* (F.) (Curculionidae), Bramshill Park, N. Hants, SU 7660, 21.vi.1994, one swept off heathy grassland; *Liparus germanus* (L.) (Curculionidae), Hinxhill, E. Kent, TR 0543, 21.vii.1994, at roots of *Heracleum sphondylium* L.

KNILL-JONES, S. A.—A specimen of *Dytiscus marginalis* L. (Dytiscidae), taken in a m.v. light trap at Freshwater, I.o.W. on 25.vii.1994.

LOTT, D. A.—Some beetles from mountain areas in Europe. (1) Massif Central, France. *Bembidion ascendens* Daniel (Carabidae), *Neobisnius procerulus* (Grav.) (Staphylinidae), River Sioule, Chou vigny, Puy de Dome, 11.vii.1986; *Bembidion azureascens* Wagner (Carabidae), *Tachys sexstriatus* (Dufts.) (Carabidae), *Lionychus quadrillum* (Dufts.) (Carabidae), *Carpelimus nitidus* Baudi (Staphylinidae), *C. obesus* (Kiesenw.), *C. pusillus* (Kiesenw.), *Paederus balcanicus* Korge (Staphylinidae), *Philonthus rufimanus* Er. (Staphylinidae), River Allier, Maringues, Puy de Dome, 13.vii.1986; *Lesteva monticola* Kiesenw. (Staphylinidae), *Psephidonus* (= *Geodromicus*) *kunzei* (Heer) (Staphylinidae), *Stenus fossulatus* R. (Staphylinidae), *Quedius dubius* (Heer) (Staphylinidae), La Grande Cascade, Mont Dore, Puy de Dome, 29.vi.1992.

(2) Savoy Alps, France. *Nebria jockischi* Sturm (Carabidae), *N. castanea* Bon., *Membidion bipunctatum* (L.) (Carabidae), recorded at 2630 m, *Pterostichus multipunctatus* (Dej.) (Carabidae), *Trichotichnus laevipennis* (Dufts.) (Carabidae), *Cymindis humeralis* (Fourc.) (Carabidae), *Deliphrum tectum* (Payk.) (Staphylinidae), *Psephidonus* (= *Geodromicus*) *kunzei* (Heer) (Staphylinidae), *Omalium ferrugineum* Kraatz (Staphylinidae), *Ochtheophilus longipennis* (Fairm.) (Staphylinidae), *Philonthus montivagus* Heer (Staphylinidae), *Ocypus chevrolati* Baudi (Staphylinidae), *O. picipennis* (Er.), *Quedius punctatellus* (Heer) (Staphylinidae), *Q. dubius* (Heer), *Q. obscuripennis* Bernh., *Liogluta nitidiuscula* (Sharp) (Staphylinidae), Val d'Isere, Savoie, 29.viii.1993 to 3.ix.1993; *Olophrum alpinum* Er. (Staphylinidae), *Anthophagus alpinus* (F.) (Staphylinidae), *Hygrogeus aemulus* (Rosen.) (Staphylinidae), Bonneval sur Arc, Savoie, 2530 m, 30.viii.1993.

(3) Cantabrian Mountains, Spain. *Lathrobium angustatum* Boisd. & Lac. (Staphylinidae), Peurto de Piedrasluengas, Palencia, 8.vi.1990; *Philonthus coeruleescens* (Boisd. & Lac.) (Staphylinidae), *Ischnopoda* (= *Tachyusa*) *balteata* (Er.), Rio Torio, Felmin, Leon, 9.vi.1990; *Gabrius nigrituloides* Coif., Valporquero, Leon, 9.vi.1990; *Philonthus confinis* Strand, A. (Staphylinidae), Puerto de Palombero, Cantabria, 11.vi.1990.

(4) Sierra de Albarracin, Spain. *Chaetarthria similis* Woll. (Hydrophilidae), *Gabrius tirolensis* (Luzé) (Staphylinidae), *Euryalea ?decumana* (Er.) (Staphylinidae), Rio Guadalavair, Albarracin, Teruel, 19.v.1994.

(5) Pyrenees, Spain. *Actidium aterritimum* (Mots.) (Ptilidae), *Boreaphilus velox* (Heer) (Staphylinidae), *Neobisnius prolixus* (Er.) (Staphylinidae), *Philonthus coeruleescens* (Boisd. & Lac.) (Staphylinidae), Torrent Capistol, Martinet, Lerida, 15.v.1994.

(6) Peurto de Beceite, Spain. *Carpelimus obesus* (Kiesenw.) (Staphylinidae), *C. pusillus* (Grav.), *Lathrobium angustatum* Boisd. & Lac. (Staphylinidae), *Medon ripicola* (Kraatz) (Staphylinidae), *Scopaeus gracilis* (Sperk) (Staphylinidae), *S. laevigatus* (Gyll.), *Erichsonius signaticornis* (Muls. & Rey) (Staphylinidae), *Gabrius pisciformis* Fauv. (Staphylinidae), Barranco de feu, Castellon, 17.v.1994; *Stenus canescens* Rosen. (Staphylinidae), *Philonthus palustris* Bris. (Staphylinidae), rrimus (Herbst) (Staphylinidae), Herbes, Teruel, 18.v.1994.

(7) Black Forest, Germany. *Pterostichus pumilio* (Dej.) (Carabidae), *Micropeplus marietti* Duval (Staphylinidae), *Otiiorhynchus scaber* (L.) (Curculionidae), Dachsberg, 21–25.vii.1988; *Gabrius astutus* (Er.) (Staphylinidae), *Gaurotes virginea* (L.) (Staphylinidae), Ibach, 27.vii.1988.

(8) Karkonosze, Poland. *Quedius punctatellus* (Heer) (Staphylinidae), *Gnypta caerulea* Sahl. (Staphylinidae), Szrenica, 13.viii.1994.

MORRIS, M. G.—(1) The British species of *Cathormiocerus* Schoen. (Coleoptera, Curculionidae, Entiminae), mostly recent captures. The genus has a very restricted range, western Europe only. *Cathormiocerus attaphilus* Bris., Stoke Point, S. Devon, 26.vii.1993 and 1.viii.1994, RDB1, known only from here and The Lizard, Com., in the British Isles, *C. britannicus* Blair, Rinsey, Corn., 25.vii.1993 and Furzebrook, Dorset, 13.v.1994, RDB1, the Dorset captures represent a considerable extension of known range for this species, which is endemic to the British Isles, *C. maritimus* Rye, Lizard, Corn., 19.v.1993, RDB3, although more widely distributed than most of the other species, it seems to be less common; *C. myrmecophilus* (Seidlitz), Cathole, S. Devon, 17.x.1987, and Stoke Point, S. Devon, 23 & 26.vii.1993, RDB3; *C. socius* Boh., near Ventnor, I.o.W., 13.iv.1977, and near Sandown, I.o.W., 15.v.1968, RDB2, confined to the Isle of Wight in the British Isles.

(2) *Cathormiocerus maritimus* and *C. myrmecophilus* from Pointe du Raz, Finistere, Brittany, France, 21.iv.1994, found on maritime cliffs in situations very similar to those in Cornwall and S. Devon.

(3) A selection of interesting weevils from the Canary Islands, where about 75% of the species are endemic; Tenerife, March 1993 (T), and Gran Canaria, March 1994 (GC); *Auletobius convexifrons* (Woll.) (Attelabidae), (T), quite common by beating, especially *Rubus*; *A. cylindricollis* (Woll.), (T), fairly common; *Perapion neofallax* Warner (Apionidae), (T) and (GC), particularly on *Emex spinosa*, closely related to the European *P. violaceum* Kirby; *Rhissotrichum tubuliferum* (Woll.) (Apionidae), (GC) (and not found on (T), despite searching), a miniature version of the common Mediterranean *P. tubiferum*, on *Cistus monspeliensis*; *Kalcapion fortunatum* (Roudier) (Apionidae), (T) and (GC), on *Mercurialis annua*, L. generally common; *Taeniapion atlanticum* (Uyttenboogaart) (Apionidae), (T), on *Urtica* spp.; *T. delicatulum* (Woll.), (T), on *Parietaria* spp.; *Lapidapion canariense* (Wagner) (Apionidae), (T), abundant on shrubby legumes, particularly *Lygos monosperma*; Holotrichapion *wollastoni* (Chev.) (= *rotundipenne* Woll.) (Apionidae), (T) and (GC), by sweeping *Vicia* spp.; *Laparocerus excavatus* Woll. and *L. ellipticus* Woll. (Curculionidae), two representative species of this species-rich genus, which is confined to the Canaries and Madeira; *Sitona latipennis* Gyll. (Curculionidae), (T) and (GC), very common and widely distributed, on various shrubby legumes; *Cionus variegatus* (Brulle) (Curculionidae), (T), on *Scrophularia* spp., a species little known to wingelmueller, the monographer of the genus (1937), pairs from two populations contrasting in the degree of black coloration were shown; *Stenopelmus rufinatus* Gyll. (Curculionidae), (GC), beaten from *Pinus canariensis*. The exhibitor could find no previous record of this North American, *Azolla*-feeding species in the Canaries; *Smicronyx pauperculus* Woll. (Curculionidae), (T), on *Cuscuta* sp.; *Hesperorhynchus hesperus* (Woll.) (Curculionidae), (T), associated with *Crassulaceae*, a particularly interesting genus endemic to the Canaries and Madeira, with five flightless species, of which this is the commonest; *Mogulones biondii* Colonnelli (Curculionidae), (GC), known on few specimens, described in 1990 as a subspecies of *M. pseudopollinarius* (Harald Lindberg) and raised to specific rank by Colonnelli (1992); *M. pseudopollinarius* (Harald Lindberg), (T), associated with *Echium* spp., also known from La Palma; *Parethelcus nescicola* Colonnelli (Curculionidae), (T), allied to our *P. pollinarius* (Forst.) and like that species, feeding on *Urtica* spp.; *Sirocalodes nigroterminatus* (Woll.) (Curculionidae), (T) and (GC), the Canarian equivalent of our *S. mixtus* (Muls. & Rey), and, like it, feeding on *Fumaria* spp.; *Macrobrachonyx gounellei* Pic (Curculionidae), (T), associated with *Pinus canariensis*, Canarian endemic anthonomine, generally scarce and occurring as isolated individuals; *Tychius colonnelli* Caldara (Curculionidae), (T), associated with *Lotus glaucus*,

described in 1991, specimens were from the type locality where the species is quite common.

PORTER, D. A.—Twelve species of Coleoptera collected between 1992 and 1994. *Bembidion quadripustulatum* Serv. (Carabidae), Powdermill Reservoir, E. Sussex, 28.vi.1992; *Haliphys obliquus* (F.) (Haliplidae), Heron Lake, Staines, Middx, 13.vii.1994; *H. variegatus* Sturm, East Guldeford, E. Sussex, 20.x.1993; *Xantholinus longiventris* Heer (Staphylinidae), Rye Harbour, E. Sussex, 10.v.1992; *Trichophya pilicornis* (Gyll.), Drawsteignton, S. Devon, 21.iv.1992; *Zyras humeralis* (Grav.) (Staphylinidae), Drawsteignton, S. Devon, 21.iv.1992; *Metoecus paradoxus* (L.) (Rhipiphoridae), East Runton, E. Norfolk, 18.viii.1994; *Grammoptera variegata* (Germ.) (Cerambycidae), Lyndhurst, S. Hants, 2.vi.1994; *Mesosa nebulosa* (F.) (Cerambycidae), Brockenhurst, S. Hants, 28.v.1992; *Altica brevicollis* Foud. (Chrysomelidae), Troytown, Dorset, 3.ix.1993; *Apion stolidum* Germ. (Apionidae), Crewkerne, S. Som., 19.iv.1992; *Mecinus collaris* Germ. (Curculionidae), Grange-over-Sands, Westmor., 10.viii.1992.

HEMIPTERA

ALEXANDER, K. N. A. & FOSTER, A. P.—A selection of the more interesting bugs found during the work of the National Trust's Biological Survey in 1994: *Liorhysus hyalinus* (F.), coastal heath, St David's Head, Pemb., 16.vi.1994; *Pionosomus varius* (Wolff, J. F.), Nicholaston & Penmaen Burrows, Gower, W. Glam., 19.vii.1994; *Trapezonotus ullrichi* (Fieber), second Welsh record, St David's, Pemb., 23.vi.1994; *Lasiacantha capucina* Germ., under thyme on seacliff, Holestrow, Kynance, Corn., v.1994.

EVERSHAM, B. C. & TELFER, M. G.—Some interesting bugs from Breckland road verges: *Thyreocoris scarabaeoides* (L.), *Podops inuncta* (F.), *Chorosoma schillingi* (Schummel), *Syromastus rhombeus* (L.), *Alydus calcaratus* (L.), *Neides tipularius* (L.), *Coranus woodroffei*.

HODGE, P. J.—Two species of bugs: *Physatocheila smreczynskii* China (Tingidae), New Forest, S. Hants, SU 1908, 18.ix.1994, on old crab apple tree (*Malus sylvestris* Miller); *Microvelia pygmaea* (Dufour) (Veliidae), Chailey Common, E. Sussex, TQ 3821, 24.ix.1994, in shaded pond.

HYMENOPTERA

ALEXANDER, K. N. A. & FOSTER, A. P.—Two uncommon ants found in 1994 during the National Trust's biological survey. *Leptothorax tuberum* (F.), 22 and 29.vii on limestone sea cliffs at Paviland and Pennard Cliffs, Gower, Glam.; *Myrmecina graminicola* (Lat.), 29.vi at Good Hope Farm, Strumble Head, Pemb.

BOYD, G.—A selection of spider wasps and solitary wasps taken in 1994. *Cerceris rybyensis* (L.) and *Ectemnius continuus* (F.), both 20.vii at Cambridge; *Argogorytes mystaceus* (L.), flying over raspberry flowers 11.vi, Frithsden Beeches, Ashridge, Herts.; *Ectemnius cavifrons* (Thom.) and *Dipogon subintermedius* (Magretti), on rotten oak, 2.vii at Croxton Park, Leics.; *Cerceris arenaria* (L.), male and female in cop on flower of *Reseda lutea* L., 9.vii; *Ammophila sabulosa* (L.), 6.viii; *Episyron rufipes* (L.), on a loose sandy bank, 1.vii; *Ectemnius continuus* (F.), 27.viii, the last four species taken in relic areas of Breckland heath, 1–3 miles south of Brandon, W. Suff.

BOWDREY, J. P.—A cynipid gall wasp new to Britain. Examples of galls found on prickly sowthistle, *Sonchus asper* (L.) at Fingringhoe, near Colchester, Essex, on 19.viii.93. Adults emerged in July 1994 and were subsequently identified by Dr J. L. Nieves-Aldrey of Madrid as *Aulacidea follioti* Barbotin.

BROCK, J. P.—A display of ichneumonid parasites in the subfamilies Pimplinae and Xoridinae from Ashted Common, Surrey and other sites around London. The species displayed were associated with both dead and live trees, and have as host insects various cerambycid beetle larvae, wood-nesting aculeate Hymenoptera and some wood-boring lepidopterous larvae. Malaise trapping has shown that some species thought to be rare are fairly common in some localities, where they may serve as indicators of good quality ancient woodland.

COLLINS, G. A.—The bee wolf, *Philanthus triangulum* (F.) taken 30.vii.94 at Frensham Heights, Surrey. This formerly scarce sphecid wasp has recently become widespread in southern England.

HALSTEAD, A. J.—Some local sawflies taken in 1994 except where stated otherwise. Female *Janus femoratus* (Curt.), male *Dolerus bimaculatus* (Geoff.) and female *Eutomostethus gagathinus* (Klug), all swept from a boggy area of Chobham Common NNR, Surrey, 5.vi; female *Rhogogaster genista* (Benson), numerous on broom, 5.vi, Chobham Common NNR, Surrey; female *Cimbex femoratus* (L.) bred 25.iv from a larva found on birch 20.vi.93, Chobham Common NNR, Surrey; female *Heterarthrus nemoratus* (Fall.), swept from birch, 15.vi, Chobham Common NNR, Surrey; female *Athalia cornubiae* Benson, col. C. W. Plant in a malaise trap in a garden, Bishop's Stortford, Herts., vi.93; male and female *Rhogogaster chambersi* Benson, swept from chalk grassland and female *Pareophora pruni* (L.) on blackthorn flowers, both 15.v at the Sheepleas, near West Horsley, Surrey; male *Hoplocampa testudinea* (Klug), on apple blossom, RHS Garden, Wisley, Surrey, 29.iv; female *Nematus capreae* (L.) netted by R. A. Jones and male *Macrophya rufipes* (L.), swept from long grass 9.vii at Nunhead Cemetery, SE15.

HARVEY, P. R.—Some interesting records from Mill Wood Pit, part of the Chafford Hundred and Lakeside development area at Thurrock, S. Essex. The

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PLATE III. ANNUAL EXHIBITION 1994

- 1: *Diarsia mendica*, Geddington Chase, Northants, 20.vi.1988, J. W. Ward. 2: *Amphipyra berbera*, Blandon Heath, Oxon, 22.vii.1993, M. F. V. Corley. 3: *Discestra trifolii*, Wroughton, Wilts., 9.viii.1992, D. J. Brotheridge. 4: *Evergestis limbata*, Chale Green, I.O.W., 23.vii.1994, S. Colenutt (S. A. Knill-Jones). 5: *Meganola albula*, Dungeness, Kent, 15.vii.1994, S. P. Clancy. 6: *Homoeosoma sinuella*, Torquay, Devon, 20.vii.1994, A. H. Dobson. 7: *Mussidia nigrivenella*, Dungeness, 12.viii.1994, S. P. Clancy. 8: *Agriphila inquinatella*, Dungeness, Kent, 27.vii.1994, S. P. Clancy. 9: *Agrotis cinerea*, mixed gynandromorph, Swanage, Dorset, J. Clarke. 10: *Drymonia dodonaea*, Ashted, Surrey, 26.vi.1994, J. T. Scanes. 11: *Mythimna conigera*, Inverness-shire, 21.vii.1990, A. G. J. Butcher. 12: *Cucullia scrophulariae*, Swanage, Dorset, 18.v.1994, J. Clarke. 13: *Hoplodrina alsines*, albino male, Dungeness, Kent, 8.vii.1994, B. Skinner. 14: *Odontoptera bidentata*, Hampstead, 12.v.1994, A. G. J. Butcher. 15–18: *Luperina nickerlii*, male (15) and female (16) nominotypical form, Prague, Czechoslovakia, and male (17) and female (18) undescribed subspecies, Essex, B. Goater. 19: *Baorisa hieroglyphica*, Nepal, T. W. Harman. 20: *Dichomeris juniperella*, Achlean Cairngorms, vi.1977, M. J. & P. H. Sterling. 21: *Cochylis molliculana*, Portsmouth, Hants, bred, 20.viii.1994, J. R. Langmaid. 22: *Caryocolum blandelloides*, Loch Fleet, Sutherland, 23.vii.1994, R. J. B. Hoare. 23: *Teliodes alburnella*, Kincaig, Inv., 17.vii.1994, M. W. Harper.



Plate III. ANNUAL EXHIBITION 1994

exhibitor has surveyed this site, part of which has planning permission for housing, since September 1993. Over 40 nationally scarce, rare or vulnerable species have been recorded including the blue carpenter bee, *Ceratina cyanea* (Kirby) and *Stelis ornatula* (Klug). Both appear to be the only Essex records for many years. Other species exhibited included the chrysid wasp *Hedychrum niemelai* Linsenmaier and its host *Cerceris quinquefasciata* (Rossius), the bee wolf, *Philanthus triangulum* (F.); the solitary bees *Andrena florea* F., *A. proxima* (Kirby) and *Nomada fulvicornis* F.

HODGE, P. J.—Three uncommon solitary bees taken in 1994. Male *Andrena proxima* (Kirby), 20.v on flowers of alexanders, *Smyrniolum olusatrum* L., at Ranscombe Lane, Glynde, E. Sussex; female *Stelis ornatula* (Klug) taken on the wing, 20.vii, at Yateley Common, N. Hants; female *Stelis punctulatissima* (Kirby) on flowers of ragwort, *Senecio jacobaea* L., 22.viii, at Chailey Common, E. Sussex.

HOWTON, D. H.—Workers of the social wasp *Dolichovespula media* (Retz.) taken at Weston Favell, Northants, 21.v.93. This is a first county record for a wasp that has now colonized much of England, including several counties further north, such as Cambs., Warks. and Leics. in 1991–92.

PORTER, D. A.—A specimen of the melittid bee, *Macropis europaea* Warncke, taken on *Lysimachia vulgaris* L. flowers at Sheffield Park, E. Sussex, 6.vii.94. This may be a new vice-county record.

ROBBINS, J.—A herbarium of mined leaves of various plants, some of which had been mined by the larvae of sawflies.

ROBERTS, S. P. M.—Some scarce aculeate Hymenoptera taken in south east Dorset in 1991–94. Chrysididae: *Elampus panzeri* (F.), 10.vii.94, Great Ovens Heath; *Hedychridium ardens* (Latr. in Coquebert), 13.vii.94, Sandford; *H. roseum* (Rossius), 10.vii.94, Great Ovens Heath. Tiphidae: *Myrmosa atra* Panz., male, 13.vii.94, Sandford and female 29.vii.94, Holton Heath (Defence Research Agency). Mutillidae: *Mutilla europaea* L., male and female, 13.vii.94, Sandford and on 6.viii.94 at Holton Heath NNR; *Smicromyrme rufipes* (F.), male and female, 13.vii.94, Sandford. Eumenidae: *Pseudepipona herrichii* (Saussure), male and female, 14.vii.91, Godlingston Heath NNR (possibly its only remaining British locality); *Symmorphus crassicornis* (Panz.), female, 13.vii.94, Sandford (first Dorset record since 1945). Sphecidae: *Astata boops* (Schr.), female with prey and male, *Mimesa bruxellensis* (Bond.), male and female, and *Diodontus minutus* Spooner, male and female, all 25.vii.94 at Kingsbridge Lakes; *Nysson dimidiatus* Jurine, female, 13.vii.94, Sandford; *Philanthus triangulum* (F.), two females, one with *Apis mellifera* L. prey and a male, 6.viii.94 Holton Heath NNR (not previously recorded in Dorset since 1829); *Passaloecus eremita* Kohl, female, 10.vii.94, Gore Heath (new to Dorset, nests found by M. Edwards, G. R. Else and the exhibitor). Apidae-Andreninae: *Andrena denticulata* (Kirby), male, 30.vi.94, Corfe Bluff and female, 25.vii.94, Northport. Apidae-Halictinae: *Sphecodes ephippius* (L.), male; *S. geoffrellus* (Kirby), male, *S. puncticeps* Thomson, two males, one melanic, *S. reticulatus* Thomson, all 3.viii.94 on flowers of creeping thistle, *Cirsium arvense* (L.) Scop. at Sandford. Apidae-Melittinae: *Macropis europaea* Warncke, male, 25.vii.94, Kingsbridge Lakes, female, 14.vii.92, Uddens, female, 4.viii.92, Tadnoll Lane, all on flowers of *Lysimachia vulgaris* L.; *Dasygaster altercator* (Harris), male, 29.vii.94, Wareham meadows, female 3.viii.94, Sandford. Apidae-Megachilinae: *Stelis ornatula* (Klug), female, 13.vii.94, Sandford, female, 29.vii.94, Holton Heath NNR; *Megachile leachella* Curt., male and female, 30.vi.94, Newton Gulley.

A nest of the social wasp, *Dolichovespula media* (Retz.) from a maple tree in a garden in West Moors, Dorset, in 1991. This was the first nest of this species

recorded in Dorset. Included with the exhibit was a series of distribution maps drawn on DMAP showing how this wasp has colonized Dorset during 1991-94.

UPPER, R. W. J.—Some solitary bees and wasps new or locally rare in Herts., Beds., Bucks and Essex taken in 1994 except where stated otherwise. *Anomophila subulosa* (L.), seen 9.vii and 1.ix, Colney Heath sand pit, Herts.; *Philanthus triangulum* (F.) vii-viii at Colney Heath sand pit and at Amwell Quarry in dumped sand, Hoddeston sand pit. *Gorytes bicinctus* (Rossius), 1.viii, Colney Heath sand pit, *Nyxon trimaculatus* (Rossius), 9.vii, Colney Heath sand pit; *Cerceris arenaria* (L.), 22.vii, Panshanger Park, Hertford; *Entomognathus brevis* (Vander Linden) on *Heracleum* flowers, 23.vii, Panshanger Park and 8.vii, Frogmore Lakes, St Albans, Herts.; *Crossocerus distinguendus* (Morawitz), 16.viii, High Down House, Pirton, Herts. and 7.vii, Danesbury, Welwyn, Herts.; *Psen bruxellensis* (Bon.), 5.viii.93, Old Parkbury Pit, Park Street, *Tachysphex pompiliiformis* (Panz.), 10.vii, Colney Heath sand pit, 29.vi, Patmore Heath, also seen at Panshanger Park in July. *Ectisyron rufipes* (L.) nesting in dumped sand and attracted to *Daucus* flowers, 16.viii, Amwell gravel quarry, *Pezomachus eremita* Zohl 24.vi, Hatfield Forest, Essex, nesting in beetle holes in dead *Sambucus*; *Melitta haemorrhoidalis* (F.), 25.vii, females in SW corner of Church Hill, Therfield Heath, Herts. and males, 14.viii at Deacon Hill, Peggidon, Beds., on flowers of harebell and other *Campanula* spp.; *M. tricolorata* (Kirby), 30.vii, in field margin below Aldbury Towers SSSI, Tring, Herts., on *Odontites* flowers; *Hylaeus cornutus* Curt., 19.vii on *Heracleum* flowers by footpath at Colney Heath sandpit, *Lasiglossus malachurus* (Kirby), male 21.viii, Colney Heath and 4.ix, Colney Heath sand pit, *Coelioxys elongata* Lep., 30.vi at colony of *Megachile willughbiella* (Kirby) in plant nursery in Bishops Stortford, Essex, *Stelis punctulatisima* (Kirby) on *Imula hirta* flower in garden, 8.viii, Welwyn, *Colletes similis* Schenck, 19.vii, Colney Heath sand pit, *C. daviesianus* Smith, 30.vi, on *Achillea filipendulina* flowers in nursery, Bishops Stortford, *C. succinctus* (L.) and *Andrena fuscipes* (Kirby), both females, 2.ix, Black Park, Langley, Bucks., *Sphecodes longulus* von Hag., 10.vii, Colney Heath sand pit, *Andrena bucephala* Steph., 8.v, Whippendell Wood, Watford, Herts.

WATSON, C.—A male *Philanthus triangulum* (F.) taken at Rushey Mead Nature Reserve, near Bishop's Stortford, N Essex (no date). This species wasp, which stocks its nest with honey bees, has expanded its range in recent years and is scattered along the Thames estuary in Essex.

ODONATA

PORTER, J.—A specimen of the highland darter, *Sympetrum nigrescens* Lucas, 15.viii.94, at Glen Lonan, Argyll

ORTHOPTERA AND DERMAPTERA

EVERSHAM, B. C. & TELFER, M. G.—a survey of insects found in roadside grassland during March-October 1993 and 94 near Lakenheath Warren, Suffolk. These included the stripe-winged grasshopper, *Stenobothrus lineatus* (Panz.) and the short-winged conchard, *Conocephalus dorsalis* (Lat.). The lesser earwig, *Labia minor* (L.) appears to be associated with rabbit droppings and dead vegetation at the study site.

NEUROPTERA AND MECOPTERA

COLLINS, G. A.—Some local species taken in Surrey. Neuroptera: *Psectra diptera* (Burmeister) 4.viii.90, S. Croydon; *Hemerobius atrifrons* McLach., 14.iv.90, Netley Heath; *Micromus angulatus* (Steph.), 6.xii.93, Banstead. Mecoptera: *Panorpa cognata* Ramb., 25.vii.94, Westcott. The last two species were collected by R. D. Hawkins.

PLANT, C. W.—An ant-lion, *Euroleon nostras* (Fourc.) (Neuroptera: Myrmeleonidae): a species and family of insects possibly overlooked in Britain. Until this year this ant-lion was unknown in the British Isles apart from Jersey, although it is widespread elsewhere in Europe. During 1994 three adults were captured in a locality in E. Suff. (Mendel in press). The exhibitor showed two examples taken in Hungary, together with some British insects which might be confused with ant-lions. The giant lacewing, *Osmylus fulvicephalus* (Scop.) has similarly blotched wings but is mainly found near fast-moving streams and it has longer, simple filamentous antennae. *E. nostras* is likely to be found in areas where there is warm, loose dry sand, and it has shorter, stouter clubbed antennae. Some ant-lions do not have spotted wings. An example is *Myrmeleon formicarius* L. which was allegedly recorded at Gorleston, E. Suff., in 1931. It is possible that such ant-lions could be confused with certain teneral dragonflies and damselflies. These may fly in a similar manner to ant-lions. The antennae of dragonflies and damselflies are very short and thin, and easily distinguished from the stouter, club-tipped antennae of antlions. Examples of a damselfly, *Coenagrion puella* (L.) and a dragonfly, *Sympetrum striolatum* (Charp.) were displayed to show this difference. Larval pits are more likely to be encountered than adult ant-lions. They are constructed in soft dry sand, often at the edge of fields, but also at the side of sandy tracks and other areas that are subjected to trampling. Pits should be sampled by quickly penetrating the sand to a depth of about two inches with a one inch wide glass tube, used as a core sampler. The sand can be gently poured out until the larva is seen. Pupation occurs in the sand, in a circular silk cocoon to which sand grains adhere. An example of a cocoon with the translucent white pupal exuvium of *E. nostras* protruding was exhibited.

SIPHONAPTERA

GEORGE, R. S.—Some charts showing the distribution of fleas in Scotland, Yorkshire and Lancashire+Cheshire. The Scottish chart indicated all the species, sub-species and hybrids on the British list (except the doubtfully British *Monopsyllus anisus* Roth.) and the numbers of forms recorded in each of the old counties of Scotland. Only the rabbit flea, *Spilopsyllus cuniculi* (Dale) has been found in every county. The chart showed a record of the cat flea, *Ctenocephalides felis felis* Bouche in the Orkneys. This is a new, unpublished record and is the most northerly in the British Isles. The other two charts for Yorkshire and Lancashire+Cheshire showed which 10-km squares have had fleas recorded and the numbers of flea forms in these squares. They indicated the paucity of recording and the need for more specimens to be submitted to the exhibitor for identification. Some species cards relating to Yorkshire were shown, indicating in which 10-km squares each species has been found.

The exhibitor made available some information sheets on flea collection methods. This was illustrated with a display of flea collecting from birds' nests, which is mainly done in winter when nests are not in use. A tube of 5081 fleas in alcohol was shown that had been collected from a house martin's nest from Stogursey, Som. the dominant species in the nest was *Ceratophyllus hirundinis* (Curt.), with *C. farreni*

farreni Roth. and *C. rusticus* Wagner also present in substantial but smaller numbers; *farreni* and *rusticus* vary considerably in their relative proportions of the nest populations. In the past *rusticus* was considered quite rare but now it is more frequent than *farreni*.

ARACHNIDA

HACKETT, D.—A female specimen of the spider *Segestria florentina* (Rossi) (Araneae: Segestriidae) found 17.x.94 at Thames Road, London W4. This large Mediterranean segestrid spider occurs at a few sea ports around Britain and was known by W. S. Bristowe to occur in the old walls of Westminster School, London, in the 1930s. This year Edward Milner, spider recorder in the LNHS, discovered it at Charterhouse, Cripplegate, the City. The specimen exhibited came from the Kew area, West London, so its true distribution in London is yet to be clarified. The web is funnel shaped, with cartwheel-like spokes radiating across the substrate (tree crack or wall crevice), this web type being characteristic of segestrids. This spider's clearest identifying feature is the metallic bottle-green fangs. In the field the spider can usually be tempted out to get a glimpse of the fangs by tickling the outer part of the web with a twig or other slender object.

PLANT, C. W.—A specimen of the scorpion, *Euscorpium carpathicus* (L.) spp *candioti* Birula (Chactidae) collected on the Mediterranean island of Gozo, April 1994. This small scorpion is frequent on Gozo and was found in groups of four or five individuals under boulders where the soil was damp. They seemed reluctant to move when uncovered and remained tightly pressed into soil crevices.

ILLUSTRATIONS

CLARKE, J. H.—*Bembecia chrysidiformis* (Es.), captive breeding from ovum to imago in one year. Last year the exhibitor showed a poster illustrating the mating of this species in captivity with photographs of the calling female, a pair in copula, the female ovipositing and the one newly hatched larva that was observed. Further photographs illustrated his recent results. Most of the ova did hatch (as evidenced by their empty egg shells) but larvae were not seen. Presumably they hatched at night and made their way straight down to the rootstock. The project was expected to take two years but the exhibitor was able to report back in just one year.

Initially the plants showed no outward signs of infestation. They were put in a shady corner of the garden and essentially ignored for the winter. During March inspection showed the docks in a very poor state indeed. On pulling off the crown of dead leaves from the most moribund plant (which showed no signs of life whatsoever) the exhibitor was amazed to see a fully grown *sesiid* larva staring up from the top of the rootstock. Dissection of this rootstock produced no less than 15 fully grown larvae some of which were making their cocoons or silken emergence tubes; the root was totally replaced with tight packed grass and no viable portions remained. Other roots also contained larvae but not as many. Larvae were relocated into other docks and in due course emerged as adults. These were taken back to their original locality and released. One larva remained and as yet showed no signs of forming its emergence tube or cocoon; it would probably emerge in 1995.

It seems that given sufficient food the species will preferentially keep to a one-year lifecycle but a small proportion will take two years. In the wild more may keep to a two-year cycle especially if feeding on a small shrivelled sorrel rather than a large lush great water dock. Having a lifecycle of variable length is an advantage in

providing a buffer against adverse environmental factors which could seriously affect the reproductive success of a population in one season.

HACKETT, D.—Photographs of the spider *Segestria florentina* (Rossi), to accompany a dead specimen.

HARLEY, B. H.—Colour photocopies of the colour plates (1–9) of Yponomeutidae, Epermeniidae, Schreckensteiniidae, Coleophoridae and Elachistidae for volume 3 of the moths and butterflies of Great Britain and Ireland from drawings by Richard Lewington, with some monochrome drawings of coleophorid cases by the same artist. The work is to be published in 1995.

HENWOOD, B. P.—Photographs of the larvae of *Eupithecia virgaureata* Doubl., a wild first brood larva found feeding on the leaves of grey willow (*Salix cinerea* L.) near Newton Abbot, Devon, and a wild second brood larva feeding on flowers of golden rod (*Solidago virgaurea* L.) at St Agnes Cornwall. The first brood larva is virtually unknown in the wild.

PICKLES, A. J.—Photographs of Microlepidoptera. Larva of *Udea decreptialis* (H. & S.) photographed in mid-August feeding under a slight web on the underside of a frond of lemon-scented fern *Oreopteris limbosperma* (All.) Larvae were found sparingly, on this species of fern only, at a locality which was close to a loch in central Scotland. The larva would not accept *Dryopteris* or other *Oreopteris* species in captivity. Larva, pupa and adult of *Cnaemidophorus rhododactyla* (D. & S.). The larva, which was just visible inside the characteristic slight spinning it had constructed around a flower bud, was feeding on *Rosa canina* (L.) and was photographed on 18.vi.1994 at an Essex locality. Larvae and pupae were found at about head height on all sides of the bushes. A pupa found at the same time was concealed in a similar spinning.

SOKOLOFF, P.—A photograph of an unusual aberration of the red admiral, *Vanessa atalanta* L. The butterfly was characterized by bright orange suffusion from the fore- and hind-wing bands, covering the basal areas of all wings, and extending to the thorax and abdomen. The coloration resembled that of *ab eos* Fritsch, but was much more extensive. The marginal white spots on the fore and hind wings were also much enlarged. The insect was photographed at Hinksey Hill Top, Oxfordshire on 27.viii.1994.

WARING, P.—A display of photographs illustrating some of the field meetings of the Society during 1994 and the notable moths recorded. Ranging from Abernethy Forest, Inverness-shire, south to Whiteparish Common, Wiltshire, from the Mawddach Valley woodlands, Merionethshire, and Welshbury Hill, Gloucestershire in the west to Cantley Marshes and Catfield Fen in Norfolk, and including the home of the Society's building and collections, Dinton Pastures, Berkshire.

CORRIGENDUM TO 1992 ANNUAL EXHIBITION

Since it would have constituted the first Irish record, Dr M. C. D. Speight has rightly queried the '*Orthonevra brevicornis* Loew' from Co. Fermanagh, that was exhibited at the 1992 BENHS Annual Exhibiton (*Br. J. Ent. Nat. Hist.* 1993; 6: 70). Dr Speight, to whom I am grateful, has subsequently examined the specimen and shown it to be *Portvenia maculata* (Fallén).—A. P. Foster, The National Trust, 33 Sheep Street, Cirencester, Glos. GL7 1QW.

BENHS FIELD MEETINGS

Powerstock Common, Dorset, 11 June 1994

Leader: **Mick Parker**. Seven members arrived for the daytime meeting to be met with warm and sunny conditions. An area near to the car park was the first to receive attention; part of this area, a birch and willow copse had recently been cleared and the resulting logs had been left in piles. These logs showed extensive workings of the lunar hornet clearwing *Sesia bembeciformis* Hübner and it is obvious that this species although rarely seen is common here.

The group moved south into the wooded part of the reserve and through various clearings and rides and here amongst fourteen species of butterfly occurred four local species the marsh fritillary *Eurodryas aurinia* Rottemberg, the Duke of Burgundy fritillary, *Hamearis lucina* L., the small pearl-bordered fritillary, *Boloria selene* D. & S., and the wood white, *Leptidea sinapis* L. Two day-flying moths were also noted, the burnet companion, *Euclidia glyphica* L. and the small purple-barred, *Phytometra viridaria* Clerck. All these species were to be encountered in greater numbers along the disused railway embankment which borders the reserve. The group then made their way along the southern edge of this embankment which becomes increasingly wooded and turned east and then north through damp oak woodland and continued through mixed woodland back to the car park. Over ninety species of Diptera were recorded, although most were common species the best record being the conopid *Thecophora atra* F. Twenty-eight species of Hymenoptera were also noted of which most were sawflies. Small numbers of Hemiptera, Coleoptera, Odonata, Neuroptera and Mecoptera were also added to the days list which now totalled one hundred and fifty one species, before the day ended several roe deer were seen and a stoat made an appearance. The moth trapping session began with a group of ten. Most of the group considered the embankment area the best option, and six of the eight traps were situated here. Unfortunately a clear sky and a falling temperature ensured the moth catch was low. All the species recorded were common and did little to excite although the privet hawk *Sphinx ligustri* L. made a spectacular entrance, despite the falling temperature. I was determined to stay to the bitter end, and bitter was the word; nevertheless the moth list reached sixty one species to make a grand total of two hundred and twelve insect species listed, thanks are due to the Dorset Wildlife Trust for permission to hold the field meeting and to the recorders who made it such a successful meeting. A full list has been forwarded to the D.W.T. and other interested groups.

Catfield Fen Butterfly Conservation Reserve, Norfolk, 16 July 1994

Leader: **Paul Waring**. This joint BENHS/Butterfly Conservation meeting at the Butterfly Conservation reserve at Catfield Fen, Norfolk, on 16 July, set out to see if the small dotted footman *Pelosia obtusa* could be found in the more accessible parts of the fen which are currently being cleared of scrub and are now largely open reed and sedge-beds, some of which had been cut before the field meeting. This meeting was particularly well attended, with 35 people, including a contingent from the Norfolk Moth Group. 23 light traps were operated on the fen and moths seen included the reed leopard *Phragmataecia castanea* (only by Ken Saul's group), dotted footman *Pelosia muscerda*, dentated pug *Anticollis sparsata* (a worn singleton near

the Hubbard's Marsh ligger), dotted fanfoot *Macrochilo cribrumalis*, cream-bordered green pea *Earias clorana* and a host of wainscots including the striped *Mythimna pudorina*, southern *M. straminea*, fen *Arenostola phragmitidis*, mere *Photodes fluxa*, Fenn's *P. brevilinea* and brown-veined *Archanara dissoluta*. Other moths of interest included the oak eggar *Lasiocampa quercus* (a female), lesser cream wave *Scopula immutata*, blue-bordered carpet *Plemyria rubiginata*, dingy shell *Euchoeca nebulata*, privet hawk-moth *Sphinx ligustri*, round-winged muslin *Thumatha senex*, suspected *Parastichtis suspecta*, Haworth's minor *Celaena haworthii*, crescent *Celaena leucostigma*, small rufous *Coenobia rufa*, silver hook *Eustrotia uncula*, Lempke's gold spot *Plusia putnami* and the pyralids *Chilo phragmitella*, *Schoenobius gigantella*, *Dioryctria abietella* (det. J. Clarke) and several of the common china-mark moth species. Several fully grown larvae of the emperor moth *Pavonia pavonia* were found feeding on the leaves of alder buckthorn *Frangula alnus*. No small dotted footman were seen, even though 13 males and 2 females were seen at a nearby site on 15 July (Brian Elliot) and 10 males at the same site on 17 July. The small dotted footman were in an uncut reedbed, with thick reed litter lying like straw. Fenn's wainscot was the commonest moth here with about ten per trap on the latter night when the weather was indifferent and the temperature was 9° C (B. Skinner). Only one or two Fenn's wainscot were seen per trap at Catfield Fen BC reserve, suggesting that the habitat is much less suitable for both moths. However, there are other parts of the BC reserve, currently accessible only by boat, which still need investigation. The small dotted footman was also found in a thick reedbed with much standing litter on the nearby Catfield Fen National Nature Reserve on 21 July 1994 by Julian Clarke, when five adults were seen.

During the daytime part of the meeting we were shown some small larvae of the swallowtail butterfly *Papilio machaon* by Vic Stares who is studying them on the fen as part of her research project at the University of East Anglia. One of the larvae was still at the stage where it resembled a bird-dropping; another had reached 3 cm in length. Other butterflies seen included adults of the large skipper *Ochlodes venata*, green-veined white *Pieris napi*, gate-keeper *Pyronia tithonus*, meadow brown *Maniola jurtina*, ringlet *Aphantopus hyperanthus*, a full-grown larva of the peacock butterfly *Inachis io*, and, at 07.00 hrs the following morning, while those of us who had slept in our cars had breakfast on site, a painted lady *Cynthia cardui* basked in the sun on the edge of the car-park.

Other observations during the day-time part of the meeting included the royal fern *Osmunda regalis* and cowbane *Cicuta virosa* along dyke edges on the eastern boundary of the reserve and the plume moth *Adaina microdactyla* which is dependent on hemp agrimony *Eupatorium cannabinum*. A larval case of the common bag-worm *Psyche casta* was noted on a common reed *Phragmites australis*. A few of the common darter dragonfly *Sympetrum striolatum* and the blue-tailed damselfly *ischnura elegans* were on the wing. A marsh harrier *Circus aeruginosus* flew overhead at one point and a male grasshopper warbler *Locustella naevia* was singing busily in Hubbard's Marsh. Four species of flies were identified, by Gavin Boyd, including the syrphids *Pyrophaena rosarum*, *Episyrphus balteatus* and *Xylota segnis* and the stratiomyid *Chloromyia formosa*, all of which would be expected from the habitats present on the reserve.

Records of over 130 species of moths were collected for this reserve as a result of this field meeting and the good coverage with light traps helped to give an indication of the distribution of species on the reserve. A copy of the full species list for all groups has been sent to Roland Rogers, organizer for the Norfolk Branch of Butterfly Conservation, who manage the reserve, and attention has been drawn to

the requirements of the small dotted footman and the general wildlife value of derelict reedbeds thick with reed-litter so that examples of this habitat can be conserved on this interesting and diverse fen. The data have also been entered in full into the national data-base for the rarer British macro-moths and the Invertebrate Site Register (supported by the Joint Nature Conservation Committee).

I would like to thank Roland Rogers and the Norfolk Branch of Butterfly Conservation for their help and interest during the organisation of this field meeting and all the entomologists who attended and helped to make it such an enjoyable event.

BOOK REVIEW

New life for old woods, the Land Rover woodlands campaign information pack run by Butterfly Conservation, Colchester Branch, £3.95.—The information pack is a glossy A4 folder with a poster guide of butterflies showing 16 species, a seven-page woodland management booklet relating to butterflies, a four-page woodland management leaflet relating to moths and 15 cards describing a mixture of common and scarce butterflies.

The publication starts with a foreword on the inside cover which describes how our butterfly fauna has been disappearing over only a few decades and gives percentage figures of decline for 10 species. It goes into how numerous insects have been decimated by changing woodland management especially coppicing, which has virtually stopped in the 20th century, and how most butterflies have disappeared because they cannot tolerate heavy shade. It concludes by saying that the priority is to restore open areas by re-coppicing and to encourage an uneven age structure within our woodlands.

The poster guide gives brief details of how to recognize the various families of butterflies; there are line drawings of the seven main groups with the names of the various species within each group and brief details of what each family looks like. The inside pages have sixteen photographs of butterflies which look as though they have been taken in the field; in the main, these are of excellent quality.

The booklet, on woodland management for butterflies, describes how various butterflies need different types of habitat and emphasizes the fact that an uneven structure would be best for all the species that live in our woods. It considers 'why manage for butterflies', and examines the historical link with coppicing, before contemplating various managements for coppices, high forest and woodland rides. In all it is quite an informative part of the package and is interspersed with further photographs.

The four page leaflet on woodland management for moths is less colourful but nevertheless it has similar objectives concerning the management of the woodland environment for moths.

The fifteen cards describing the butterflies are in the last section. Each has a distribution map which compares historic and present day locations together with foodplant and species information, what habitats are required and how to recognize and to conserve the insects with line drawings of butterflies and foodplants. This informative package should be recommended reading for anyone interested in woodland management and its natural history. The hope is that the recommendations are actively taken.

THE 1994 PRESIDENTIAL ADDRESS—PART 1 REPORT

PAUL WARING

Windmill View, 1366 Lincoln Road, Werrington, Peterborough PE4 6LS.

Ladies and gentlemen, it has been a great pleasure to be President of this Society during its 122nd year. The Society's Pelham-Clinton Building at Dinton Pastures is now very much up and running and much less of Council's time this year has needed to be spent on issues related to its construction and management. Although there are still jobs carrying over from the move, and there has been a continuing saga of minor problems with the air conditioning system which has never completely settled down to smooth running, the Building is largely fulfilling our hopes for it and is very much an asset rather than seeming a liability. In a large measure this is due to the efficient way that Peter Baker, as Buildings Manager, and Peter Chandler, as Curator, have dealt with the matters of running and maintenance as they have arisen. I would very much like to thank these two gentlemen for their efforts on behalf of the Society. They are just two examples of the devoted and conscientious work put in by the officers and members of Council to ensure the smooth running of the Society's affairs. Our Society is fortunate in having a very strong team on Council, with each person working hard so that the Society can continue to provide and develop the services offered to the membership and to facilitate activities and projects which members wish to advance. You have heard the Officers' reports and I would like to thank each and every one for their efforts on behalf of the Society. Their work has made my job as President feel like driving a well maintained luxury car rather than the humbler vehicle in which I arrive at field meetings! My year as President has very much involved working with a responsive Council and I have been able to see a number of my contributions encouraged and developed. The chairing of the Council meetings at Baden-Powell House and the Society's indoor meetings at the Royal Entomological Society has been a stimulating and enjoyable experience and it has been an honour to write and sign letters and papers on behalf of the Society and to address the Society at the Annual Exhibition and Dinner at Imperial College, London.

Our officers have reported some of the high-lights and features of the 1994/5 term in their reports. I was pleased to see the results of the Society's growing body of fieldwork at Dinton Pastures reviewed to the end of 1993 by Peter Chandler and published in our Journal during 1994 (7: 118–126). The paper contains a detailed map of the site to aid future recording work.

The Society's role in invertebrate conservation has been actively discussed throughout the year and continues to develop. A review by Stephen Miles of the outcome of a special meeting on the subject in 1992 was published in our Journal in January 1995 (8: 19–26) and Council is resolved to assist in the advancement of conservation objectives throughout the various activities of the Society.

The Society's position on collecting and exhibition of threatened and scarce species was discussed and re-emphasized in the Journal (7: 141–144), and an up-dated list of "Red data book" macro-moths was included.

Inter-relations with other entomological societies have been developed during the year, including a number of joint field meetings with Butterfly Conservation, about which more later, and the Society's activities have been promoted in more general, as well as entomological, publications.

During the year the Diptera Recording Schemes set up a Dipterists' Forum to provide a new administrative structure for production of news-sheets, bulletins and the *Dipterists' Digest* and to continue to promote the study of flies and the mapping of

their distributions throughout the British Isles. The group approached our society with a view to affiliation and to obtain financial help in getting started, mainly for small loans to make advance payments that would be recouped from sales and membership subscriptions. The affiliation has proceeded and similar arrangements are likely to be considered to assist and develop other special interest groups within entomology.

Investment of the Society in a computer this year opens the way for improved indexing of the Library and Collections and much greater use of the data we hold, as well as enabling new activities. The purchase of the *Recorder* data-base will enable full species lists from field meetings and other work to be annotated and produced by and for members for recording schemes, land-owners and personal use, so don't miss the demonstration of this program at the workshop meeting on 8 April.

At the end of 1994 I proposed to Council the idea of mounting a BENHS Expedition, which, if well-received, might become a regular event and an addition to the Society's activities. The idea is to visit British and former British dependent territories with a strong invertebrate conservation aim in mind and I shall expand on this in Part 2 of this Address. Council have approved this idea in principle and a notice to members will appear in the next issue of the Journal.

I have also suggested the development of a BENHS "logo" to be attached to certain products of the Society for greater recognition of the Society's activities. Our member Rob Dyke is currently working on some designs to be put before Council. I hope the logo will take its place among those of other organisations and may be seen on the covers of the Surrey Invertebrate Atlases and similar projects which the Society is supporting. I trust this will not be seen by any members as an undesirable concession to the late 20th century but rather as part of a noble tradition extending back to heraldic crests and coats of arms, if you would prefer!

Two problems with wide-reaching implications for field entomologists were reported by members during my term of office and I have responded to each on behalf of the Society. The first concerns a member who was recording moths at a light trap in good faith in a province of Spain, having a permit for a neighbouring province but having been previously informed that none was necessary for the area in which he was then working. This year he was charged for having contravened recent Spanish legislation which is said to prohibit capture of insects, even in live traps from which they are released after recording. A large fine was threatened. The gentleman in question has no connections with any trade in insects and has done a large amount of moth recording both in Britain and in Continental Europe which has been of direct benefit to nature conservation, including valuable surveys of nature reserves. Furthermore he does not take long series of any species from a site. He is well-known to me and I had no hesitation in providing a character reference. On behalf of this Society I wrote a very full letter to the Spanish authorities, which was kindly translated by a Spanish member of *Societas europaea Lepidopterologica*, explaining the valuable contribution that is being made by volunteer moth recorders including this man. I have also requested details of the legislation in question and addresses of the offices to which one must apply for any necessary permission so that we can advise our members of the correct procedure and facilitate their recording activity. I am pleased to report that all charges against the individual in question have been dropped. However, at the time of writing I have not received details of the contact points for permits. I hope this issue will be resolved shortly.

The second worrying development occurred when another well-respected member of this Society applied to renew his natural history permit for 1995 for Forestry Commission sites in the South Downs District of Forest Enterprise, where he has already done a great deal of recording work, the results of which he has written up

and supplied freely to the district office. He was informed that from 1 January 1995 an administrative charge would be levied by this Forest Enterprise District to deal with such permits and he was asked to pay £10, which, under protest, he duly did, at the same time reporting this matter to our Society and to his MP. Gravely concerned, I immediately contacted several members of the Forestry Commission and have established that this move is not a national ruling and is peculiar to South Downs District who originated the idea. My FC contacts were as concerned as I and were largely unaware of this insensitive development. It seemed quite ridiculous when at the same time other parts of the organization are offering grants to cover the travel costs of naturalists to encourage biological recording on FC holdings. Charging for natural history permits would severely undermine the credibility of the pro-conservation stance the FC has been endeavouring to develop and promote in recent years. At the time of writing, I have received an assurance from a senior officer (Mr R. Leslie, Regional Environmental Manager for Forest Enterprise South and West, Avon Fields House, Somerdale, Keysham, Bristol, BS18 2BD) within the FC that this matter will be cleared up and that it will not be necessary to pay for permits for genuine natural history recording. He has promised to see that our member receives a refund and a £50 grant for 1995. If any other members find themselves being asked to pay for such permissions, (please contact the regional environmental manager). I will be pleased to provide details of this FC contact so that he can investigate.

During the year seven of our members have passed away, including several particularly well-known figures within this Society.

Gaston Prior died on 1 April, after a protracted illness. He was a past President of this Society (1978), held posts on Council and was a frequent attender of indoor meetings and the Annual Exhibition. Gaston's great love was the larvae of pug moths *Eupithecia spp.* and he was engaged in a joint work on this group with Adrian Riley until Gaston's illness made further contribution impossible. Many members will recall his London days but it was on his retirement to Woodstock in Oxfordshire, that I first got to know Gaston. Following the move he immediately became involved with the Oxford University Entomological Society, Woodstock Museum and the Hope Collections, engaging in many days of voluntary curation work at the latter. During the late 1970s and mid 1980s I went beating larvae with Gaston on a number of occasions. He would always turn up with one of his proud possessions, an old beating tray that had once belonged to the late Baron Charles de Worms, for whom he held a great respect. Many times I would give him lifts back from Oxford to Woodstock and he would sit cursing, in his inimitable way, the local bus company for not operating a late service to get him back from evening meetings. Gaston would often refer to entomological work done in the forties and it was some time before I realized that he was talking about the 1840s! I would like to thank you Gaston, above all, for imparting to me a proper sense of historical perspective!

Basil MacNulty died suddenly on 12 April, aged seventy nine, at his home in Rhossili, on the Gower Peninsula. Basil was an honorary member of the BENHS, a long-standing member of Council, Secretary between 1961 and 1968 and President in 1970. He was perhaps best known to many current members as organizer of the Annual Dinner and proposer of the toast to "The Founding Fathers". Basil worked for many years as a research chemist in various parts of Britain, and, between 1952 and 1958, in Nigeria, which enabled him to form a large collection of West African insects, especially Lepidoptera and Coleoptera. He later published many of the entomological results of his time in Africa. At the time of his death he was working on the larvae of African lasiocampid moths to complement his earlier work on African lymantriids and I often used to meet him at the Natural History Museum

amongst cabinets of furry caterpillars. He also had a substantial involvement with the forthcoming volumes on geometrid moths for the series *Moths and Butterflies of Great Britain and Ireland* (Heath and Emmet, 1976 onwards).

Ian (R.I.) Lorimer died suddenly on 31 May, aged seventy four, at his home in Orkney. Ian was perhaps best known to many as the author of *The Lepidoptera of the Orkney Islands*, published in 1983. He also wrote many of the sections on noctuid moths in volumes 9 and 10 of the *Moths and Butterflies of Great Britain and Ireland*. Ian started his involvement with Orkney long before he moved there permanently from London. He is fondly remembered for being tremendously helpful to other lepidopterists and welcomed visitors to Orkney. He wrote many detailed and helpful letters and sent lists of records to myself and others and did a great deal to promote the study of Lepidoptera in the northern Isles.

Jack Newton died on 6 July, aged eighty-seven, after extended illness. Jack was probably best known to members as the author, with Guy Meredith, of the *Macrolepidoptera of Gloucestershire*, published in 1984 by the Cotteswold Naturalists' Field Club. The following year his supplement to Clutterbuck and Bainbridge-Fletcher's *Microlepidoptera of Gloucestershire* was published by the same Society. Jack was equally adept with both macro- and micro-moths and was the county moth recorder for Gloucestershire. He regularly attended our Annual Exhibitions, at which he presented some notable exhibits. I came to know Jack late in his life but enjoyed several long telephone conversations with him on various subjects and it was as a result of Jack's work that I discovered the colony of barberry carpet moths *Pareulype berberata* in Gloucestershire (*Ent. Rec.* 103: 287–292). Jack leaves behind an extensive body of data from many years of industrious recording in the county. His fine collection has been left to the Reading Museum and Art Gallery.

Ian Guy Farwell died on 26 August aged seventy-four. He joined this Society in 1947 and was a devotee of the Annual Exhibition. He was for many years a stalwart of the Lymington Natural History Society, leading many field trips to the local marshes, the Isle of Wight and his beloved New Forest and Communicating his enthusiasm to others. Ian was a general naturalist with a particular interest in butterflies and the larger moths, and he collected a number of striking aberrations including two halved gynandromorph silver-washed Fritillaries *Argynnis paphia* taken in the New Forest in 1939.

Bill (W. E.) Minnion died in early September after an unsuccessful heart by-pass operation. Bill was a good friend of the late Bernard Goodban and together they were perhaps best known for the discovery of the balsam carpet moth *Xanthorhoe biriviata* in Britain. I first came across Bill as the author of a note he wrote in 1952 on the discoveries being made with the new mercury light traps (*Ent. Rec.* 64: 182). Bill was active in the Ruislip Natural History Society and gathered an impressive list of macro- and micro-lepidoptera for the area.

Robert St Leger OBE died at the end of the year, aged sixty-eight. He had a long career in the Colonial Service where he gained a reputation as incorruptible and unflappable. He was a passionate lepidopterist and his postings enabled him to collect widely in the tropics. He amassed a huge collection of butterflies and moths—one of the largest in private hands in Britain—and this has been left to the Natural History Museum, London. His specialism was the butterflies of West Africa and the Caribbean and he discovered several new species and subspecies. *Charaxes legeri* was named after him and *Liptena priscilla* after his wife.

The Society is always sad to lose members, for whatever reason, and some of the above were leading lights. We have already stood in memory of these people at

previous meetings so I shall not ask you to do so now. At the same time it is encouraging that a steady stream of new members are coming into the Society and we hope that they will enjoy long membership and be able to make valuable contributions.

BOOK REVIEW

The butterflies and moths of Berkshire by B. R. Baker. Hedera Press, 1994, xxxi + 368 pp, 3 monochrome plates, 2 maps, A5, hardback, £25.—It would be hard to find another entomologist with credentials as impressive as those of Brian Baker to compile a new county list for the Lepidoptera of Berkshire (Watsonian vice-county 22), a venture originally inspired by the author's curatorial work on Reading Museum's Lepidoptera collections. A native of the county, he has served as Deputy Director of Reading Museum, President of the Reading and District Natural History Society, President of the British Entomological and Natural History Society as well as being involved in the founding of the Berkshire, Buckinghamshire and Oxfordshire Naturalists' Trust.

The book's cover profile of the author states that "the field, laboratory and library studies resulting in his writing of *The butterflies and moths of Berkshire* have been the culmination of a life-time's work and dedication." There can be little argument with that nor with the superb quality of the end product.

The foundation document for this new list is *The Victoria county history of Berkshire* published in 1906, which credited Berkshire with 1261 species of Lepidoptera. The subsequent addition of just over 400 species, bringing the total to a figure which represents almost two-thirds of the species-total for the British Isles, illustrates the entomological significance of the county.

Deliberately intended as a companion volume to Barry Goater's *The butterflies and moths of Hampshire and the Isle of Wight* (1974), the format follows that of the earlier work. A welcome addition is the use of Bradley and Fletcher log-book numbers in the list of records and in the indexes, facilitating easy reference to species.

The brief introductory chapters include notes on the geology and habitat-range of the county, comments on the assessment and presentation of the records and a bibliography. Especially enjoyable in this section are the cameos of early Berkshire lepidopterists. We see the remarkable dedication and expertise of these early collectors, who worked without the aid of high-tech equipment and ease of transport available to the modern entomologist.

Some local lists are rather like telephone directories to use—name, location, number—and are about as interesting to read. Here however we have a wealth of data, exhaustively researched and meticulously presented, giving us a summary of both the historical and the current status and distribution. Presentation of data is locality-based (so much more interesting than dots in squares!) and an index of place names giving four-figure grid references is provided. As well as localities, dates recorded and recorders' names are listed. Occasional annotations to the records give comments on doubtful records, reasons for a species' decline or anticipation of possible wider distribution of a species in VC22.

The author's own superb colour photographs of *Apatura iris* (L.), which adorn the book's covers, set the seal on a wonderfully impressive work of reference. Unquestionably the standard by which all other local lists should be judged.

DISTRIBUTION OF THE SOCIETY'S JOURNAL

DAVID YOUNG, Distribution Secretary

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- Allan, P. B. M. 1947. *A moth-hunter's gossip*. 2nd edn, Watkins and Doncaster, London, p. 149.
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Cover illustration: The forest bug, *Pentatoma rufipes* (L.), on an oak leaf. Photo: R. A. Jones.

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 THE SOCIETY'S 'NEW' LOGO

RICHARD A. JONES

13 Bellwood Road, Nunhead, London SE15 3DE.



It will not be long before members begin to notice a strange device adorning BENHS letterheads, notices, books, and yes, even the front cover of the Society's journal. At first sight it may appear vaguely familiar, but at the same time it will seem different and new. A few words of explanation are perhaps in order, for current members and hopefully, those in the future reading through their back issues trying to get a flavour of the history of the Society as it was towards the end of the twentieth century.

At a recent Council meeting, it was suggested that the Society ought to have a readily recognized logo* which could appear on its letterheads, on official documents, on promotional material, on its publications or those from other organizations which it supported, on its journal, or even, and this was quite a radical suggestion, on tee-shirts, sweatshirts or other ephemera. Other entomological and natural history societies have their own emblems so why not the BENHS?

There were various suggestions, but it was immediately pointed out that the Society already had a logo of sorts—the peculiar beast woven into the Society's official tie. However, this design lacked the name of the Society. After much debate and discussion on how to proceed it was decided to incorporate the insect in question with a typographic representation of the Society's name in some compact form. Having come to the Society's aid previously for designs of Christmas cards, cover illustrations for the journal and the like, Rob Dyke volunteered to draw up some design suggestions. In the mean time, I tried to do some research on a question that had long been at the back of my mind—what animal is it anyway?

At first glance, the long-tailed moth-like insect is obviously a member of the exotic neuropteran family, Nemopteridae. These relatives of lacewings and ant-lions are characterized by broad forewings, long narrow hindwings and a lazy flapping flight. None occurs in Britain, so how could such a curious creature have been adopted by a 'British' society? The exact answer is still lost in time, but a few details quickly emerged even though they were contradictory.

The BENHS ties first appeared in the early 1960s when the Society was still the old 'South London'. Barry Goater was a Council member at the time and remembers Arthur Smith being asked to come up with a design for the tie. The design was done, the ties made and we still have them today. According to Barry the question of the beast's identity was regularly asked at the time and Smith would earnestly reply that it was merely a stylized insect and was not meant to represent any particular species, from overseas, from Britain or even from South London.

*The word logo is an abbreviation of logotype. In the days of hand typesetting, when each metal letter was laboriously selected from trays of type and laid out to form words, sentences and ultimately pages, only a limited number of typefaces was available. If a publisher wished to have a specially designed typeface for a particular trademark or colophon it was separately cast in metal as a complete word; this small, often decorative, word-block was called a logotype, from the Greek *logos* meaning word and *typos* meaning impression.

However, John Bradley, who knew Smith well, could not imagine him drawing anything other than the precise anatomically perfect pictures for which he was well known, and is certain that it must have been a painstaking study of an individual taxon. At first, it was supposed that the insect in question was the Iberian species *Nemoptera bipennis* which appears in European field guides. But that species has a significantly different wing shape as do others in the family.

Smith is no longer with us and any original sketches or drawings are gone. In order to create a new logo a new drawing must be made, but the mystery surrounding the exact nature of the insect still remains; a compromise must be made.

The result, a new stylized version drawn by Rob Dyke, is an echo of Arthur Smith's original design, as it appears on the Society's ties, and also from a menu of the 1972 annual dinner—the Society's centenary.

The logo will start to appear on documents, publications and wherever the Society has an input and by its very nature it will increase awareness of the Society in this visual age.

ACKNOWLEDGEMENTS

The thanks of the Society are due to Rob Dyke who drew the design and Shirley Wheeler a typographer and graphic artist who set the lettering. My thanks are due to Barry Goater and John Bradley for their help in trying to track down the memory of Arthur Smith.

SHORT COMMUNICATION

A second record of *Ctenophora flaveolata* (F.) (Diptera: Tipulidae) in Gloucestershire.—On the morning of 9.v.1994 a single male of this species was swept from the edge of pasture woodland at Overtown, near Cranham Common in the Cotswolds, East Gloucestershire (VC33), grid reference SO900122. This represents the second record for this rare species in the county following its discovery at Cirencester Park Woods on 6.v.1990, also in VC33 but located approximately 10 km to the south-east of Overtown (Alexander, 1991). Godfrey (1994) has also reported the recent occurrence of this species from the neighbouring county of Oxfordshire.

C. flaveolata appears to be associated with large over-mature trees, especially beech (Stubbs, 1987). Although the woodland at Overtown was dominated by a growth of fairly young sycamore with very little dead timber, apart from a few small branches, a few mature beech and ash trees were present together with some old moss covered stumps located in partial shade. It seems likely that these old rotten stumps will have provided suitable habitat for the larval development of *C. flaveolata*—A. P. FOSTER, The National Trust, 33 Sheep Street, Cirencester, Glos. GL7 1QW.

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HETEROPTERA RECORDING IN WALES DURING 1993 AND 1994

KEITH N. A. ALEXANDER AND ANDREW P. FOSTER

The National Trust, 33 Sheep Street, Cirencester, Gloucestershire GL7 1QW.

The work of the National Trust's Biological Survey Team took us to a wide variety of properties scattered across Wales for much of the 1993 and 1994 field seasons. During this time we found a good selection of the local specialities as well as some surprises.

The following lists give details of the localities, and, where appropriate, additional comments on the distribution and habitat associations. Three species, *Trapezonotus ullrichi* (Fieb.), *Pachybrachius luridus* (Hahn) and *Pionosomus varius* (Wolff, J. F.), are of British Red Data Book status (Kirby, 1992a).

SOUTH-WESTERN SPECIALITIES

Enoplops scapha (F.) (Coreidae). An adult plus numerous nymphs were found on a clump of sea mayweed growing on the face of head cliffs at Porthysgo on Llŷn, Caernarvonshire (SH208264), 15.vii.1993. We are aware of no published records for this species from North Wales. However, there are two specimens from the region in the collections at Leicester Museum: Porth Ceiriad, Llŷn (SH307248), 19.viii.1985, J. H. Matthias, and 'cliffs opposite S. Stack', Anglesey, 21.ix.1980, P. Lucas. It was also seen in S. Wales during 1994 where it is well known.

Dicranocephalus agilis (Scop.) (Stenocephalidae). Adults found on the very small area of sand dune behind Traeth Penbryn, Cardiganshire (SN293524), 30.vi.1994—it is not listed for the county in Kirby & Lambert (1990). Nymphs were also found on *Euphorbia paralias* L. growing on head cliff at Deep Slade, Pwllldhu Head, Gower, Glamorganshire (SS562869), 25.vii.1994. It is best known in Cornwall and Devon, but with a good scatter of records from West Wales, especially the dunes of the Castlemartin Peninsula, Pembrokeshire (Kirby, 1992b), Carmarthenshire and Caernarvonshire (Kirby, 1991).

Trapezonotus ullrichi (Fieb.) (Lygaeidae). This species was discovered new to Wales by P. Kirby & S. Lambert on 25.vi.1990 along the south coast of the St David's Peninsula at Caerfai, Pembrokeshire, SM760253 (Kirby, 1992b). Kirby (pers. comm.) has subsequently found it on Pendine Cliffs, Carmarthenshire (SN233078), a single male on an ox-eye daisy flower beside cliff path, 15.vi.1993. A single adult was found by K.N.A.A. also on an ox-eye daisy flower in an area of notably flowery maritime grassland on Porthlysgi Cliffs at SM735235, 23.vi.1994. The association with ox-eye daisy appears to be characteristic (Alexander & Grove, 1991).

COASTAL AND HEATHLAND SPECIALITIES

Corizus hyoscyami (L.) (Rhopalidae). Well known from sand dunes in Pembrokeshire, but a small colony was found on dry seacliff grassland with the *Trapezonotus* at Porthlysgi Cliffs. These were similarly found on ox-eye daisy flowerheads.

Liorhyssus hyalinus (F.) (Rhopalidae). One taken on coastal heath, St David's Head (SM733280), 16.vi.1994; found in Pembrokeshire only once before, by S. Judd in 1985/86 (in Kirby, 1992b).

Pionosomus varius (Wolff, J. F.) (Lygaeidae). A speciality of the coastal sandhills of Kent, Pembrokeshire and Gower. Previous Gower records relate to Pennard, Llangennith and Whiteford Burrows (Kirby, 1992a) and Three Cliffs Bay (Kirby, 1993, in Fowles, 1995). The last locality is rather imprecise, but the grid reference given, SS538877, indicates the Pennard Burrows side of the bay. We can now add Nicholaston and Penmaen Burrows (SS523879 and 535881, respectively) on the western side of the bay, leaving very few of Gower's dune systems where it has not been recorded.

Plinthisus brevipennis (Latr.) (Lygaeidae). A single adult was found in open western gorse and bell heather heathland at Mynydd y Graig, Llŷn, Caernarvonshire (SH225265), 16.vii.1993. Although a common and widespread species of dry sandy heaths across the southern half of England, this appears to be scarce in Wales. The only other modern record in the north also comes from Llŷn: Mynydd Cilan, 1992, A. P. Fowles; otherwise there are only a few very old records from Anglesey and Denbighshire (M. J. Morgan, pers. comm.). Even in Pembrokeshire there is only one record (Kirby, 1992b).

WETLAND SPECIALITIES

Pachybrachius luridus (Hahn) (Lygaeidae). A single specimen of this Red Data Book (Kirby, 1992a) bug was taken by sweep-netting in an area of grazed mire at Bryn-y-Bont, Nantmor, Caernarvonshire (SH598461), 29.vi.1993. This area is at the uppermost end of the Glaslyn Marshes and is underlain by shallow peats and estuarine silts, formerly part of the estuary, but long-since drained and brought into agricultural use. Good quality acid mires persist here however, and are rich in both characteristic mire plants and invertebrates. *P. luridus* is mainly a New Forest species in Britain but has been found at a handful of other sites, including one other Welsh locality, Ynys-hir, Ceredigion. The Ynys-hir record was first published by Kirby (1992a) but without the details. It was actually found by A. E. Stubbs as long ago as September 1972 close to the RSPB Reserve Warden's house (SN678961). The two localities appear to be very similar in character, being mires on estuarine silts, Ynys-hir being on the Dovey Estuary.

Capsodes gothicus (L.) (Miridae). This bug was discovered in Pembrokeshire only as recently as 1988, at Cwm Dewi, Dinas (Alexander & Hawkins, 1993). We found it at two further sites along the north coast: Gernos (SN122484) and Treseissyllt (SM886363) Cliffs. It was also taken in Ceredigion at Mynachdy'r-Graig (SN554742), on *Lotus uliginosus* Schkuhr on cliff-top, 28.vi.1994.

PASTURE-WOODLANDS

Xylocoris cursitans (Fallén) (Anthocoridae). Adults were found beneath bark on the stump of a recently felled ash, within pasture-woodland, Berth-lwyd Farm, Breconshire, (SN915134), 27.vii.1994; also seen at Dolmelynlyn, Merioneth (SH7222) and Erddig Park, Denbighshire (SJ326482). It has a thinly scattered and localized distribution throughout Wales, and is a good indicator of long-established pasture-woodland sites and ancient woodlands.

ACKNOWLEDGEMENTS

Our thanks to: Pete Kirby for his help in compiling this article and for permission to publish his record for *Trapezonotus ullrichi*; to Adrian Fowles and Joan Morgan

for additional information on North Wales records, and Derek Lott for information on the *Enoplops* species held at Leicester Museum.

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BOOK REVIEW

The Dryinidae and Embolemidae (Hymenoptera: Chrysoidea) of Fennoscandia and Denmark, by M. Olmi. *Fauna Entomologica Scandinavica* 30, Leiden, E. J. Brill, 1994, 100 pp (including 38 colour plates), hardback, NLG 100, about £42.—This book deals with one species of Embolemidae, which has never been reared, and 34 species of Dryinidae in four subfamilies, all parasitoids of Homoptera: Auchenorrhyncha (various groups of Cicadomorpha and Fulgoromorpha). Professor Massimo Olmi's work has transformed the classification and species-level taxonomy of these two families over the past 15–20 years and he is widely respected as the world authority. As is usual for the *Fauna Entomologica Scandinavica* series, the work focuses strongly on the fauna of Fennoscandia and Denmark, but there is a large overlap with the British fauna, and it is plainly indicated in the section on distributional records that all but six of the treated species are recorded from the British Isles. Unfortunately it is not possible to tell that only five British species (*Anteon pseudohilare* Burn, *Anteon reticulatum* Kieffer, *Anteon scapulare* (Haliday), *Mystrophorus formicaeformis* Ruthe and the more doubtful *Dryinus collaris* (L.)) are not included: a shame, perhaps for all users, that this faunal summary, so clearly showing which Fennoscandian or Danish species occur in Germany and the British Isles, does not extend to indicating which species known in those neighbouring countries have yet to be found in the area of focus.

Following a short history of work on the two families in north-west Europe, there is a brief section on the classification of Chrysoidea, and a more thorough treatment of morphology (well illustrated by line drawings and SEMs) and comparative biology that culminates in an interesting section suggesting the evolutionary ecology behind the extreme morphological specializations in the front legs of female Dryinidae (except *Aphelopus*) in relation to host capture. Then come the keys and species level treatments, in which line drawings of female chelae (except, of course, *Aphelopus* in which the structure is absent) and male genitalia are given for each species and whole insect drawings are supplied of several. A separate listing of host–parasitoid records is unfortunately presented bald, with no indication of origin,

repetition of occurrence, or any level of verification that may (or not) have been applied, leaving the reliability and significance of the recorded associations poorly guaranteed. Thirty-eight very space-consuming colour plates comprising six good photos depicting life history and 30 whole (plus a few part) insect drawings of pleasing quality, a summary chart of distribution records for each included species by province within the four countries with records also indicated for Germany and Great Britain, and a bibliography of 150 references complete the work.

Despite considerable earlier input from British workers into knowledge of their biology and systematics, these insects have not been winning the hearts and minds of most aculeate hymenopterists in Britain in recent years. Of course, they are small and inconspicuous, but there have been other reasons: except for Aphelopinae and notwithstanding Olmi's comprehensive but relatively scarce work on the world fauna published in 1984 and 1989 (from which progress can in fact be made), our 1978 checklist and the previously existing British identification literature (e.g. Perkins, 1976, *Handbk Ident. Br. Insects* 6 (3a), which is not easy to use with confidence) contain some pretty bad muddles, in Anteoninae especially. Olmi is a lumper rather than a splitter, and his classification sinks a number of generic names (in Dryininae and Gonatopodinae) based on differences appreciable only in the female sex, and the British list has also been affected by the sinking of several species-level nominal taxa, as well as unexplained new records of *Aphelopus querceus* Olmi and *Anteon exiguum* (Haupt) from Britain in the present work (see Burn, 1995, *Entomologist's Mon. Mag.* 131: 139-140). To the British worker especially, a check-list of species in which the full synonymy was reconciled at a glance would have been a very helpful addition, though to be fair perhaps the Fennoscandians and Danes don't need the unscrambling so badly. The keys seem reliable and this mostly excellent and authoritative book should surely provide a good basis for hauling this interesting and bizarre group of parasitoids back into strong focus for British hymenopterists.

MARK R. SHAW

BOOK REVIEW

Scuttle flies, the Phoridae, by R. H. I. Disney. London, Chapman & Hall, 1994, xii + 468 pp, hardback, £67.50. Regular readers of this journal will have noticed several papers over the years by Henry Disney, on a group of small, easily overlooked, hunchbacked flies, the phorids. With the same author's two Royal Ent. Soc. handbooks on the family already published, it might be wondered what more this prodigious entomologist could find to say about these diminutive creatures. The answer is "quite a lot". In contrast to Spartan descriptive keys, his new book offers an in-depth biological study to "a family of flies whose diversity of larval lifestyles is apparently without rival among insect families". There are parasites, parasitoids, predators and saprophage scavengers; some are potential biological control agents, others are pests; they are aquatic, terrestrial and there is at least one intertidal species. After an extensive analysis of different lifestyles, habits and general biology, there are two huge keys and identification notes to 229 world genera. More than half of these genera are still known from only one sex, so many will turn out to be the "missing" sex of a previously described genus. The book concludes with a short methods chapter on collecting and preserving and 50 pages of references. This is a book for the specialist rather than the general entomologist, but such a detailed treatment will mean that if you ever want to know anything about phorids, you will know where to go in the library.

R. A. JONES

ON A COLLECTION OF *BOMBUS* AND *PSITHYRUS* PRINCIPALLY FROM SUTHERLAND, WITH NOTES ON THE NOMENCLATURE OR STATUS OF THREE SPECIES (HYMENOPTERA, APOIDEA)

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INTRODUCTION

A small collection of *Bombus* and *Psithyrus* was made by the present author and Mrs M. W. Baker at Inchnadamph, Sutherland, between 29 September and 2 October 1964. The majority of the specimens were collected from *Centaurea* on meadowland near the SE corner of Loch Assynt (grid ref. NC 253218) [abbreviated below to Inchnadamph A] and along the path following the stream, Allt Poll an Droighinn, running down from Beinn Uidhe, at an altitude of c. 500–1250 ft [Inchnadamph B]. A few specimens were collected in the Inchnadamph National Nature Reserve (where it had been intended to collect, but where few plants were still in flower), in Gleann Dubh, c. 750 ft (NC 276205) [Inchnadamph C]. For specimens collected elsewhere, full data are given. Despite the late date, 79 specimens representing seven species were taken. It was noted that workers of several species of *Bombus* remained active until well after sunset in spite of the cold: Freuchen & Salomonsen (1959: 193) record that in the Arctic, in June, *Bombus* species, which here fly even in rain and fog, 'fly the twenty-four hours of the day, although about midnight the number diminishes for a few hours' (see for more detailed observations on arctic *Bombus*, and further references, Friese, 1908).

The opportunity has been taken of recording also the *Bombus* and *Psithyrus* taken by the late C.H. Jowett, Esq., and Miss P.H. Jowett on Mull and Iona in 1962 and 1963. These records are enclosed in square brackets.

SPECIES TREATMENTS

Bombus (Megabombus) hortorum (L., 1761)

Material: Sutherland, Inchnadamph (A), 30.ix.1964, 1♂; 1.x.1964, 1♂.

[Mull, Ross of Mull: Uisken, 2.ix.1962, at mallow, 3♂; Uisken, 2 miles S. of Bunessan, 14.ix.1962, 1♂ (all C.H. & P.H. Jowett); Uisken, 10.ix.1963, 3♂ 1♀ (C.H. Jowett); Ardfenaig, 2 miles W. of Bunessan, 10.ix.1962, 2♂ (C.H. & P.H. Jowett); Ardfenaig, 5.ix.1963, 2♂ (C.H. Jowett). Iona, 5.ix.1963, at *Centaurea nigra* L., 1♂ (C.H. Jowett).]

Bombus (Thoracobombus) pascuorum septentrionalis Vogt, 1909

Apis pascuorum Scop. 1763: 306; Carniolia [for the locality see Baker, 1994: 289, note (1) under Scopoli].

Apis agrorum F., 1787: 301; [♀]; in Europae. Junior primary homonym of *Apis agrorum* Schrank, 1781.

Bombus agrorum f. *septentrionalis* Vogt, 1909: 64, 75; Nordwest schottland. No type designated: proposed for a form of unspecified status ('In der Färbung steht dieser Gruppe [*frey-gessneriformen*' of *agrorum*] nahe: *septentrionalis* m. Wie *valesianus* . . .').

Bombus agrorum [Rasse] *septentrionalis* Krüger, 1958: 338.

Material: Sutherland, Inchnadamph (A), 29.ix.1964, 1♂ ♂; 30.ix.1964, 1♂ ♀; 1.x.1964, 2♂ ♂; 2.x.1964, ♀.

[Mull: Ross of Mull, Uisken, 2.ix.1962, at mallow, 4♂ ♀; Uisken, 2 miles S. of Bunessan, 14.ix.1962, 1♂ (all C.H. & P.H. Jowett); Uisken, 10.ix.1963, 1♂ ♂ (C.H. Jowett); Kintra, 1.5 miles N.W. of Fionnphort, 10.ix.1962, 1♂ (C.H. & P.H. Jowett); Kintra, 6.ix.1963, on *Centaurea nigra* L., 2♂ ♀ (C.H. Jowett); Ardfenaig, 2 miles W. of Bunessan, 10.ix.1962, ♀ (C.H. & P.H. Jowett).]

Bombus (Thoracobombus) ruderarius ruderarius (Müller, 1776)

Material: [Mull, Ross of Mull, Uisken, 10.ix.1963, 1♀ (C.H. Jowett). Iona, 5.ix.1963, at *Centaurea nigra* L., 11♂ (C.H. Jowett).]

Bombus (Thoracobombus) laevis sladeni (Vogt, 1911)

Bombus muscorum auctt. nec (L.) [The lectotype of *Apis muscorum* L., designated by Day (1979: 68), belongs to the species variously known under such names as *cognatus* Steph. (Saunders, 1884), *venustus* Smith (Saunders, 1896), *solstitialis* Panz. (Richards, 1927), *variabilis* Schmiedeknecht (1930), *humilis* Ill. (Bischoff & Hedicke, 1931), or *helferanus* Seidl (Pittioni, 1939). It is regrettable that Løken (1973: 146), although 19th century Scandinavian authors had correctly identified Linnaeus's species, elected to follow the misapplication of Linnaeus's name.]

Bombus muscorum f. *laevis* Vogt, 1909: 63; Kleinasien.

Bombus smithianus 'var., or race,' *pallidus* Evans, 1901: 47; ♂; [Scotland:] 'taken by myself near Kingussie (Inverness-shire), Aberfoyle (S. W. Perthshire), and Elvanfoot (Lanarkshire), and also specimens from the Perth district, Dumbartonshire and Kirkcudbrightshire, kindly sent me by Messrs. Rodger, Malloch, and Service'. Invalid junior homonym of *Bombus pallidus* Cresson, 1863 [= *Bombus (Fervidobombus) pennsylvanicus* (Degeer, 1773)].

Lectotype, by present designation, ♂, labelled 'Elvanfoot/18.9.00' (endorsed '*Bombus/smithianus* ♂', the '*smithianus*' overwritten on '*venustus*') and 'W. Evans RSM/1971.55' [print], in Department of Natural History, National Museums of Scotland. Paralectotypes, in same collection: 11 ♂♂, Scotland: Lanarkshire, Elvanfoot, 5.ix.1900 (3), 11.ix.1900 (1), 12.ix.1900 (2), 18.ix.1900 (1), ix.1900 (3) (all W. Evans); Dumbartonshire, Bonhill, 15.ix.1900 (J. R. Malloch); Kirkcudbrightshire, Southernness, viii.1895 (R. Service).

Agrobombus muscorum . . . var. geogr. nov. *sladeni* Vogt, 1911:52; sex?; Südeuropa.

Bombus muscorum celticus Yarrow, 1978: 15; *nom.nov.* for '*Bombus muscorum pallidus* Evans (*Bombus smithianus* var. *pallidus* Evans, 1901)'. Yarrow failed to designate a lectotype for Evans's taxon. Since *celticus* was proposed as a replacement name, it has no independent type.

Nomenclature: The name *laevis* was proposed by Vogt for a form of unspecified status¹ from Anatolia: 'An *Muscorum*formen finden wir in Kleinasien einen ganz kurzhaarigen Vertreter *laevis* m.: wie *muscorum* gefärbt = *typicus*, die Orangefarbe des Thorax auf einen runden Fleck beschränkt—ab. *laesoides* m.'. The taxon was later recognized by Richards (1935a: 79) as a subspecies of what he also knew as *muscorum*. That the nominotypical subspecies is not identical with the presumed *Stammform* is perhaps unfortunate, but by no means an uncommon accident of nomenclature.

Bombus laevis exists in two groups of colour-forms, of erratic distribution, treated as species by some authors. Dark forms have been referred to '*smithianus*' [*smithianus*

auctt. nec White]², pale to '*muscorum*' [*muscorum auctt. nec* (L.)]. There are, however, no significant structural differences between the two groups, and no apparent ecological or biological differences. Both groups are represented in the British Isles, each by several forms now treated as subspecies of *laevis*. The names *allenellus*, *scyllonius* and *liepeterseni* (the last a misapplication)³ have been applied to dark forms occurring on islands off the British and Irish coasts, the names (*pallidus* =) *celticus*, *sladeni* and *orcadensis* to pale forms inhabiting the British and Irish mainlands and (*orcadensis*) the Orkneys.

The name *pallidus* was proposed by Evans for 'the variety having the hairs on the underside of the body, and on the legs, pale yellow instead of black'. Evans's description must be taken as referring exclusively to the male because, although he had material of both sexes, he was unable to distinguish the queens and workers from his '*venustus*' (pale forms of *muscorum* and ? *pascuorum*): 'Besides these males I have females and workers from the same and other localities, which I cannot but regard as belonging to the same form, though the absence of any known structural differences between ♀ and ♀ of *Smithianus* and those of *venustus* precludes . . . absolute certainty of identification'. Dr M. R. Shaw sent for examination the series from Evans's collection standing as *pallidus* in the National Museums of Scotland. The series comprises 14 males, of which two are without data and are not accepted as syntypes, 8 queens and 6 workers. A lectotype has been selected as noted above and 11 other males labelled as paralectotypes: since Evans did not identify any queens or workers as definitely belonging to *pallidus*, it would seem illogical to recognize any queen or worker *pallidus* in his series as syntypes.

The name *sladeni* was proposed by Vogt for a variety with the 'Behaarung deutlich struppiger als die des *typicus*, weniger struppig als die von *pallidus*. Färbung die des *typicus*, aber Thoraxdorsum vorne und hinten ausgesprochen hellgelb behaart (Annäherung an die Färbung *fulvofasciatus* Friese meines *muscorum laevis*)'.

Richards (1935a: 77) noted that *pallidus* (*celticus*) was doubtfully distinct from *sladeni*, and *celticus* and *sladeni* appear in fact to represent a north-south cline in coat and colour characters: the British mainland and Irish mainland *laevis* should be known as *sladeni*. The occurrence of *Bombus laevis sladeni* has been linked with marshy and similar habitats, but this is by no means always so: at Seaford, Sussex, for example, *sladeni* occurs on chalk downland in association with, among others, the deceptively similar *muscorum anglicus* [*Bombus humilis anglicus* Yarrow, 1978].

A summary of the British and Irish forms of *laevis* is given at Appendix 1.

Material: Sutherland: Inchnadamph (A), 29.ix.1964, 1♀ 1♂; 30.ix.1964, 2♂ 2♀; 1.x.1964, 2♀.

[Mull, Ross of Mull, Uisken, 2.ix.1962, at mallow, 2♂ 1♀; Uisken, 2 miles S. of Bunessan, 14.ix.1962, 1♀ (all C.H. & P.H. Jowett).]

Bombus (*Kallobombus*) *cardui cardui* (Müller, 1776)

Apis cardui Müller, 1776: 165; no locality specified [Denmark or Norway].

Apis soroensis F., [1777]: 246; Habitat in Daniae nemoribus. Lectotype ♀, Denmark: Sjaelland, designated by Løken (1966: 200).

Nomenclature: *Apis cardui* was described by Müller in the following terms: '1929. *Ap. Cardui* hirsuta nigra, ano albo. *+*' (signature a4: '. . . signo + a me, detectae indicantur').

Von Dalla Torre (1896: 549) gave *cardui* as a junior synonym of *soroensis*, but Müller's work (title page dated 1776, preface dated 31 March 1776, addenda

dated 18 June 1776) appeared before Fabricius's (title page not dated, preface dated 26 December 1776). The Scottish and Fennoscandian *cardui* belong to the nominotypical, white-tailed, form of the species. To be more exact, both Müller's ('hirsuta nigra, ano albo') and Fabricius's ('*Apis hirsuta atra, ano albo . . . tota atra, solo ano nigro*': lectotype designated by Løken, 1966) descriptions chanced to be based on the same melanic, white-tailed variant, although the ranges of both the N. W. European white-tailed⁴ and the more widely distributed red-tailed (*proteus* Gerstäcker, 1869) subspecies of *cardui* overlap in Denmark with the presence of all grades of intermediates as well as melanic forms (Løken, 1973: 32).

Material: Sutherland, Inchnadamph: (A), 30.ix.1964, 2♂; 1.x.1964, 1♀; (B), 1.x.1964, 1♀.

[Mull, Ross of Mull: Uisken, 2.ix.1962, at mallow, 1♂; Uisken, 2 miles S. of Bunessan, 14.ix.1962, 1♀ (both C.H. & P.H. Jowett); Uisken, 10.ix.1963, 3♀; Kintra, 6.ix.1963, at *Centaurea nigra* L., 2♂ (all C.H. Jowett); Kintra, 1.5 miles N.W. Fionnphort, 10.ix.1962, 2♀ (C.H. & P.H. Jowett).]

Bombus (Bombus) magnus (Vogt, 1911)

Terrestribombus lucorum f. *magnus* Vogt, 1911: 56; ♀ Nordschottland und . . . Orkneyinseln.

Nomenclature: Saunders (1884; 244; 1896: 378) recognized, under the name *terrestris* L., but a single species of *Bombus s. str.* in Britain, and treated '*lucorum* Smith' as a colour variety. Subsequently, two species of *Bombus s. str.* were generally recognized in Britain, *B. audax* Harris, 1780 [= *terrestris* *auctt.*], represented by its nominotypical form⁵, and *B. terrestris* (L., 1758, *nec auctt.*) (= *B. lucorum* (L., 1761)), also represented by its nominotypical form. More recently a third form, *B. magnus* Vogt, 1911, described from Britain, has been recognized as of specific rank by various authors, e.g., Krüger (1951–58, *passim*, but especially 1954: 264) and Løken (1973: 46), and this ranking is accepted here. *B. magnus* appears to be, in N. W. Europe, a relict form existing in populations peripheral to those of the more or less ubiquitous *terrestris*, and although a majority of recent British records, especially those from southern Britain, based on unreliable coat-colour characters, are suspect, the identity of the present series is unambiguous. *B. magnus* was 'described' by Vogt in the following terms: 'Das ♀ des *Tb. [Terrestribombus] lucorum* ist in Nordschottland und auf den Orkneyinseln so gross wie das von *Tb. terrestris* [*i.e.*, *audax*] (*forma nova magnus*)'. To this meagre description subsequent authors have added various details, but the distinctions alleged have not been wholly convincing (Elfving, 1960: 31, was unable to separate Finnish *magnus* from (*lucorum*=) *terrestris* in the presence of material determined by Kruseman) and even those made by Løken (1973: 14, key, couplet 11 and fig. 13A 14) are not entirely satisfactory⁶. However, in N. W. Scotland, where *audax* does not occur, *magnus* is distinguishable from *terrestris* by its larger size, by, in the queen, the colour pattern and especially the pinkish-yellow colour of the tail, and, in the male, by the genitalia.

While the character may not be a practical one for routine determinations, differences in the endophalli of *magnus*, *terrestris* and *audax* confirm specific ranking of *magnus* (C. O'Toole: personal communication).

Material: Sutherland, Inchnadamph: (A), 29.ix.1964, 4♂; 30.ix.1964, 2♂ 1♀; 1.x.1964, 3♂ 2♀; (B), 1.x.1964, 1♂ 2♀ 1♀; Inchnadamph, without exact locality, 29.ix–2.x.1964, 6♂ 3♀ (not now held).

The genitalia of 12 of the males were extracted and the lengths of the gonocoxites measured, taking the reference points indicated by Richards (1927: fig. 61). To ensure that the results would be strictly comparable with those published by Richards (1927: 249), control measurements of series of *audax* and *terrestris* from southern England were made. The results indicated a population intermediate between the *audax* and *terrestris* populations sampled by Richards (Fig. 1).

It is noteworthy that, as the figure indicates, in the series examined and in the series recorded by Richards there was no overlap between large examples of *terrestris* and small examples of *audax*, that the difference between the means for *terrestris* and *audax* was substantial; and that the mean value for the admittedly small sample of *magnus* ($n=12$) fell approximately midway between the mean values for the other species and between the upper limit for *terrestris* and the lower limit for *audax*. The data on which Fig. 1 is based are given in Table 1.

It may be noted that, for the samples measured in connection with the present paper, SD and CV for widely separated populations of *audax* (Iran, N.W. Europe) were quasi-identical, SD 0.0408, 0.0424, CV 1.9, 1.96; for *terrestris* (all populations) were 0.0489, 2.49; and for *magnus* were 0.0941, 4.6, indicating a higher degree of variability in that species—or in that population. A larger sample of the Inchnadamph population would be desirable, but no alien component appears to be present in the present one, which, apart from some variation in the colour of the clypeal hairs, appears homogeneous. Mayr (1969: 170) notes that zones of secondary intergradation between subspecies are often characterized by a greatly increased CV; and, of course, the boundaries, or areas of overlap, between a relict species surviving in populations peripheral to those of an invasive or usurping species (here the nearly ubiquitous *terrestris*), are likely to be shifting ones.

Among the characters that have conventionally been used to separate males of *audax* and *terrestris* is the colour of the hairs of the clypeus, vertex, mesosomal episterna and pseudosternum, and first metasomal tergum. In *audax* these hairs are usually black, in *terrestris* yellow. In the present series, of five specimens with gonocoxites falling within the range of variation of *terrestris*, three have the coloration of *audax* while the other two are nearer *audax* than *terrestris*; and, of six falling within the range of variation of *audax*, the two largest, nearest the mean for *audax*, are those most resembling *terrestris* (hairs of the indicated areas predominantly pale, although still darker than in that species). This reversal suggests that coat pattern in the *terrestris* complex is an unreliable distinguishing character.

As to any correlation between size and coat pattern of colour, the present small sample is inconclusive. Taking gonocoxite length as a measure of size, and the colour of the clypeal hairs as an index of the extent of pale coloration, no strong correlation is evident, although there is an apparent tendency for smaller specimens to be darker:

Gonocoxite length (mm)

1.93 1.93 1.93 1.98 2.01 2.01 2.05 2.09 2.13 2.13 2.13 2.21

Colour of clypeal hair (b: black, pb: predominantly black, m: mixed, pp: predominantly pale)

b m b b m m m m pb m pp pp

Of the 3 queens, two have the tail pinkish-buff and the thoracic collar extending well onto the mesepisterna, characters generally regarded as characteristic of *magnus*. The third has the white tail of southern British *terrestris* and the yellow thoracic

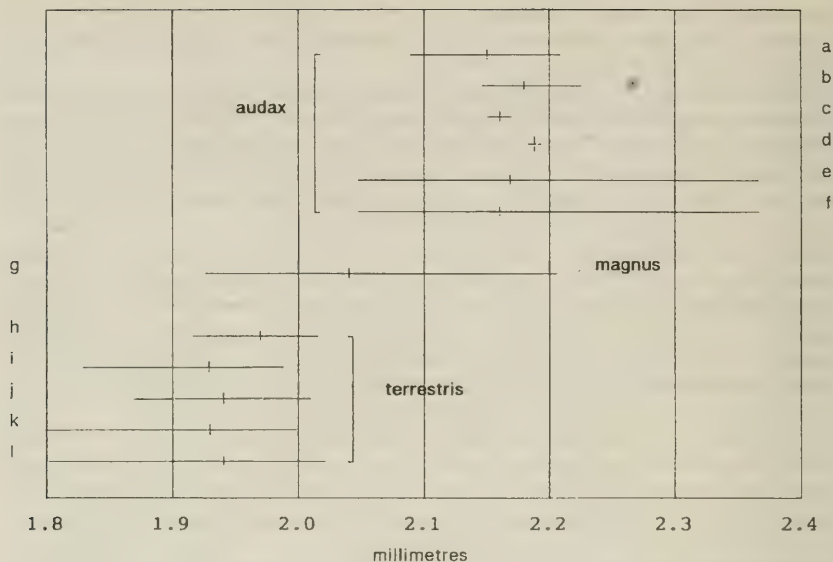


Fig. 1. Length of gonocoxite in *Bombus* (*Bombus*) species. a: *audax dalmatinus* D.T., Iran (Mazandaran) [includes one ex. det. Yarrow as *magnus* but which is normal *audax*] [$n=14$]. b: *audax virginalis* (Geoffr.), Channel Is. ($n=6$). c: *audax audax* (Harris), New Zealand [Nelson (Philpott): introduced] ($n=2$). d: *audax audax* (Harris), England (Surrey, Hindhead: atypical, hairs of face pale) ($n=2$). e: *audax* (Harris), England (south; Richards 1927: 249, as *terrestris*) ($n=49$). f: *audax* (Harris), all populations ($n=73$). g: *magnus* Vogt, Scotland (Sutherland, Inchnadamph) ($n=12$). h: *terrestris* (L.), Austria (Niederösterreich, Steiermark, Kärnten) ($n=11$). i: *terrestris* (L.), England (Norfolk, Mundford) ($n=3$). j: *terrestris* (L.), Iran (Mazandaran) [det. Yarrow as *magnus* (3) or *lucorum* (1)] ($n=4$). k: *terrestris* (L.), England (south; Richards 1927: 249, as *lucorum*) ($n=40$). l: *terrestris* (L.), all populations ($n=57$).

collar extending less far onto the mesepisterna. The collar in all three examples is paler than in *terrestris*.

Bombus (*Pyrobombus*) *jonellus jonellus* (Kirby 1802)

Apis jonella Kirby, 1802: 338; ♂; prope Londinum. Holotype ♂ BMNH designated by Yarrow (1968: 11).

Material: Sutherland, Inchnadamph: (A), 30.ix.1964, 2♂; 1.x.1964, 2♂; (B) 1.x.1964, 1♂; (C), 30.ix.1964, 3♂.

[Mull, Ross of Mull, Uisken, 10.ix.1963, 1♀ (C.H. Jowett).]

These examples are referable to f. *atrocorbiculosus* Vogt, 1911.

Psithyrus (*Ashtonipsithyrus*) *campestris* (Panz., 1800)

Apis campestris Panz., 1800, 7 (74): pl.11; [♀]; in regione sylvarum sabulosa [Germany].

Psithyrus (Allopsithyrus) barbutellus (Kirby, 1802)

Apis barbutella Kirby, 1802: 343; ♀♂; Barhamiæ.

Material: [Mull, Ross of Mull, Uisken, 2.ix.1962, at mallow, 2♂ (C.H. & P.H. Jowett).]

Psithyrus (Fernaldaepsithyrus) sylvestris Lepelletier, 1833

Psithyrus quadricolor 'sous-var. B.' *sylvestris* Lepelletier, 1833: 377; ♂; Les Pyrénées et les environs de Paris . . . de la collection de M. Latreille, actuellement en la possession de M. le général Dejean.

Apathus sylvestris Thomson, 1872.

Material: Sutherland, Inchnadamph: ♂♂, white-tailed: (A), 1.x.1964, 1♂; 2.x.1964, 3♂; (B), 1.x.1964, 1♂ (somatic mosaic); Allt nan Uamh (NC 254178), 2.x.1964, 1♂ (f. *carelicus* Richards); ♂♂, yellow-tailed: (A) 29.ix.1964, 2♂; 30.ix.1964, 1♂ (f. *confinis* Franklin); 1.x.1964, 3♂; 2.x.1964, 2♂; ♀♀ (A), 30.ix.1964, 1♀; 2.x.1964, 2♀; Inchnadamph, n.f.d., 1♀.

A mixed population: the females are typical *sylvestris* as defined by Richards (1929: 353), the males a varied series of typical (white-tailed and *citrinus* (*Psithyrus quadricolor* var. *citrinus* Schmiedeknecht, 1883) (yellow-tailed) forms. The series varies also in the relative proportions of the basal flagellar segments, in the form and degree of development of the subapical callus of S7, and in the form of the squama. The callus of S7 varies from being broad, weak and regular to being narrow and more or less impressed medially, i.e. sub-bituberculate (regarded as the typical condition by, e.g., Popov, 1931, Richards, 1929). It was suspected initially that two species might be represented, *sylvestris* and *flavidus* (Eversmann, 1852) but there is no correlation between the observed variations. Some examples would, however, be difficult to separate from *flavidus*, a probable but insufficiently confirmed parasite of *B. jonellus*. In the palest male, A3 < 4; the hairs of the vertex are yellow and black mixed, of T1 yellow with a few black medially, of T2 and T3 medially black, of T3-5 yellow, of T6 (a few black medially) and T7 orange, and the callus of S7 is broad and regular: this comes very close to *flavidus* Eversmann.

The host of the Inchnadamph series is presumably *B. jonellus*.

Psithyrus (Fernaldaepsithyrus) meridionalis Richards, 1929

This species does not occur in Britain but the opportunity is taken of correcting errors in respect of the type locality. Richards (1929: 351) gave the type locality as 'Styria, Tragop Oberort', a misreading of Tragöb (Tragöss) Oberort (Austria, Steiermark, N.W. of Bruck an der Mur, at the foot of the Hochschwabgruppe). Løken, designating a lectotype (1984: 23), for some inexplicable reason transfers Styria to Yugoslavia.

SUMMARY

Species of *Bombus* and *Psithyrus* collected in Sutherland and on Mull and Iona are recorded. Notes on the nomenclature of the British forms of *Bombus laevis* Vogt, 1909, on the nomenclature of the species commonly known as *B. soroensis* (F., [1777]), and on the status of *B. magnus* Vogt, 1911, are given. The name *agricolae* is proposed for the Hebridean and Shetland form of *Bombus laevis* Vogt, hitherto known mistakenly as *smithianus* White or *liepetterseni* Løken. Lectotypes are

designated for *Bombus* 'Smithianus var., or race, pallidus' Evans, 1901 [= *B. muscorum celticus* Yarrow, 1978, = *B. laevis celticus* Yarrow] and *Bombus smithianus allenellus* Stelfox, 1933. Misstatements concerning the type locality of *Psithyrus meridionalis* Richards, 1929, are corrected.

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NOTES

¹Vogt (1909:11) recognized four infrasubspecific categories: (a) *var. geographica*, equivalent to the modern concept of a subspecies; (b) *Rasse*, for forms of infrasubspecific rank (c.f. 1911: where the term is used for the colour-forms occurring within a single nest-colony); and (c) and (d), *aberratio* and *aberratio extrema*, for individual variations. In addition, he used *forma*, in an entirely modern sense, for forms of uncertain status (1911: 50, footnote 1). As the names *laevis* (1909: 63) and *magnus* (1911: 56) were proposed for *formae*, these names, as well as *sladeni* (proposed for a *forma geographica*, 1911: 52), are valid for subspecies attributed to Vogt.

²The use of the name *smithianus* for a Shetland insect represents a persistent misidentification. White (1852a: 158) proposed *smithianus* as a *nom. nov.* for *arcticus* Dahlbom, 1832, *nec arcticus* Kirby, 1821, as a result of Smith's having misidentified ['immediately recognized'] as *arcticus* Dahlbom specimens taken by White in various Shetland localities. Dahlbom's *arcticus* is a *pascuorum* subspecies of Arctic Fennoscandia: [*B. arcticus* Dahlbom, 1832, = *B. agrorum erlandssoni* Kruseman, 1950, =] *B. pascuorum smithianus* White, 1852.

Löken (1973: 114) treated *Apis arctica* Quen. in Acerbi, 1802, as a newly described species and as a senior synonym of *Bombus (Alpinobombus) hyperboreus* Schön. 1809, the latter name being retained and *arctica* considered a *nomen oblitum*. *Apis arctica*, however, appears *not* to have been intended as a new species: Acerbi (p. 250) stated 'The following are to be found in the work of Fabricius' and included in his listing (p. 252) the three species *Apis alpina*, *A. arctica*, and *A. lapponica*. *Apis arctica*, described by Quenzel on p. 253 and illustrated at fig. 7 on pl. I, should, therefore be some Fabrician insect, but whether of O. Fabricius or of J.C. Fabricius is unclear. While *Apis alpina* [*Apis alpina* L., 1758] does appear in the former's *Fauna Grönlandica* (1780) and *Apis lapponica* was described by the latter in the *Ent. Syst.* (1793), no *Apis arctica* appears to have been described in any work of either author published prior to 1802. It might be surmised therefore that one or the other Fabricius was in communication with either Acerbi or Quenzel and that *arctica* was a manuscript name given by him but not subsequently published (no *arctica* appears in J.C. Fabricius's

Syst. Piez. (1804)). *Apis arctica* appears, therefore, to have been published by accident rather than by design, but is nevertheless a validly proposed name.

³*Bombus laevis liepetterseni* [*Bombus muscorum liepetterseni* Løken, 1973] is erroneously included in the Aculeata section of the revised Check List (Fitton *et al.*, 1978: 140): *B. l. liepetterseni* is confined to Norway, where it occurs in coastal localities from 60° northwards. Presumably, the subspecies referred to was the hitherto in nominate, pale, form of *laevis* from the Hebrides and Shetland, i.e., *agricolae*.

⁴Not the only white-tailed form; cf. *cardui radoszkowskyi* Dalla Torre, 1890 (*Bombus perplexus* Radoszkowsky, 1884, *nec* Cresson, 1863). This subspecies was found to be one of the most abundant montane humble-bees in various localities in the Central Alborz (Iran), a single male taken at 1370m on 17.ix.1966, but all other specimens taken at between 2150 and 2450m, males from 24.viii to 7.x, females from 5.vii to 24.viii, workers from 27.vii to 7.x, many at *Salvia amasiaca* (Freyn & Bornm.) Bornm.

⁵*Bombus audax audax* is principally distinguished from other subspecies by having, in the female, a buff rather than a white tail, but buff-tailed examples do occur sporadically in continental *audax* [*virginialis* (Geoffroy, 1785)] (cf. Vogt, 1911: 39; H. Müller, 1944: 104) and the Sardinian *audax sassaricus* Tournier, 1890, is predominantly buff-tailed. Richards (1978: 417, as *terrestris terrestris*) notes that one Channel Is. (Alderney) female approaches the mainland British form.

⁶It is perhaps significant that in analysing geographical variation in '*Terrestris-bombus*' species, Krüger (1958: 294–303) did not attempt to differentiate between the males of *lucorum* (*terrestris*), *magnus* and *burjaeticus* (*burjaeticus* Krüger, 1951: 143, 1954: 277; from Transbaikal) in his tabulations. The recognition of numerous subspecies in *terrestris*, *audax* and *magnus* in the absence of fully adequate criteria for species recognition, and the recognition of supposed new species in the *terrestris* group, have been carried to extremes in some recent work.

⁷Caius Julius Agricola, whose fleet (first century A.D.) explored the north-east coast of Britain as far as the Orkneys.

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APPENDIX 1. British and Irish forms of *Bombus laevis* Vogt

1. Pale, '*muscorum*', forms [= *muscorum* Richards, 1935a, 1935b]

sladeni (Vogt, 1911): 52 [*Ab. [Agrobombus] muscorum* var. *geogr.*]; sex?; Südeingland'.

pallidus Evans, 1901: 47 ['*B. Smithianus*, var., or race, *pallidus*']; ♂; Scotland: 'taken by myself near Kingussie (Inverness-shire), Aberfoyle (S.W. Perthshire), and Elvanfoot (Lanarkshire), and also . . . from the Perth district, Dumbartonshire and Kirkcudbrightshire'. Invalid junior homonym of *Bombus pallidus* Cresson, 1863 [= *Bombus (Fervidobombus) pennsylvanicus* (Degeer, 1773)]. No type designated by Evans: for lectotype designation see p. 8.

celticus Yarrow, 1978: 15 [*Bombus muscorum celticus*]; *nom. nov.* for '*Bombus muscorum pallidus* Evans (*Bombus smithianus* var. *pallidus* Evans, 1901)'. Yarrow failed to designate a lectotype for *pallidus*.

Distribution: Mainland Britain and Ireland; Mull; Skye.

orcadensis Richards, 1935a: 78 [*Bombus muscorum orcadensis*]; ♀, 'The male and worker are not distinguishable from *pallidus*'; Orkney Is: Holotype ♀ (examined), labelled 'Orkney Is. [print], Mainland, Stennes. 15.vi.12 [MS], E.G.B. Meade-Waldo. 1912-259. [print]' and '*B. muscorum orcadensis* Rich. Type' [pencil, Richards], in BMNH [not registered].

Distribution: Orkney Is.

2. Dark, '*smithianus*', forms [= *smithianus* Richards, 1935a]

agricolae⁷ subsp. nov.

[*smithianus* *auctt.*, *nec* White, 1852; misidentification.]

[*smithianus smithianus* Richards, 1935a; misidentification.]

[*liepeterseni* Fitton *et al.* (1978) *nec* Løken, 1973; misidentification.]

muscorum zetlandicus Yarrow, MS, in BMNH.

Description; see Richards, 1935a: 79 [as *smithianus smithianus*]; ♂♀♂; Shetlands, Lewis, Tiree, Coll.

Holotype: ♀ labelled '51₉₁' [the entry 1851-91 in the British Museum's accessions register, referring to this one specimen, reads '*Bombus arcticus* . . . Lerwick . . . Presented by A. White Esq^{re} . . . the common *Bombus* of the Mainland of Shetland'], 'var. *smithianus* White. [print]', and '*B. muscorum zetlandicus* ssp. n. det. I.H.H. Yarrow HOLOTYPE ♀', B.M. Type Hym. 17 b 1276.

Distribution: Inner and Outer Hebrides; Shetland; ? Ross [the Ross specimen recorded by Richards may simply have been a dark example in a *sladeni* population].

Yarrow's manuscript name is not adopted since the species has a wider distribution than the name implies. It is however given here since it may be encountered in other collections.

allenellus Stelfox, 1933: 235 [*Bombus smithianus allenellus*]; ♂♀♀; Ireland: Aran Is., Inishmore. Stelfox, 1934: 42.

Stelfox's type series comprised 50 specimens, all bearing the National Museum of Ireland's printed label 'Inishmore/Aran Islands/Co. Galway./C. W. Allen. July 1932./62-1932.', standing over his manuscript label '*Bombus Smithianus* White, race *allenellus* Stelfox. 50 typical series arranged by A.W.S. 17.2. 1934. Described in I.N.J. Nov. 1933. A. W. Stelfox.'. Stelfox did not designate a type but labelled one ♀ as 'type', one ♂ and one ♀ as 'cotypes' (Dr J. P. O'Connor, personal communication). Stelfox's ♀ 'type' is now designated as lectotype of *allenellus*, his other syntypes as paralectotypes.

Distribution: Aran Is.

scyllonius Richards, 1935a: 81 [*smithianus scyllonius*]; holotype ♀ Scilly Is.: St. Mary's, 10.ix.1904 ([Col. J.W.] Yerbury), B.M. Type Hym. 17 b 1214.

smithianus subsp. *innom.*, Richards, 1935a: 81 (Channel Is.: Alderney).

Distribution: Scilly Is.: Channel Is. (Richards, 1978: 419—Channel Is. form no longer regarded as subspecifically distinct from Scillies form).

SHORT COMMUNICATION

Rhynchaenus testaceus (Müller) and *Anthonomus rufus* Gyll. (Coleoptera: Curculionidae) in Cornwall.—On recently sorting through some Coleoptera captured in Cornwall during the 1970s I discovered a specimen of *R. testaceus* that had been beaten from a young alder alongside the River Fal on 12.viii.1978 near Ruan Lanihorne, East Cornwall (VC2), grid ref. SW887422. I have been unable to trace any previous records for the county, indeed there appear to have been very few recent (post-1970) records for the whole of Great Britain: Collier (1989) reports its discovery in an alder plantation alongside the Little Ouse River, Norfolk in 1987 and informs me (*in litt.*) that he has subsequently recorded it in the Ministry of Defence, Stanford Training Area, Norfolk, where it was not uncommon in another small alder plantation during 1988; Morris (1993) provides a recent record from Holme Fen, Huntingdonshire, and Hyman & Parsons (1992), who assign *R. testaceus* to Red Data Book (vulnerable) status, also list the recent Norfolk and Huntingdonshire records.

Five small, widely spaced alders were present on the flood plain of the River Fal when I revisited the Cornish site on 15.iv.1995—much as I recall the site from 1978. All were beaten for *R. testaceus* without success, although it may have been too early in the year for the adult weevil since most of the trees were still in bud and only a few leaves were just beginning to open on each tree. Small numbers of adult *Galerucella lineola* (F.) were, however, present. Further south and east along the roadside towards Ruan Lanihorne village, more alders, both large and small, were beaten without finding *R. testaceus*, though again adults of *G. lineola* were present on all the trees. K. N. A. Alexander visited the area in early May 1995 but also failed to locate *R. testaceus*.

During my return visit on 15.iv.1995 to search for *R. testaceus* another scarce weevil, *Anthonomus rufus*, was discovered when more than a dozen examples were beaten from blackthorn bushes adjacent to the bridge at grid ref. SW887421. Although *A. rufus* has previously been recorded in West Cornwall (VC1), where it does appear to be very localized; this may represent the first record of this species for East Cornwall (VC2). Among previous records for West Cornwall are: Porthcurno near Penzance, and Grochall on the Lizard in 1974 (Morris, 1976), on both occasions by beating blackthorn prior to flowering, and near Chyvarloe, grid ref. SW647237 on 3.iv.1983 when I captured two examples, also from blackthorn bushes in bud. It may be significant that the Ruan Lanihorne examples were also beaten from blackthorn mainly in bud—adjacent bushes in full bloom failed to yield any specimens.

I thank M. Collier for allowing me to quote his unpublished observation of *R. testaceus* and for a specimen of this species which confirmed the identity of the Cornish example, and Prof. M. G. Morris for alerting me to relevant literature.—A. P. FOSTER, 61 Pittsfield, Cricklade, Swindon, Wiltshire SN6 6AW.

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THE 1994 PRESIDENTIAL ADDRESS—PART 2

FIELD MEETINGS—A CELEBRATION OF SOME PAST GLORIES AND THE PRESENT ROLE OF FIELD MEETINGS AS AN INCREASINGLY VALUABLE PART OF OUR ACTIVITIES

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INTRODUCTION

In preparing this Presidential Address I first looked back over those of the past Presidents I have known. We have enjoyed a great variety of topics and approaches in recent years. Some Presidents, like Colin Plant and Paul Sokoloff, delivered fine papers on a particular taxonomic group on which they were working. Peter Baker and John Owen focused on the insects of a particular site which they had surveyed in detail. Two years ago John Muggleton chose a subject dear to my heart (e.g. Waring, 1989a, 1990a, 1994a) when he shared with us his experiences of light-trapping for moths. Alan Stubbs and Ian McLean dealt with insect conservation issues. One topic I considered for my Address was the conservation work on some of Britain's endangered moths, but I have already spoken to the Society on this subject. Those who would have liked an update may care to refer to Waring (1990b & 1994b) for reviews of this subject and rest assured that I will continue to report the latest developments through the bi-monthly reports in *British Wildlife* magazine. Another topic which I know is of interest to many members, and with which many are actively involved, is the National Recording Network for the Rarer British Macro-moths (Waring, 1991a, 1992a) and the production of an atlas for the nationally scarce and threatened species (Waring, 1992a, b & in prep.). However, this is the topic for our special workshop meeting at Dinton Pastures on 8 April.

I have chosen instead to speak here about the field meetings of our Society and to use this opportunity, as the Society's new Field Meetings Secretary, to celebrate some past meetings and promote this area of the Society's activities for the future. One of the attractions of this topic is that it involves everybody here and the whole of the membership, so I trust it will be of wide interest. My aim is to examine some field meetings I have attended, the results they produced and ways in which future meetings can be developed and promoted, both as a service to our members and to land-owners, managers and the general public. At the same time I hope to provide the opportunity for us to recall and re-live fond memories of pleasant days and nights in the field and to report on meetings which some may have missed.

I have always considered the British Entomological and Natural History Society as the premier society for field entomology in Britain. The majority of the publications of this Society promote and assist the fieldwork of individuals and organizations in some way. Our journal is received by every member and for many it is the face of the Society and their main contact. Most issues carry one or more reports of field meetings. Our Annual Exhibition, the largest event in the Society's calendar, consists largely of exhibits of specimens, photographs and other results of recent fieldwork by members on an individual or combined basis. Both the Exhibition and the Dinner provide the opportunity to exchange results of fieldwork, initiate future plans and commiserate with each other on the appalling weather during a key part of the season and the insects and other wildlife we failed to find! Our meetings provide the chance for the lone moth trapper to tell of the night he was

inundated with unbelievable numbers of rare immigrants on the coast. Another replies with his nocturnal encounter with the poacher or the courting couple or tells of the day his coleopterist friend found a species of beetle new to Britain in the bride's wedding bouquet! This is what our society is all about in my view, the combination of serious scientific research and recreational entomology. Above all, the Society provides opportunities to meet with other active field-workers and share skills. The field meeting is an especially characteristic feature of this Society which is worth cherishing.

THE FIRST FIELD MEETING

Do you recall your first field meeting with the Society? I trust it left a favourable impression and that the leader made you feel welcome. I think the first field meeting I attended was one led by the late Gaston Prior, in Wychwood Forest, Oxfordshire. This was back on 28 July 1984. I remember the excitement of getting the meetings card and seeing that there was a meeting arranged in my area and therefore not too difficult to get to, so out came the diary. The other exciting part about this particular meeting was that it was not a site that one could easily visit as a private individual. At the time there was great debate about the footpaths and access in the area or lack of them. As a youth I had often cycled past this splendid forest. I had ventured in twice. The first time I met no-one, but on the second occasion I had just reached the fish-ponds in the centre and was watching a Buzzard *Buteo buteo* at close quarters when a green Mini-moke appeared from over a rise and two large gentlemen with shot-guns politely asked me to leave and escorted me back to the entrance.

Gaston's meeting was excellent. There was a good turn-out, about a dozen people or more, with these entomologists obviously making the most of this rare opportunity to see the Forest. The weather was favourable. By this stage I had purchased my first old banger and I remember loading it up with every conceivable bit of entomological and overnight kit, far too much to actually carry, but to equip me for every eventuality. As we gathered at the entrance I recognized John Campbell, whom I already knew as Oxfordshire county biological recorder at Woodstock Museum, and one or two other familiar local faces, but I got to know several more as a result of the meeting. I remember studying the way Charlie Gibson had managed to pack his generator and light-trap into a back-pack so that he could get straight onto site with all his kit in one go. I recall Gaston pointing out the diagnostic features of certain pug-moth larvae (*Eupithecia* spp.) I had swept. I remember John Campbell showing us the coppicing plot he was working on. At night we ran light-traps and I recall the excitement when Charlie found a four-spotted footman *Lithosia quadra* had entered his trap. This was the first any of us had seen in the Oxford area and the first I had ever seen. We spent the rest of the session speculating as to whether we had discovered an unknown colony, but we later found out from the *Entomologists' Record* that there had been other records from scattered places during this period, suggesting an influx of immigrants. Lastly, I recall sleeping in my car and discovering that it was parked in something of a frost hollow. The car wouldn't start in the morning and I remember Patrick Boston giving me a hand to push-start it, and the relief when it eventually fired on all cylinders.

I was fortunate to start off with such a good field meeting, but each one has added some useful or pleasant aspect to my experience.

DISTANT FIELD MEETINGS

The Wychwood example was local to me but our field meetings programme provides the opportunity to visit distant sites, in the knowledge that someone else has

made the necessary arrangements at the other end. These long-haul trips can be more daunting for some members because of traffic and unfamiliar roads but I hope more people will be tempted. In this way the Society will be encouraged to hold a proportion of meetings in more remote places, which are less well recorded than the places where entomologists are thicker on the ground. A memorable long-haul field meeting for me was Dungeness, Kent, on 5 September 1987. This provided an opportunity to meet Bernard Skinner for the first time, as he was leading the meeting (Skinner, 1988). I saw the handsome caterpillars of the toadflax brocade *Calophasia iunula* for the first time, one of the local specialities of this area and a Red Data Book species. I collected one to photograph and rear but was also impressed by the restraint on the part of the members who were more experienced on this site. I remember someone, I think it was Rob Dyke, explaining to us that this was a localized insect, not uncommon on Dungeness but scarce on the surrounding coast. As a result we all thought very carefully about collecting any. I confined myself to one and I think hardly any others were removed. I remember distinctly us all gathering in a group to look at them and then walking away leaving the majority on the plants to continue feeding. I remember Bernard being very friendly and approachable and meeting a number of the members from the south-east for the first time. It was in fact a cold night and moths were few, migrants fewer, so there was plenty of time to get to know each other as we walked round the traps. It was also a full moon and I remarked that I thought it odd to have such a meeting at this phase of the moon and was this significant for movements of migrants, aware that the light traps would be less effective at catching them on moonlit nights than on dark ones. Bernard wryly remarked that he liked a bit of competition from the elements, but then explained that this was the only date offered to him when the programme was being organized. The other memory that stands out from this trip was departing from the site about 02.00 hrs to drive all the way back to Peterborough because my colleague had no sleeping gear and had arranged something for the following day. We were on the road at least three hours, perhaps more. I was virtually nodding off at the wheel for the last few miles. Fortunately, there was very little on the roads at this time but I resolved never to drive such a long way so late at night again.

As a result of my first Dungeness experience, I decided that on any field meetings involving night work that I would lead, I would make arrangements for members to be able to sleep in their cars, off road, and where this could be arranged, make it clear in advance, so no one would feel the need to drive long distances when they were tired. This also means they can leave their traps and generators running all night and stay nearby, adding to the amount of data collected, with advantages all round. Staying in a local hotel or bed and breakfast is always an option for those able and willing to make the necessary arrangements in advance or to arrive on spec, but it is not as convenient for all-night trapping. I am also mindful of the fact that some members, particularly the younger ones and those that are out of work, may not be able to afford the costs of overnight accommodation. Besides, it can be a precious part of the experience to awake on site and inspect the traps at first light, with the chance of seeing a fox *Vulpes vulpes* or other wild creature and to enjoy birdsong and the first rays of the sun.

Incidentally, field meetings at Dungeness have become something of a tradition in the Society of late, and you will be pleased to note that there are two in the 1995 programme. Both are led this year by Sean Clancy, who lives on Dungeness. When I contacted him to arrange one he said fine, but please not another one in September, what about all the other months! He got his wish, there is a meeting in July this year, but, because the September meeting is popular we have retained it as well. Contact Sean for overnighing details.

Now I'll move on to some of the field meetings I have led, partly because I have a good overview of what happened on site and, equally importantly, know what happened to the results. I can also be critical of any short-comings, knowing that I share the responsibility. I shall be illustrating the following accounts mainly with moth examples, because this is my speciality, but please do not take away the impression that field meetings are dominated by any particular order; we cover all groups of animals and plants and are keen to see all interest groups represented on meetings, hence the "natural history" part of the Society's title.

FENS AND BRECKLAND IN 1988

The first BENHS field meetings I led were in 1988 when I organized two. These were at Chippenham Fen, Cambridgeshire, on 2 July and Cranwich Plantation, Norfolk, on 23 July. The chances to visit Fens and Breckland proved popular and both meetings were very well attended. Ian McLean led the day-time session at Chippenham Fen and was joined by ten members. Many interesting species of flies were noted and we flushed two silver-barred moths *Deltote bankiana*, a speciality of this reserve. Twenty members gathered for the night session and, as they did so, there was a heavy rain shower just before dusk which I knew would not help the light-trapping. Here was I, leading my first meeting, responsible for all these people driving out to this fairly remote site and perhaps they weren't going to see many moths. I expect every leader feels this way on his first and even subsequent meetings. On this occasion, I knew the site well from working on it throughout the previous year, and I had encountered many interesting species of moths. What I wanted to find out from this field meeting was how widely distributed they were on the Fen. The meeting offered the chance to disperse lots of light-traps and their operators across the Fen and get an overview in one night which would take me many nights to build up working on my own and would cover parts of the site I had not sampled before.

Well, the weather literally put a damper on the night and catches in individual traps were well down. I did not get the results I had hoped for, with species I knew to be widespread and common turning up only in small numbers and sporadically due to the small sizes of the samples in the traps. However, twenty-nine lights were operated that night and, owing to this large fire power, we ended up accumulating an impressive list of species, and most of the specialities were seen at least once. A full account was provided for the journal (McLean & Waring, 1989). The meeting seemed to be enjoyed by all and was a successful social occasion (Fig. 1) One group had come down from Derbyshire and were very pleased to see several wetland species and to experience the Fen, so much so that they requested details of the necessary contacts so that they could return on future occasions and continue to extend and up-date the moth list for the site. Subsequently, a full list of the species we recorded was supplied to the site manager and local Nature Conservancy Council (NCC) office as it then was, the data were entered onto the Invertebrate Site Register and the results were a substantial contribution to an unpublished report by a new member of this Society (Howton, 1991), who offered to compile all the records on file for me as a result of his interest in the site.

The Chippenham Fen experience evidently did not deter people from attending field meetings led by Waring because several of the same faces turned up again just a couple of weeks later at Cranwich Plantation. For this meeting I had asked Gerry Haggett if he would join us. Many members will know that Gerry produced the book on the larvae of British Lepidoptera not figured by Buckler, which this Society published in 1981 but which is no longer available (Haggett, 1981). It is in fact a



Fig. 1. One of the lights operated at Chippenham Fen, 2 July 1988. Left to right are: Alison, Meral and Allon Jenkins, Andrew Halstead and David Young.

compilation of eleven illustrated papers published over a number of years in the Society's journal, the result of a life-time's work on larvae, some of it with the guidance of the late A. J. Wightman, who also worked extensively on this subject. Gerry and I had got to know each other a year or more previously due to a shared interest in the larvae of wainscot moths and were then engaged in what turned out to be an unsuccessful search for the viper's bugloss moth *Hadena irregularis* in Breckland in 1988 and 1989, covering all the known sites for the larval food-plant (Waring, 1989b, 1990b). I felt that the chance to search for moth larvae with Gerry would be a considerable draw to the day-time part of the meeting for members. I was disappointed therefore when only three members turned up for this part of the meeting. True, the weather forecast had been dodgy for the day but, as it turned out conditions were good and those of us present had a most enjoyable and productive time examining larvae with Gerry. I realized how fast he beats compared to me, which helps to explain why he ended up with a longer list of species. Seeing him at work was an insight I would not have got from any book. I remember him putting me on the spot when we came across the larva of the least black arches *Nola confusalis*, which I was having trouble identifying, and then him explaining the diagnostic features.

The evening session at Cranwich Plantation was much better attended, rising to nine members in addition to the leaders and it was then that I realized how much our membership is orientated to light-trapping moths rather than day-time work on larvae or on other orders of insects. In discussing the higher attendances at this and other light-trapping sessions compared with day-time meetings, I have come to realize that other practical considerations are involved as well. For some there are family commitments to take into account, Saturday shopping or ferrying youngsters

around. There is also the matter of time spent travelling to the venue and understandable difficulties in making an early start after a hard week at work and the time taken to load the vehicle etc. With this in mind, you will see that some of the 1995 meetings start after lunch, to give people the chance of a comfortable drive and to reduce the length of the day when light-trapping is involved. Other meetings start in the morning because this time is best for encountering some Diptera and other insect orders. I have also come to realize, through field meetings, how little nocturnal work is undertaken by students of orders other than the Lepidoptera and that there can be a sort of day and night shift amongst members, with some turning up only for one or the other. Those that attended the night-time session at Cranwich enjoyed what many said was the best night of 1988. It was a truly incredible night. The moths were so numerous and varied that almost everyone had over a hundred species of macro-moths at each light-trap. New species continued to be added steadily throughout the warm dry night and virtually everyone stayed on, manning the traps until dawn, even if they had not intended to stay so long. A total list of 168 species of macro-moths alone was recorded for the night. Apart from manning my light, I spent a large part of the night visiting the other members and sweeping larvae with Gerry on the way, learning to recognize some of the numerous geometrid larvae on bedstraws *Galium* spp. in the process. The whole meeting was one of the most successful and productive I have witnessed and a great source of satisfaction for me. I prepared an account for the journal (Haggett & Waring, 1989) and sent the full list to the Forestry Commission as an addition to their records for this site and as a testimony of the level of interest in what some may regard as a very specialized part of the wildlife value of their holdings in Breckland. Gerry had prepared a set of management guidelines for these plantations which were established on Breckland heaths, and he emphasizes the values of the rides and open spaces as well as the trees and shrubs. I would like to feel that the results of our field meeting add to the weight of that case and provide a tangible demonstration of it.

WOODWALTON FEN IN 1989

Encouraged by the good attendance of my two field meetings in 1988 and the results at Cranwich in particular, I arranged two more in 1989. Both of these were at Woodwalton Fen, Cambridgeshire (old Huntingdonshire, VC 31). Both had the principal aim of locating the marsh moth *Athetis pallustris* which was a major speciality of the Fen in the 1930s through to the 1950s (e.g. Edelsten *et al.*, 1944ab) but which has not been recorded from this site since the 1960s, in spite of several searches. When I moved to Peterborough in 1987, Woodwalton Fen had been one of the local sites I had most wanted to study. I had been there once before but had never had a chance to look for moths there. During 1987 I managed to run light-traps there during each month from early May to September in spite of a badly fractured arm resulting from when a car knocked me from my bike on the way to work, on the second week of my new job with the Nature Conservancy Council. I well remember carrying and starting generators with my left hand, due to the pain from the metalwork I carried around in my right arm until this was taken out in 1988.

I failed to find the marsh moth at Woodwalton in 1987 and 1988 in spite of using all the techniques described by Edelsten and others, including the litter-pile method for the larvae, which I have used with success for this moth in Lincolnshire. At Woodwalton Fen I searched existing large piles (Fig. 2) of cut litter on the fen and arranged small piles at intervals along the droves which I later searched, all to no avail. As at Chippenham Fen, a field meeting offered the chance of getting numerous



Fig. 2. Bernard Skinner and others lifting litter piles for marsh moth larvae in Lincolnshire, 29 September 1990. The same method was unsuccessful at Woodwalton Fen in 1987 and 1988.

light traps out over the Fen and having people walking around with Tilley lamps searching for the moth. Now experienced in the ways of the Fen and how it is apt to turn very cold and unproductive at night in June, I picked two dates which would suit the moth, based on previous records, as an insurance against unfavourable weather. Of course Woodwalton Fen has many other attractions and it remains one of my favourite local sites for walks at all times of the year.

Both the field meetings at Woodwalton Fen were well attended; for example we had 27 people and 31 lights, including five actinics, on 3 June. Many interesting insects were recorded and the meetings provided the opportunity to fill the Rothschild Bungalow (Fig. 3) in the centre of the Fen with entomologists regaling each other with stories, as in former days during the history of this famous Fen. The Bungalow was and is a great place to pass round specimens in pill-boxes and examine them without fear of losing them. Some of us spent the night in the Bungalow and others in cars at the entrance. Back in the 1980s the Bungalow used to be left open and was a welcome retreat from the rain or mosquitoes. There was a visitors' book into which I added the names of the more interesting moths I saw on each visit and I think some of us signed it on these field meetings, for posterity. Sadly, the Bungalow is now kept locked, following an incident of vandalism. Fortunately, the damage was minor and this fine thatched building remains available, by arrangement, for future entomological meetings and I hope it will continue to be so used. We did not succeed in finding the marsh moth and it has not been reported subsequently. I believe this moth is one feature of this Fen which has been lost, possibly as a consequence in some way of flooding in the 1960s or the increased wetness and possible over-nutrication of the Fen, from water-borne agricultural fertilizers and consequent changes in the



Fig. 3. The Rothschild Bungalow at Woodwalton Fen.

vegetation. Comments were collected from those who attended the meeting and had known the fen in the past. The field meeting enabled us to make comparisons that would be difficult to make on paper and without visiting the site together. It seems that places on the Fen where the marsh moth occurred, which had a sparse, dry field-margin quality when the Fen was drying out and becoming encroached with scrub in the 1950s, are now high luxuriant reed growth *Phragmites australis*. Other species of moth, like some of the reed-dependent wainscot moths, are doing very well as a result of present management. The continuing task is to find ways of maintaining all the species somewhere on the Fen, so that marsh carpet moths *Perizoma sagittata* and other specialities and their foodplants are not swamped, literally, by wainscot habitat.

A memorable and welcome feature of these two meetings was the use of an Argo-cat, a balloon-tyred semi-amphibious vehicle that I was trained to drive for the meetings. We used the Argo-cat to transport generators and other heavy equipment to remote parts of the Fen and to collect up tired moth-trappers at the end of the session. This greatly improved our coverage of the Fen. We made sure, in particular, that the best stands of meadowsweet *Filipendula ulmaria* were light-trapped because this was a plant with which the marsh moth had been associated in the past.

What we did discover as a result of the field meetings at Woodwalton was that the distribution of the concolorous moth *Photedes extrema* varies considerably on the Fen. At one time it was common along many of the droves but this was not our experience, though it remains widely distributed in small numbers. However, at the south-east corner of the reserve there is a field in which the larval foodplant *Calamagrostis canescens* remains abundant. On 17 June twenty-three concolorous moths were recorded here at one m.v. light mounted five feet (c1.5m) above ground when the moth was only reported in ones and twos elsewhere on the Fen. The

concolorous started to arrive as soon as it was dark and continued to come until 23.50 hrs, while the light was operated until 00.50 hrs (Peter Waite, pers. comm). This result, along with a full species list, was sent to the site manager of the reserve and attention was drawn to its importance so that it could be taken into account during habitat management work. The day-time part of the first of the two meetings was covered in our journal (Kirby, 1990). I presented an exhibit of photographs and results at our Annual Exhibition and reported the main results of the night work in Waring (1989b). I intended to do something more ambitious with the light-trap results and write a larger account for this Journal but more pressing matters and other work prevented this. I then passed the results to Barry Dickerson, the county lepidoptera recorder for vice-county Huntingdonshire, who spent some hours sifting them and now has a copy of the data for his own use. Like many other of the field meetings of our Society, an account has not yet appeared in the Journal. I take this opportunity of reporting the Woodwalton meetings here, belatedly. Being the guilty party, perhaps I might be allowed to offer the following advice to other leaders in a similar position. No matter what grand plans you may have for the data collected, and even if hardly anything was recorded and it rained all day and night, do put a few lines together for the journal at the earliest opportunity and mention if further material was collected and more results are likely to appear. There is always the temptation to wait for the specialist to provide the very last identification, which has to be done over the winter when fieldwork is less demanding. I have been waiting just over ten years for one hymenopterist to identify a small number of specimens! The greater the time that elapses between the field meeting and writing the report, the less likely it is to come to fruition. A preliminary report is better than nothing at all and gives a lead that can always be followed up in the future if necessary.

HOLME FEN IN 1992

Interest in having further field meetings in the Fens resulted in the Holme Fen meetings in 1992. This Fen is more a birchwood now, but it still has some wetland areas and some interesting dykes. At this stage I had become interested in the status of the oak eggar moth *Lasiocampa quercus* in the Peterborough area because I was intrigued to find it occurred in my back garden in Werrington, just north of Peterborough (Waring, 1994d). There are old records from Holme Fen but the county recorder had not seen the moth there in the many years he had been operating and considered it very rare in the county. During the meeting, which was well attended and a most enjoyable social occasion, we attempted to assemble males to a virgin female brought along for the purpose. We failed, I suspect because we did not get the female set up early enough in the afternoon. The moth was given to one of the party to try her at Woodwalton Fen, where she succeeded in attracting a mate, producing an important record for the county, if not on the field meeting. The best laid plans . . . The meeting was reported in full in Waring (1992c).

BERNWOOD FOREST IN 1993

On the 1993 field meeting at Bernwood Forest, on the border of Oxfordshire with Buckinghamshire, I returned to an old stamping ground in which I used to record butterflies during the 1970s and in which I light-trapped extensively during the 1980s while conducting the studies for my Ph.D. (Waring, 1990a). The main aim of the meeting was to check on the continued presence of as many species of moth as possible to get 1990s records and maintain recording activity. The past records for

this site date back to the early years of this century and the list and the changes in the moth fauna were reviewed by Waring (1988, 1990a, c). The support for the meeting was superb and enthusiastic but the weather left a lot to be desired. Nevertheless, two new species were added to the historical list as a result of the meeting. One of these, the pine hawk-moth *Hyloicus pinastri* is almost certainly a new arrival to the wood since the 1980s. Two came to light in Waterperry Wood, in an area in which I frequently trapped during the 1980s. In addition to general coverage of the rest of the wood by myself and others at that time, the conifer-dependent species were the subject of special study (Hatcher, 1989) but the pine hawk was never found. The moth has been recorded in other places in Oxfordshire, in some of which it is resident, and now it may have colonized Bernwood at last. The other addition to the historical list was the hornet clearwing *Sesia apiformis* which is now common in some of the planted poplars but may have been overlooked for some years. In addition to the results given in the field meeting report (Waring, 1993) and submitted to English Nature and the Forestry Commission, Peter and Di Sharpe have since found more trees tenanted by the hornet clearwing in the wood. This last snippet of information was gained in conversation on another field meeting somewhere else!

SEVEN FIELD MEETINGS IN 1994

Up to 1993 I had led one or two field meetings a year, much like many other leaders. As part of my contribution during my Presidential year I decided to try out various other ideas relating to field meetings and ended up leading seven during 1994.

One statement I had often heard was that you will get good turn-outs if you go to famous localities but you won't be able to get people out to investigate unknown sites. Now, of course, lack of records does not mean a poor site and sites without records are just the sort that need our attention. I was also interested to use field meetings to collect data from sites which are threatened in some way, where invertebrate data might help to defend a site against damage but where little information is to hand. These were some of the motives behind the meetings at Welshbury Wood, Gloucestershire, and Whiteparish Common, Wiltshire.

WELSHBURY WOOD IN 1994

Welshbury Hill is nothing if not off the beaten track. There appear to be no moth records whatsoever for this wood prior to the field meeting and it is virtually unknown entomologically. My wife and I visited this site once, in September 1990, on a holiday in Gloucestershire, on the recommendation of Keith Kirby of English Nature's Woodlands section. The woodland on the top of the hill is full of small-leaved lime *Tilia cordata* and there is also an iron-age fort among the trees. No doubt the woodland has an interesting history. It is known to have been in existence since before 1600 and therefore qualifies as ancient. Recent work suggests that even some of the living stools of coppiced lime are much older than this! After our walk round I decided that one day I would return to this wood to search for the scarce hook-tip moth *Sabra harpagula*. This moth is currently unknown outside the Wye Valley on the nearby border of Gloucestershire and Monmouthshire and is dependent on small-leaved lime. In the winter of 1993/94 I wrote to the Forestry Commission who manage the site, sent an off-print of the successful field meeting on FC property at Bernwood in 1993 and obtained permission for the meeting and a set of keys.

I am delighted to report that this meeting was very well attended indeed. Twenty-two people turned up and at least 19 lights were operated. We had a wonderful time nothing among the limes on this eerie site, to the accompaniment of a long-eared owl chick *Asio otus* calling like a squeaky gate and with the occasional sighting of badgers *Meles meles*. Preliminary reports have appeared in several places already (Brock, 1994; Waring 1994e, 1995a) and the meeting and results were featured at our Annual Exhibition. The big news is that we discovered a colony of the small-leaved lime-dependent pyralid moth *Salebriopsis albicilla* which was not known to be resident outside the Wye Valley. Bernard Skinner had tipped us off to look out for this moth and in fact joined us for the night, even though he had suffered a stroke only weeks before. The discovery of this moth bodes well for the scarce hook-tip. However, we did not find the latter on this occasion, or in adjacent Flaxey Wood on the same night, or on return visits which Bernard and I made independently in the subsequent days, even though we had established that it was flying in the Wye Valley on the night before the field meeting.

Unbeknown to me when planning the meeting, management of the limes was under discussion and debate by various concerned parties, including the Forestry Commission. I have since been able to help with advice on the best options for the moths, based on the work done and data collected on this field meeting.

WHITEPARISH COMMON IN 1994

Whiteparish Common was threatened by a road-building proposal when I submitted it for inclusion in the 1994 field meetings programme. I knew of the site from a summer spent in south Wiltshire in 1983 when I was surveying nearby Bentley Wood and was aware of Roy Pitman's work in the area in the 1930s and 1940s from meeting him and from his records in the Wiltshire county list of Lepidoptera (de Worms, 1962). When I checked the Invertebrate Site Register and other files for information on the site, I found that there was nothing on the moths of the site since the 1950s. During my survey of Bentley Wood (Waring, 1984), I discovered all sorts of species that had not been reported from there for years and I felt sure that Whiteparish Common would perform likewise, particularly since Norman Hutchinson of Fordingbridge had just succeeded in finding the triangle *Heterogenea asella* there. Norman kindly obtained permission from the private owner for us to hold the field meeting, which took place on 2 July. This date was hand-picked for certain nationally scarce species which were possibilities given the type of habitat and given records from comparable sites in the region. Members of this Society joined members of Butterfly Conservation and several local contacts for a day-time walk round the site and for light-trapping. Among other important species, we discovered the scarce merveille du jour *Moma alpium* at several places on the site. The presence of this Red Data Book species alone greatly strengthens the conservation case for preventing damage to these woodlands. A full list of the species we found was supplied to the owner and to a local site defence group and the results were quickly published (Waring, 1994e, 1995a), and will soon appear in this journal. Fortunately, the road proposals which threatened this site have since been dropped, though for reasons other than the moths I must admit. Nevertheless we have demonstrated the continuing presence of nationally scarce and threatened species at this site and this will have to be taken into account if any other proposals arise which threaten this site.

MEETINGS THROUGHOUT BRITAIN

Another statement I had heard was that meetings would flop if they were not held within easy striking distance of London and the south-east. After all, the Society has

only recently grown out of being the old "South London" Society (back in 1968!). Well, if we are truly to be BRITISH, meetings should be held throughout Britain. I am sure that we could attract many more members to the Society from northern Britain if we were seen to be more active in these areas.

Few people would disagree that Inverness-shire is hardly within a morning's drive of London, but this is where I arranged one of the field meetings. Actually, I wanted to hold it further north still, in East Ross, in some Caledonian pine forest which had never been worked for moths before. However, the owner was wary of allowing more than a couple of hand-picked and trusted people onto the site so it was clearly not appropriate for a field meeting. I arranged to light-trap this site with one other person and not to publish the results, so I visited it in advance of the field meeting, which I arranged for Abernethy Forest, courtesy of the RSPB.

Our Society made a £1000 donation to the RSPB from the Hammond fund in 1988 to help them buy the Abernethy Estate, which includes Caledonian pine forest, with capercaillies *Tetrao urogallus* and ospreys *Pandion haliaetus*, and heather moorland. This was the site about which John Owen gave his Presidential Address (Owen, 1989). My field meeting provided the opportunity for members to inspect the site and see what a worthwhile cause our donation has supported. But who would come? Well, several people as it happened. Mr and Mrs Rich Austin came all the way from the Channel Islands, but they also happened to have relatives in the area. Mike Britton, from Yorkshire, had arranged a holiday at Nethy Bridge and came along. Robert Hoare and Gordon Ramel came up from the south (Winchester and Exeter respectively). Meanwhile, I took the precaution of inviting the Highland Biological Recording Group to add some local support and they fielded three members. I had picked the date to coincide with the end of the Scottish Entomologists' week at the Bettyhill Field Station on the north coast of Sutherland, part of which I attended, and I hoped that some attenders might have joined us on their journey south. However, they were possibly exhausted after some days of fieldwork in Caithness and Sutherland and did not swell our numbers on this occasion. One of this group remarked that he was surprised to hear that the BENHS was holding a meeting here and had not thought to consult his events card! Lest anyone feel that this is in any way a criticism of a Scot and not politically correct in some way, I would add that, like most of the group I met at Bettyhill, the gent in question was an Englishman, up from Hampshire no less!

The Abernethy meeting was also advertised as part of Butterfly Conservation's Woodland campaign of 1994. We had a productive daytime session in which invertebrates of a range of orders were recorded and I was particularly pleased to see larvae of the light knotgrass moth *Acrionicta menyanthidis*. We did not see a capercaillie, though we encountered an egg-shell of this large game bird. In between the afternoon and evening sessions we watched the ospreys around the nest at Loch Garten. One species we particularly hoped to see at night was the cousin german moth *Paradiarsia sobrina*. At the request of the RSPB we visited a part of the Estate which has been little recorded entomologically and, although it was a cold night, it was a delight to see four cousin german moths among the other species at light. A full list and account of our results was sent to the RSPB and to the Highland Biological Records Centre for their data-bases, to the local Lepidoptera recorder and to the Bug Club for their magazine. The meeting was also featured in Butterfly Conservation's Annual Review for 1994 (Waring, 1995a), British Wildlife (Waring, 1994e) and a full account can be found in our Journal (Waring, 1995c).

As I left the RSPB's lodge on the fine morning of 14 August, the reserve warden, Stewart Taylor, said that our Society was very welcome to return to Abernethy and

to use the Lodge for overnight accomodation. I would strongly recommend that we take up this offer. We could even book for more than one night to give members more time on the site. Abernethy is a real Highland experience, fine habitats to explore and the Lodge, which is the largest all-timber building in Scotland, has a special character of its own and excellent facilities for small parties of entomologists to work and dine in (Fig. 4).

JOINT FIELD MEETINGS

Regarding joint meetings, some eyebrows were raised when I suggested I would like to hold several joint meetings with Butterfly Conservation. I am pleased to report that these went well and there will be more in 1995. Many members of Butterfly Conservation are keen on other aspects of natural history apart from butterflies and the interest and profile of moths within this society is growing and being developed all the time (e.g. Waring, 1991b, c, 1992e, 1994c). There was a very good response to an appeal in *Butterfly Conservation News* for records of certain of the less common day-flying moths (Waring, 1991c, 1992f) and I have had a number of letters of support, interest and feed-back from each of the other articles. A considerable number of people are long-time members both of BENHS and BC, myself included.

There is a lot to be said for joint meetings with local societies and I am sure there is a lot of future potential here. In many ways it should be a courtesy to involve local societies if possible, when working in their area. From a purely practical view this is also likely to bolster numbers attending in areas where our membership is thin and make meetings in such places more viable. The field meetings in the Mawddach Valley Woodlands, Abergwynant, Merionethshire (Waring, 1994e), and at Cantley Marshes, Norfolk, were good demonstrations of this.



Fig. 4. The RSPB lodge at Abernethy.

At one of my first Council meetings as junior Vice-President of our Society, I drew attention to the RSPB's appeal for the purchase of Cantley Marshes. I had visited other sites elsewhere in the Yare Valley and knew them to be excellent for wetland insects. I asked Council to consider a donation to this appeal, on the understanding that our Society would be able to explore the invertebrates of the site. I was delighted when the Council voted to back this idea and a donation was made. I then set about arranging a field meeting for members to inspect the site that they had helped to buy. There was a good turn-out from members, as I had hoped. The members of the Norfolk Moth Survey were also invited and turned up in droves! We ended up with over thirty people attending and we were able to cover the adjacent Buckenham and Strumpshaw Fens as well. Many nationally scarce and local species were recorded.

A good reason for joint meetings is that it enables both societies to develop closer links and learn about each other's activities. Allies can be useful and I would like to think that the membership of many local or regional societies might be interested in joining our national society and enjoying the services it can offer.

The only problem with leading seven field meetings in 1994 is that I ended up with the job of Field Meetings Secretary as a result!

FIELD MEETINGS IN THE FUTURE

I am sure that the value of field meetings will continue to increase. It sometimes seems that in Britain so many people seem to be adopting a passive, stay at home, spectator and consumer approach to life, and an increasingly insular one with fewer social contacts. Field meetings provide an opportunity to break out of that, to get out, meet new people with similar interests and do something that is not man-made, charged by the hour and over-prescribed. Also, in a countryside where quality habitats are diminishing and permits and paperwork are necessary to visit many of the remnants, field meetings are a big help for the member who wishes to explore good sites without becoming personally involved in the bureaucracy.

The need for the data we collect on field meetings has never been greater. The ability of this Society to hold successful field meetings which produce useful results counts very much in its favour. Such field meetings are one of the activities and products of the Society which other organizations and the general public can appreciate as being of worth. So the more we promote our work, the greater the advantages to the Society and its members.

I would like to see some field meetings each year developed in various ways. We plan to have a proportion of future meetings devoted to sites which are threatened in some way or where data are needed to help with habitat management issues. I have incorporated these ideas in compiling the 1995 programme. The problem with threatened sites is that it can be difficult to obtain permission for the meeting. Four sites had to be excluded from the calendar in 1995 because permission could not be obtained. The Society needs to consider our course of action when we are concerned about a threatened site but cannot obtain permission to explore it. One option may be to publish details of the sites where permission has been requested and denied. This will at least promote the fact that we are concerned about the wildlife which may be at risk. Our informal conservation group, co-ordinated by Stephen Miles, will select some sites for attention each year and any members of the Society are most welcome to draw our attention to any others.

In addition, I wonder if it may be possible to collect quantitative as well as qualitative information on some of our meetings. For example, it is sometimes useful to compare the numbers of individuals of particular species seen in different habitats.

There can be very marked differences in numbers (Waring, 1989a; Majerus *et al.*, 1994) even though the total species list for both may be similar and this can shed light on the effects of different management histories and other factors. Such comparisons depend on adopting standard methodology but this can be arranged on site during the field meeting. Waring (1989a & in press) provides some suggestions for light-trappers for example, and a standard method for beating larvae is discussed and developed in Waring (1990a). The accompanying diagram (Fig. 5) shows the results I obtained when I ran four identical actinic light traps all night over the same period in four types of managed habitat at Woodwalton Fen in 1987. I also replicated the experiment at Chippenham Fen at the same time. Both sites produced the same pattern of results. All four of the reed-dependent species shown were most abundant in the "tall fen"

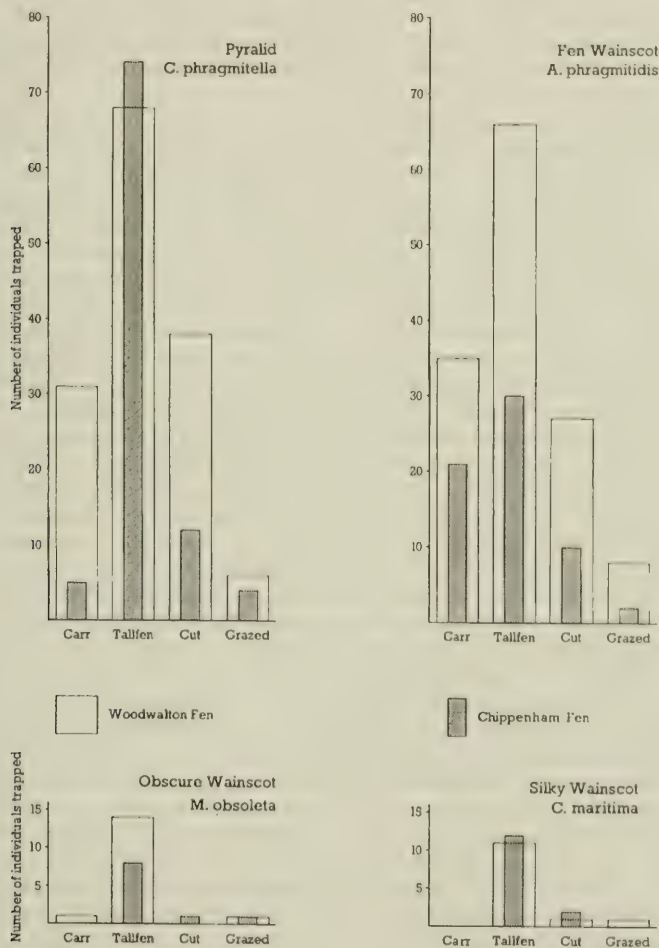


Fig. 5. Comparative catches of four fenland moth species at Woodwalton and Chippenham Fens in moth traps operated in different habitats.

sites and uncommon or absent in the grazed areas, which conforms to expectations based on our knowledge of their ecology. Some species appear to be less tolerant of invading carr woodland or reed-cutting than others. The differences between catches can be very marked and each habitat is likely to have species which are most common there. Field meetings with numbers of people on site simultaneously provide an opportunity to collect good data about the habitat associations of our invertebrates by comparing different parts of the site and this opportunity should be exploited.

A FEW TIPS FOR ORGANIZING YOUR FIELD MEETING

(1) Permission.—If you have a site but do not know who to approach for permission to hold a field meeting, the owner or manager of the site can usually be established by contacting the local office of the appropriate government conservation agency (CCW, EN, SNH) or county wildlife trust, each of whom are in the telephone directory. In case of difficulty, the Head Office numbers are CCW: 01248 370444; EN: 01733 340345; SNH: 0131 4474784.

(2) Site maps and other background information.—Most sites of obvious wildlife interest have some background information available on them which is not difficult to obtain. If the site has been notified as a site of special scientific interest (SSSI), you are home and dry. Vast amounts of work have been done in recent years, at tax-payers' expense, to compile site descriptions and site maps for SSSIs. The SSSI citation for the site, which includes a summary of these data, is a public document. The country government agencies given in (1) should be able to supply a few photocopies of this and the SSSI map. The map will be useful to members to find their way around the site. Marking up the map is much the best way to record where invertebrates and other wildlife were found. The meeting point and any "no-go" areas can also be marked. The wildlife trusts are often the best bet for information where non-SSSIs are involved.

(3) Objectives for the meeting.—All the meetings I have organized have had specific objectives which provided some of the reasons why I organized the meetings in the first place. Having one or two specific objectives may help encourage people along. Having said that, simply recording as many species as possible is a perfectly valid objective, but do at least let people know in advance what habitats to expect.

(4) Advertising the meeting.—This starts by compiling details for inclusion in the field programme. Follow the format in the 1995 programme and you cannot go wrong. Post it to the Field Meetings Secretary at any time before the middle of January of the year in which the meeting is to take place. We are going to aim to get the programme approved at the February council meeting and issued shortly afterwards, before people have a chance to book up their diaries with other events! In 1995 we are also advertising the meetings to the Amateur Entomologists' Society, who do not have a field meetings programme of their own, and some of the meetings will be advertised to Butterfly Conservation. Try and get your meeting advertised to local naturalists' groups but be aware that some issue their meetings calendars earlier than ours, so make preliminary contact in the autumn if you can. In some cases you might be able to get a local expert out on site to say a few words of background information and point out some features of the site at the start of the meeting.

(5) Safety.—Field meetings must be undertaken in a responsible fashion and all reasonable precautions taken to ensure they proceed safely. Members and guests are responsible for their personal safety and equipment. In addition our Society has insurance cover*. All fieldworkers would be sensible to have a basic first aid kit in the car or with their field equipment, to bandage any cuts etc. These kits can be obtained

* See announcement in *Br. J. Ent. Nat. Hist.* 1995; **8**(3): inside back cover.

inexpensively from chemists. It is a good idea for the leader to have one to ensure that at least one kit is on site.

(6) Recording and promotion of the results of the meeting.—The main report of the meeting is for the Journal. This provides a historical record of the more significant results and we have records of these going back to the earliest days of the Society. I have often thumbed through old reports for information and with computer indexing a real option now at Dinton Pastures, it will become much easier to find out if and when the Society has visited the site before and what was found. The reports have varied in format over the years and depending on the author. Some are no more than a paragraph, others include full species lists and occasionally one or more photographs. In general, I think the more information is included the better and the inclusion of photographs of the site, people and equipment greatly increases the value of the account, particularly when you look back on meetings after a few years or decades have elapsed. Off-prints of these reports are most useful for distributing to land-owners etc, and can be supplied to leaders.

(7) Additional promotion of the results.—A lot can be done to benefit the Society if a short report of the meeting can be prepared the day after the meeting. A brief note of the most interesting records of the animals and plants that can be identified reliably in the field can be included in the various wildlife reports which appear in the bi-monthly *British Wildlife (BW)* magazine and can reach a wide but discerning audience numbering several thousand within eight weeks. Several of our members contribute to the reports in *BW* and may be able to include appropriate records if these are sent promptly, while they are topical. I have regularly featured moth records from field meetings in the reports I write for *BW*. Other magazines and papers may respond to a short report, which could lead to something more substantial on the activities of the society. I have found that coverage in the popular press can result in a very poor quality of reporting, and can generate a lot of follow-up correspondence which can be time-consuming for little apparent gain to entomology, conservation or the Society. However, it does serve to raise and keep issues in the public profile. Before embarking on any promotion, it is imperative that the person who gave permission for the meeting is consulted. Their views on publicity should be sought and appropriate arrangements made when applying for access permission if possible. Any publicity about the Society should be cleared in advance with Council, and as Field Meetings Secretary I am happy to act as an intermediary to Council, with a copy or call to our Secretary in case I am unavailable.

(8) General responsibilities of the leader.—Once a field meeting has been arranged and advertised, the leader or a deputy **MUST** turn up at the appointed time, even if it is sheeting down with rain and no one has contacted them to say they are coming! There will always be people who come to field meetings at the last minute or who do not advise the leader in advance, and the weather may have been fine when they set off. Hardy souls are not put off by the weather or are prepared to gamble on an improvement later in the day. With modern traffic and delays on the road it can be difficult to arrive exactly at the appointed meeting time, particularly if coming from any distance. Cautious people will frequently arrive early because they have allowed for this, others may be detained, so I generally do not move far from the meeting point in the first half hour. The other main job for the leader is to keep a note of who attends and to compile the report for the Journal. If you get a list of names rather than count heads, you can chase people up for their records if they are tardy in sending them! The leader is not expected to be an expert on the site or an expert entomologist. Also, while he or she oversees the meeting, the leader is not a policeman. It is the responsibility of every person attending to ensure that property is

not damaged, that any protected species are not removed or disturbed and that the JCCBI codes for collecting and establishment, which the Society endorses, are not contravened. It will become difficult for the Society to obtain permission for field meetings if large numbers of uncommon species are removed as a result.

FIELD MEETINGS AND EXPEDITIONS IN OTHER COUNTRIES

Members of this Society have demonstrated their concern for insects and other wildlife in places outside Britain, via exhibits, presentations at our indoor meetings and in publications in our Journal. Many past and present members have had the opportunity to pursue entomology abroad, particularly in Continental Europe, and others would like to have the opportunity in the future. Collectively, members of our Society must gather a great deal of potentially useful data from Continental Europe but I must admit I have never been clear where to publish mine to make it available to others. Rightly or wrongly, I have not considered our Journal to be the right place. I have followed a policy of offering reports of my European trips to the *Bulletin of the Amateur Entomologists' Society* (AES), which has developed this type of report into a major feature of the journal. This feature of the AES Bulletin is in a large part due to the many examples provided over the years by Peter Cribb and that is where you will find mine (e.g. Waring & Thomas 1989, 1990, 1994). As a lepidopterist, I am also fortunate in the existence of *Societas Europaea Lepidopterologica* (SEL), which aims to promote the study of Lepidoptera throughout Europe. I have just been elected to the Council of SEL and I hope to use this opportunity to bring the BENHS closer together with SEL so that we are more aware of each other's activities and concerns. Certainly the Continental lepidopterists I have met are very keen to receive results of our trips and many are remarkably interested in what is happening in Britain. In addition, a European Society of Entomologists has recently been formed to improve communications between entomologists in general and this covers all orders of insects and branches of entomology. Lepidopterists and other entomologists in North America are also well organized into societies so that they can act collectively.

What about insects in the tropics and further south? Everyone must now have some idea of the damage to tropical habitats and the pressures on those that remain and on the wildlife that they support. But what to do about it? An option open to all of us is to support organizations such as the Worldwide Fund for Nature (WWF) and I trust that all of you are members of WWF. An Association for Tropical Lepidoptera has recently been formed, based in the USA and it produces the journal *Tropical Lepidoptera*, which provides reading material and an outlet in which to publish results, though authors are charged for each page they publish, which must discourage many. What if you wish to take things further, to develop your first-hand experience of tropical insects and get involved personally? It strikes me that now that the conservation of tropical habitats has become such a pressing concern, and now that transport around the world has become so much easier, it is time for our Society to offer what help it can. Britain has long had holdings in the tropics and subtropics and some of our members, such as the late Robert St Leger, have collected insects in these places in the past. British museums, such as the Natural History Museum, contain some of the finest collections of specimens, which our members and others have left to the nation as reference collections for use in identifying insects and for other studies. In examining reports of surveys of threatened habitats in the tropics, I am frequently surprised at the failure to include invertebrates in the survey, or the failure to identify properly to species any material that was collected. Often this is due to lack of time or expertise, or because it is felt that the invertebrates would

contribute little extra to the conservation case because so little is known about their distribution and habits. We are losing species of invertebrates even before they have been described, and more needs to be done.

In this context our Society surely has something very special if not unique to offer. Our membership includes some of the most active field entomologists in Britain. Others who may be less able to get out in the field, due to family commitments or advancing years, have skills such as sorting and mounting insects, preparation of genitalia dissections and experience in using identification guides which they could offer. These are just the sorts of skills and capabilities which are often so lacking in the tropical countries and which are so costly or time-consuming to develop. I know that I am not the only one who feels it almost a duty to extend my personal involvement and skills to help in the tropics. Through our Society we may be able to accomplish more together than working as individuals. Isn't that one reason why the Society exists in the first place?

I would like to see this Society assist members to get involved in tropical work in the ways outlined. I would like to see more than just a one-off collecting visit by a few lucky individuals. If possible, long-term links with particular places should be developed so that the Society can contribute cumulatively and see the developing results of its involvement. This is easier to achieve as a Society than as an individual.

One of my last contributions in my presidential year has been to sow the idea of mounting expeditions by the Society to current and former British dependent territories. As Richard Jones, Editor of our Journal, remarked at a recent Council Meeting, it seems rather appropriate that the Field Meetings Secretary should be planning an expedition. After all, is it not simply a field meeting in another country? I have selected Belize, formerly British Honduras, in Central America, as the destination for the Society's first expedition, and the provisional dates are to be two weeks in January–February 1996. Advantages in favour of Belize include political stability, a continuing close link with Britain, an economy which depends heavily on the success of "green" i.e. eco-friendly tourism, and a will to develop this by taking a strong pro-conservation line on development issues. Sadly, these are not features of many destinations where our help is needed. The Natural History Museum, London, has taken similar issues into consideration and is just completing a field station in Belize to facilitate fieldwork and the study of tropical rainforest in the country. It may be possible to incorporate this centre as a destination for the present and future expeditions by the BENHS to Belize, but the current expedition is not dependent on this facility. Dr Malcolm Scoble, our new President for 1995/96, works for the Natural History Museum and I know that one of his wishes during his time in post is to bring our Society and the Museum into a closer working relationship, because we have so much to offer each other. Consequently, I am hopeful not just that the proposed expedition will take place but that together we can develop possibilities for the future.

Malcolm and I are both fortunate in that we have been able to gain some experience of pursuing entomology in the tropics and sub-tropics already. I thought I would conclude with a few brief illustrations from my own endeavours, to give you a flavour of the sort of experiences other members of the society may be able to share if my proposals come to fruition, and to rekindle the memories of members who have already been to such places.

SUDAN

From January 1981 to March 1983 I lived and worked in southern Sudan on ecological impact studies of the construction of the Jonglei Canal. Details of the

work and the implications of the canal for the people, domestic stock and wildlife which inhabit this area can be found in Howell *et al.* (1988). While in the Sudan I was able to carry out standard butterfly transect walks in the vicinity of our base camp in savannah and seasonally flooded grassland every week for over two years, in Jonglei Province. This enabled me to record seasonal variations in the species of butterflies and their numbers, as well as to collect wet and dry season forms. I also ran a Robinson-pattern mercury vapour light-trap every week and recorded moths and other insects. Much of this habitat would have changed, for better or worse, had the canal been completed. Shortly after we finished our project the civil war broke out and it has not been possible to conduct such studies since, not least because some of the areas I worked are littered with land-mines. A recent eye-witness tells me that the people ate all livestock and much of the wildlife in the area before starving and migrating as a consequence of the war. No doubt the vegetation will be changing as a result, possibly even improving, at least temporarily, for Lepidoptera, if larval hostplants are not being grazed as heavily as before. My standard counts provide a base-line and a repetition of them now would enable accurate assessment of any changes.

I spent a few tranquil days motoring around the adjacent swamps in a house-boat while I was in Jonglei Province. I used to operate a Robinson trap on the roof of the boat while we were moored for the night. Perhaps I am the first to run a light-trap in these swamps? I was there to study fish breeding grounds, which were likely to be altered when the Canal extracted water from the system. Who knows how the moth fauna might have been affected by the canal? My work, taken in conjunction with predicted changes in the vegetation zones, might hold some clues.

While in southern Sudan I made trips to the forests of Bangangai, on the border of Sudan with Zaire, and the Imatong Mountains, on the border of Sudan with Uganda. I reported my experiences of the butterflies and moths of Bangangai in Waring (1992d). The opportunity to see trees with huge buttress roots and watch large numbers of butterflies feeding at damp mud on the banks of streams in the forest was unforgettable. During the civil war from 1956 to 1973 and again during the current one, many people have retreated into the forests in this area for refuge, others to trade for arms at the border, and the large mammals in the area have been extensively hunted for food. Much of the true rainforest has been opened up by felling and shifting agriculture, such that species of the drier savannah woodland are invading and species dependent on rainforest are threatened.

The British Overseas Development Administration has supported and operated a timber mill in the Imatong Mountains which has contributed to the felling of the forests there. The forests are full of exciting butterflies, moths and other insects, many of which have not been surveyed. Some special conservation areas were being discussed while I was there and I would love to find out what the current situation is and to have the opportunity to return and examine the Lepidoptera in more detail and contribute to their conservation. At least one species of butterfly I found, *Pseudacraea acholica*, is confined to the Imatongs I believe. On the peaks of the highest of the Imatongs, at over 10000 feet, are areas of what can only be described as moorland, with giant heathers. Here I saw numbers of the butterfly *Issoria hanningtoni imatonga*, a sub-species of fritillary endemic to the Imatongs. This butterfly has other sub-species confined to mountain tops elsewhere in East Africa. I also encountered a large lasiocampid larva which I know pleased the late Basil MacNulty. He was trying to identify it from my photographs at the time of his death.

HONG KONG

A brief visit to Hong Kong in April 1993 provided the opportunity for me to get to grips with some of the wildlife that occurs in China and south-east Asia. All the large mammals and some species of birds have been lost from Hong Kong, but a great deal of invertebrate interest remains and it is on these grounds that conservation cases can be justifiably made. It was fantastic to run a light-trap in the forests of Tai Po Kau and to experience the arrival at the trap of Atlas moths *Attacus atlas*, Moon moths *Actias selene* and a host of other large moths, most of which I could not identify at that time. As each minute went by I had no idea what was going to arrive next; each arrival was of great interest, some were breath-taking in their appearance; it was a tremendous thrill. My wife and I were only in Hong Kong for three weeks and did not operate the light-trap every night. Nevertheless, it has taken me two years to identify all the species we recorded, working in my spare time. It would have taken a lot longer if I had not had help from various quarters nor access to the collections in the Natural History Museum. A paper on the hawk-moths (Sphingidae) we found was published in this Journal (Waring *et al.*, 1994) and the results of this trip and visits to other countries have been the basis of a number of exhibits at our Annual Exhibition. We discovered a hawk-moth new to Hong Kong during our visit and this was illustrated in the Exhibition Report (*Br. J. Ent. Nat. Hist.* 7: 145 & Plate 1). A second paper reporting all the other moths we saw is in preparation.

In 1997 the British are due to return Hong Kong to China. What will happen to the habitats which have been conserved as national parks and other special areas during our lease of the Territory? The vast programme of building construction, the bulldozing and the destruction of native habitats now underway across the border in China, and the continuing development in parts of Hong Kong, lead to concern. Will I be able to go back to the woodlands of Tai Po Kau in a few years time and find the moth fauna intact? Will the woodlands still be there or will they have been consumed by the concrete and tarmac of the expanding city of Tai Po? I trust the new administration will take an enlightened view and value such places and the wildlife they support. I am ready to help in their conservation if I can be of any assistance.

CONCLUDING REMARKS

I hope this address has revived a few fond memories and that you are all fired with enthusiasm to participate in the field meetings programme for 1995. I have put together a full and varied programme for this year, twisted the arms of various people, gently, into leading meetings on particular sites where information on the invertebrates is needed and where it will be used immediately it is gathered. I trust that all meetings will be well attended, enjoyable and productive. There are meetings on virtually every weekend from May to September so even our old adversary, the weather, cannot be bad on them all, can it?

Finally, if you have any suggestions for sites where you would like to see a field meeting held, or would like to lead one, or have any suggestions of ways in which these meetings could be improved, do let me know. I am part way through compiling the 1996 programme but there are still some weekends available.

I wish everyone a successful field season in 1995.

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BOOK REVIEW

The type-material of Diptera (Insecta) described by G. H. Verrall and J. E. Collin by Adrian C. Pont. Oxford University Museum Publication 3, Clarendon Press, Oxford, 1995. £65, 223 pp, hardback.—As stated in the preface to this book, George Verrall and his nephew James Collin dominated the study of British Diptera for more than a century (from the 1860s to the 1960s). This work was begun to bring order to the joint Verrall–Collin collection at Oxford University Museum, and to identify all surviving syntypes of the species described by these authors. Few species described by them had holotypes designated and there have been few subsequent lectotype designations.

The main part of the text deals in detail with all the specific names they proposed, 77 by Verrall and 825 by Collin. These are dealt with in alphabetical order of specific name under each author, precluding the need for an index, and a full list of names is also given in systematic order. More than 10 000 specimens are dealt with in the species accounts.

Adrian Pont has listed as syntypic all material established as extant which conforms to the distribution stated in the original descriptions, which was sometimes vague, necessitating inclusion of all specimens likely to have been examined by the author prior to the likely date of submission of the manuscript (rather than the publication date).

The introductory chapters include biographical details of Verrall and Collin, which are invaluable in bringing together much information not previously available to dipterists. Verrall married into a Newmarket family, later setting up home there. Collin was the son of his wife's sister and became his secretary in the 1890s, at this time evidently becoming infected by his uncle's enthusiasm for the Diptera. Both had ample leisure to pursue their studies and Collin's greater longevity extended the influence of this family over British dipterology through the first two-thirds of the present century.

The small selection of photographs are well chosen to illustrate this section, although the family photographs are unfortunately undated. The latest photograph of Collin with C. N. Colyer, L. Parmenter and C. O. Hammond, three of the best known dipterists of his latter years, was taken at Chippenham Fen in the early 1950s (Cyril Hammond visited this site only on 1.viii.51 and 2.vi.52 according to his diaries held by the Society). These collectors are not otherwise mentioned in the text as they did not contribute to the type material discussed. Appendix B does, however, include brief biographies of nineteen other dipterists who collaborated with Verrall or Collin, with details of the present location of their collections where known.

The localities of British syntypes are listed in Appendix C, with their vice-counties and four-figure grid references. Curiously, Logie (a locality where many species were collected by Francis Jenkinson) is misplaced in Fife despite its regular designation of 'Logie in Elgin' at least in the works of F. W. Edwards who referred to much Jenkinson material. As confirmed by the many central Highland species recorded there, Jenkinson's Logie is by the River Findhorn (grid ref. NH9646).

This work was evidently meticulously researched and few errors or discrepancies have been noted. The synonymy and current nomenclature stated is based chiefly on the Palaearctic catalogue, so the latest accepted name is not always used. For example *Suillia dumicola* Collin is placed in synonymy with *S. mikii* Pokorny, following the catalogue despite Phil Withers' work (*Proc. Trans. Br. Ent. Nat. Hist. Soc.* 1987; 20: 91–104) establishing *dumicola* to be a good species. Some craneflies and other species are now placed in different genera from the catalogue.

Inevitably in such a detailed work there were some loose ends. Two of these can be resolved here. Attention is drawn to inaccurate citations of some type localities in the Palaearctic catalogue, largely due to the vague statements made in some of Collin's descriptions. However, under *Xylota xanthocnema* Collin, different localities were cited in the catalogue by Peck, said by Pont to be due to 'some kind of error'. Actually the data given by Peck was taken from Coe's description of the female (*Entomologist's Mon. Mag.* 1939; 75: 224). Under *Pipunculus incognitus* Verrall, reference is made to erroneous records of this species from Britain. The source of these records was actually due to Verrall himself (*Entomologist's Mon. Mag.* 1912; 48: 190-197) recording *incognitus* from Britain on the basis of specimens of *Dorylomorpha beckeri* Aczél, the correction being made in one of Collin's publications.

The inclusion of manuscript names overlooked in British check lists adds to the completeness of this work and some other previously overlooked names are cited such as *Psila uniseta* Smith, a synonym of *Chamaepsila limbatella* (Zetterstedt). Some longstanding errors are corrected, such as the supposed Irish site for *Discocerina nectens* Collin proving to be Welsh.

The immense detail of this work ensures that it will remain a valuable source work for all future researchers of the Diptera.

PETER CHANDLER

Insects and flowers—a biological partnership, by John Brackenbury. Blandford, 1995, 160 pages, £20, hardback.—Many of the higher plants rely on insects for pollination and this is a relationship that has shaped the evolution of both insects and plants. In six chapters this largely photographic book explores the way in which insects and flowers exploit each other. The majority of the photographs, which are all in colour and of superb quality, feature bees and other hymenoptera but flies, beetles, lepidoptera, mantids and spiders are also featured. Each chapter begins with a short introductory text, followed by the pictures which have descriptive captions.

The topics covered include flowers as a food source, the competition for pollen, flower types and pollination mechanisms, the structure of insect eyes and the way in which they see flowers and colours. In the final chapter the author goes further afield to consider adaptations of plants and insects to life in desert and semi-arid areas.

With around 80 per cent of the book taken up with photographs it could fall into the 'coffee table' category but the text is well written and explains the many interactions between insects and flowers.

A. J. HALSTEAD

SHORT COMMUNICATION

A courtship phase of *Lindenius albilabris* (F.) (Hymenoptera: Sphecidae).—A pair of *Lindenius albilabris* solitary wasps courted on a buttercup flower on Mardley Heath, Hertfordshire on the cold, windy morning of 8.vi.1995. The male sat on the female, flicking its overlapped wings like a tephritid fly. The male's front legs rested on the female's eyes, whilst the middle and hind legs gripped the sides of her thorax. The behaviour continued on the flower in a glass tube, but the female did not respond.—R. W. J. UFFEN, 4 Mardley Avenue, Welwyn, Herts. AL6 0UD.

OBITUARY

PAUL NEVILLE SIDDONS, 1914–1994

Paul Siddons died of inoperable cancer at his home in Perranporth on 30th November, 1994. He was well aware of this diagnosis and bore his illness with great courage. He was born at Bath, Somerset on 1st August, 1914. Soon afterwards, the family moved to Newquay and his interest in natural history began at an early age. After education at the then Newquay Boys' School, he was employed as a clerk to the local gas company until 1941. Having volunteered for aircrew at the outbreak of war, his call-up into the Royal Air Force was delayed due to lack of training places. With posting to 44 Squadron, of Lancaster bombers, he flew 29 sorties over Germany and Italy between November, 1942 and April, 1943. On several occasions his skill as a navigator under extremely hostile conditions had undoubtedly brought aircraft and crew safely home. Following a period of instructing navigators and training glider pilots he took part in operations which included those on D-day and at Arnhem. He was awarded the Distinguished Flying Medal in 1944, and later that year attained the rank of Flying Officer. After demobilization in 1946, he and his wife, Joan, came to live in Perranporth. As a Wayleave Officer with SW Electricity, the work not infrequently took him into otherwise not easily accessible parts of the county. He retired in 1979, and sadly, Joan died after a distressing illness in 1981.

Paul was a most modest, sometimes almost diffident person, as reluctant ever to believe that his entomological achievements would be thought worth publishing as he was to speak of his wartime experiences. His interests included painting in oils, the cultivation of cacti and succulents, and several of the "other orders" of insects; but he was at his happiest when netting Microlepidoptera, for which he had the keenest eye, preferring this to their rearing. However, the necessary rearing of, for example, the Coleophoridae was a challenge he also enjoyed—and certainly overcame. His prime interest was in Cornwall, where his particularly thorough investigation of certain favourite localities revealed the presence of numerous species not previously—and in some cases, not since—recorded in the county. Examples are: at Ladock woods, *Tischeria dodonaea* Staint., *Elachista humilis* Zell., *Teleiodes paripunctella* (Thunb.), *Epinotia fraternana* (Haw.), *Strophedra nitidana* (F.) and *Pammene germmana* (Hüb.); also *Ochropleura leucogaster* (Freyer), Radford's flame shoulder, on the same date as one recorded at Swanage, a shared 2nd British record; at the Gannel, Newquay, the first mainland example of *Nothris congressariella* (Bru.); at Goss Moor, *Biselachista serricornis* (Staint.) and *Donacaula mucronellus* (D. & S.); a single *Spilosoma urticae* (Esp.), the water ermine, taken in 1971, gave credence to a likewise solitary specimen reported there in 1936. At Cligga Head on 2nd July, 1986, within a few hundred yards of his home, he took a pair of *Oxyptilus laetus* (Zell.), with which, as with the *leucogaster*, he did allow himself to be exceedingly pleased! In 1945 he took 3 bath whites at Newquay while on a few days' leave, which luckily coincided with the "great invasion". In the early 1950s he bred two perfectly halved gyandromorphs of *Pavonia pavonia* (L.), the emperor moth, and, even more striking, a specimen in which the forewings are female and the hindwings male. The collection will remain in the county, and access to it can be arranged by contacting the Cornish Biological Records Unit at the Institute of Cornish Studies in Pool, Redruth.

Paul's kindness, dry sense of humour, knowledge and perhaps most of all, his companionship will be very greatly missed by all his friends; and to his daughter, Margaret and grandson, Robert, we extend our sincere sympathy.

F. H. N. SMITH

BENHS INDOOR MEETINGS

11 April 1995

The Vice-President, Dr P. WARING showed an exhibit on rearing the oak beauty moth, *Biston strataria* (Hufn.) and the slender-striped rufous, *Coenocalpe lapidata* (Hübner.) (both Geometridae). A freshly emerged female *B. strataria* was found at 15.10 hrs on 26.iii.95 at the base of an oak trunk, clinging to the bark in sun just above the grass around the roots, in Windsor Forest and Great Park SSSI, Berks. It was placed in a mating cage in his garden at Werrington, Cambs., but no males were attracted. On 1.iv she was placed with two males from Bagley Wood and copulation was taking place by 23.00 hrs, which continued until the following afternoon. They separated at about 17.00 hrs and the female was placed in a plastic box with newspaper and twigs of hawthorn, oak, birch and willow. At 9.00 hrs on 4.iv the female was seen placing turquoise eggs in crevices in the bark on the birch twig. Although no other twig was seen to be used for egg laying, when the female died on 8.iv and the box was emptied, over 100 eggs were found in parallel rows in a long strip between the newspaper and the side of the box.

Two males and females of *C. lapidata* were found at rest on *Juncus* on 30.ix.94 at Lairg, Sutherland, by searching after dark. Yellow eggs were laid by both females. Those from female A were kept over winter out of doors in an air-tight container. Hatched larvae were found when the pot was inspected on 12.iii.95. They were given buttercup and cultivated clematis leaves and brought indoors. Feeding holes were seen in the clematis leaves. Eggs from female B were kept over winter in a jar with moss and other vegetation from the Lairg site in case the eggs needed humid conditions. Many eggs disappeared, suggesting that the plant material concealed a predator, but hatched larvae were seen in mid-March after some buttercup leaves had been placed in the container. The larvae fed up rapidly and by 10.iv the largest were 25 mm long. Although young larvae seem to prefer clematis leaves, the older stages fed equally on clematis and meadow buttercup. Feeding takes place after dark. Dr Waring showed some slides of the *Juncus* flush habitat where the adult moths were found in Scotland. He also showed some slides of the four-spotted moth *Tyta fluctuosa* (D. & S.), the small eggar *Eriogaster lanestris* L. and the drab looper *Minoa murinata* (Scop).

Dr Waring's final exhibit was a desiccated larva he had found in arid grassland in Sudan. It was about 35 mm long and 10 mm wide, and densely covered by dark hairs on its upper surface. It appeared to be a beetle larva but no one present at the meeting was able to state with confidence what family it might belong to.

Mr R. A. JONES showed specimens of two wood-boring weevils found in a garden in Peckham, south-east London (VC17, Surrey) on 30.iii.95. *Euophryum confine* (Broun) is a native of New Zealand and was first recorded in Britain in 1948. For several years before that it had been confused with the other species exhibited, *Pentarthrum huttoni* Woll., which was then a very rare species. *E. confine* has spread rapidly and is now widespread throughout England. In London it is one of the most common and economically important woodworm beetles, although it only attacks wood that is damp and affected by fungal decay. *P. huttoni* was probably also an introduced species; 100 years ago it was only known from a few west-country ports where it was associated with wooden casks. It too has spread but not as vigorously as *E. confine*. It remains very local, although its provisional status of 'notable A' has not been confirmed.

Mr Jones also showed some colour transparencies taken a few weeks previously in Florida, USA. They showed tree bark with many horizontal lines of puncture marks

which were oozing sap. They had been made by a type of woodpecker, the yellow-bellied sapsucker, which feeds on the sap.

Mr A. J. HALSTEAD showed some colour transparencies of an unidentified moth bred from caterpillars boring in the growing corms of *Cyclamen coum*. Damaged corms had been sent to the exhibitor in October 1994 from a nursery near Caistor, Lincs. The small pinkish-white larvae were sent to the Natural History Museum, where they were tentatively identified as gelechiid larvae. Adults emerged in March 1995 and these were confirmed as Gelechiidae by Dr K. Sattler but further identification has not yet been possible. It is possibly a species originating from Turkey/Greece which had been brought to Britain in imported corms. The photographs were provided by the Museum's photographer.

Dr P. WARING said that he had not had a formal reply from the Forestry Commission over their policy of charging for collecting permits. He understood from a contact that two members had had their fees refunded and one had been given a small bursary towards travelling costs in connection with recording work.

Dr I. F. G. MCLEAN reported that on 2 April he had seen brimstone butterflies in abundance at Chippenham Fen, Cambs. Dr Waring said it was also numerous at Woodwalton Fen. He said that the recent Dinton Pastures workshop on moth recording schemes had been attended by about 30 people.

MIKE EDWARDS spoke on English Nature's recovery programme for the field cricket *Gryllus campestris* L. This has always been a scarce insect known from scattered sites in England but it had declined until it was down to one or two sites in Sussex. Before attempts could be made to increase its numbers and make introductions to suitably managed sites, it was necessary to investigate its biology. This showed that much of the published literature on the cricket's biology in Britain was erroneous. Some of the earlier records of the field cricket's occurrence and the associated biological data may have, in fact, referred to outdoor colonies of the house cricket *Acheta domestica* (L).

The speaker's studies of the field cricket were based on a site in a piece of storm-damaged woodland. He found that multiple matings take place and that females are often held in the males' tunnels. The male blocks the entrance with his body and males are sometimes found with their abdomens badly chewed where the female had tried to escape. Males do not always make burrows in the soil but will sometimes make pseudo-tunnels in the base of grass tussocks. Males can be located by tracing the sound of their stridulations but this is more difficult if they are not in a soil tunnel. The females lay large eggs in the soil surface. The young nymphs are gregarious in areas of bare soil and do not move into more vegetated areas until the 4-5th instar. The young nymphs are generally free-living on the surface but they can make burrows, and may use burrows while they are moulting. The overwintering stage is usually the tenth instar nymph which does not diapause but needs cold winters to keep its fat reserves up. Poor wintering causes deformed adults with females having bent ovipositors and they are generally infertile. Successfully overwintered nymphs moult twice more in the spring before becoming adults in April and May.

The field cricket is not, as is often stated, a meadow inhabitant but is an early colonist of disturbed ground. Approximately 50% bare ground seems to be ideal and cricket numbers decline when the ground becomes fully vegetated. Marking experiments show that the field cricket is not territorial and will change burrows frequently. A visit to Holland to compare field cricket sites there showed it occupied a wider range of habitats, such as grassy dunes, *Deschampsia* grassland and heather heathland. All of these sites have areas of bare soil.

Breeding colonies of field crickets were established at London Zoo from overwintered nymphs. They are being fed on a diet of fish food and bran. Keeping the nymphs successfully over the winter is difficult but the success rate is improving. In addition to the breeding tanks, an outdoor colony has been set up in an old marmot enclosure. Releases of nymphs have been made at some of the cricket's former sites, including Frensham Ponds, Iping Common and Arundel cricket ground. The last mentioned is a chalk site whereas most other localities have sandy soils. Sand warms up more quickly in the spring and this allows earlier development of the adult crickets. At Arundel, steps have been taken to rake out the thatch from the grassy slopes around the pitch in order to improve warming of the soil in the spring. Active management of cricket release sites is likely to be necessary in order to maintain the open ground habitat. This may involve controlled burning, scraping the soil or ploughing strips, or removing vegetation with the aid of a forage harvester.

9 May 1995

The President, Dr M. SCOBLE showed a pinned specimen of a bizarre wingless female moth taken in a pit-fall trap in March in the Kwazulu province of South Africa. The large moth is of an unknown family and its body is covered in spiny hairs. [See update in report of 13 June meeting.]

Mr A. J. HALSTEAD showed a specimen of the seven-spot ladybird, *Coccinella 7-punctata* L. found in his garden at Knaphill, Surrey. It had been killed by the braconid parasite *Perilitus coccinellae* (Schr.) which spins its silk cocoon between the legs of its host insect. He also exhibited two live insects taken at The Sheepleas SSSI, near West Horsley, Surrey. These were a notable B dead-wood-boring beetle, *Ptinomorphus imperialis* (L.) (Anobiidae) and a widespread sawfly, *Macrophya alboannulata* (Costa) (Tenthredinidae); the latter has larvae that feed on the leaves of elder *Sambucus nigra* L.

The following persons have been elected as members: Gordon J. L. Ramel, Bernard S. Nau, Angela Bruce, 'Ditch' Townsend, Michael Saynor, Joseph A. Ashley, Malcolm W. Storey and Malcolm J. Taylor. The Pamber Forest Management Committee has become a corporate member.

Dr D. AGASSIZ said that he hoped there would be further contact with French entomologists with a field meeting taking place in northern France in late May or June.

Mr A. J. HALSTEAD reported that on 13.iv.95 at 8 p.m. at the end of a warm sunny day he had seen a humming-bird hawkmoth in his garden at Knaphill, Surrey. It had flown several times along the west-facing wall of the house, showing an interest in the hanging tiles on the wall before flying off over the roof.

Mr R. D. HAWKINS said that he had recently heard crickets stridulating in a garden in Horley, Surrey, and thought they might be house crickets *Acheta domesticus* (L.).

Dr I. F. G. McLEAN said that a brimstone butterfly had been seen laying eggs on alder buckthorn at Chippenham Fen, Cambs on 30.iv.95.

Dr BRIAN FERRY described the geography and flora of Dungeness, while its insect fauna was covered by ROGER MORRIS. Dungeness is by far the largest shingle beach in Britain and is about 2000 ha in area. It consists of a series of shingle ridges which have been laid down by the sea over thousands of years. Gravel from the southern edge of the beach is washed away by the sea and is deposited on the east coast. The ridges are formed when pebbles are piled up by wave action during storms. There is a succession of plants which develop on the ridges over a period of time. The first ridge closest to the sea on the east coast has a few ephemeral plants of the Chenopodiaceae

family that grow in the strand line. The next two ridges further inland are colonized by sea kale *Crambe maritima* L. and curled dock *Rumex crispus* L. These plants grow in pebbles with no soil and are fully exposed to salt spray. Further inland the ridges are dominated by false oat grass *Arrhenatherum elatius* (L.) Beauv. and sea campion *Silene vulgaris* (Moench) Garcke. About 14-15 ridges inland the ridges are taken over by broom *Sarothamnus scoparius* (L.) Wimmer. This is an important plant as it provides a wider range of habitats for insects, and when the short-lived shrubs die they break down and provide an organic soil. Broom-covered ridges can support about 50 species of plants, including bryophytes, compared with 6 species on the preceding ridges. Shepherd's cress *Teesdalia nudicaulis* (L.) R. Br. is an annual that grows in bare patches where broom has died and collapsed. Further inland broom disappears and the climax vegetation of shingle heath, characterized by grasses, mosses and lichens, develops. The principal grass is fine-leaved sheep's fescue *Festuca tenuifolia* Sibth. and amongst the interesting flowering plants to be found there are large stands of sheep-bit *Jasione montana* L., English stonecrop *Sedum anglicum* Hudson and Nottingham catchfly *Silene nutans* L. The soil on these old ridges is very acid with a pH level of less than 4, a full 5 units lower than the ridges closest to the sea. On the eroding southern coast the predominant grass is red fescue *Festuca rubra* L. There are also areas of prostrate blackthorn *Prunus spinosa* L., with its branches almost entirely obscured by epiphytic lichens.

There are some natural wetlands at Dungeness but there are also pits created by gravel extraction. The disturbance of the ground mixes sand with the shingle and allows a greater diversity of plants. Ruderal plants such as yellow-horned poppy *Glaucium flavum* Crantz, biting stonecrop *Sedum acre* L., red valerian *Centranthus ruber* (L.) DC., viper's bugloss *Echium vulgare* L. and wild carrot *Daucus carota* L. are frequent in such areas.

Roger Morris described Dungeness's resident insects based on experience gained during a two-year invertebrate survey he had helped to carry out there. As might be expected the insect fauna is closely linked to the vegetation and the coastal ridges are species-poor. The beetle *Malachus marginellus* (Ol.) is frequent on *Crambe* flowers, as are bibionid flies. Many centipedes and spiders were caught in pit-fall traps set in the shingle. There is a species of jumping spider that frequents whelk shells and is only found at Dungeness in Britain. The grassy ridges support many ant nests and several *Hadena* species of moths are found on sea campion. Broom is the first woody plant of any size on the ridges and provides a structure that creates a wider range of micro-habitats for insects. There are some dead-wood insects associated with the dying plants, which also provide nest sites for solitary wasps. Nottingham catchfly is the host plant for the white spot moth *Hadena albimacula* Borkh. and the case-bearing caterpillars of *Colcophora otitae* Zell. In the disturbed areas, viper's bugloss supports five nationally notable or RDB insects and wild carrot is the host plant of the Sussex emerald *Thalera fibrialis* Scop. The wetland areas support sawflies which are important nectar and pollen sources in the spring. Thirteen species of bumble-bees have been recorded at Dungeness and the sandy areas are important sites for fossorial bees and wasps. Fine sand washed out by gravel extractions has created some areas with dune-like characteristics. The water/sand interface at gravel pits is an interesting area where several scarce beetles and flies have been recorded.

13 June 1995

The President, Dr M. SCOBLE, announced the death of Stanley Hanson who had been a member since 1949.

The President reported that the bizarre wingless female moth he had shown at the previous meeting had been identified by Martin Kruger of the Transvaal Museum as *Cyrtojana trilineata* Auriv. (Eupterotidae).

Dr I. F. G. McLEAN showed some empid flies, *Dryodromia testacea* Rondani, found at Ivinghoe Common, Bucks., on the evening of 1.iv.95. Both sexes were taken by sweeping flowering hawthorn, with more than 20 individuals being seen in about half an hour. This species belongs to the sub-family Hemerodromiinae and is unusual in this group by being yellow in colour and occurring in dry habitats, often with ancient trees. Most members of this group are dark in colour and are associated with fresh water.

Mr A. J. HALSTEAD showed an adult vine weevil, *Otiorhynchus sulcatus* (F.). This is a widespread and destructive garden pest which has root-feeding larvae. The specimen shown was heavily encrusted with phoretic mites, something that is frequently seen on dung or carrion beetles but not generally on weevils. The vine weevil had been sent to the exhibitor by an organic gardener and it had presumably gained its mite passengers from farmyard manure used in the garden.

The President announced that the Society had taken out a public liability policy that gives members cover for claims of up to £2m for losses or injuries sustained by third parties while members are engaged in field work. This is necessary as some land owners are asking for such cover before giving permission for entomologists to collect on their land. A copy of the insurance schedule is on display at the Pelham-Clinton building at Dinton Pastures and a note on the insurance will appear in the journal.

Mr R. UFFEN, referring to insurance cover for fieldwork, said that he had been asked to sign a piece of paper by the owners of a gravel pit that would have made him liable for unlimited damages. He had refused to sign.

The President also reported that the Charity Commissioners were ready to register the Dipterists' Forum as a subsidiary charity of the BENHS.

Mr B. DICKERSON, who is Lepidoptera recorder for Huntingdonshire, said that one of his recorders had reported to him that a heart and dart moth *Agrotis exclamatoris* L. and a spectacle *Abrostola triplasia* L. taken in a light trap were mating. They were found on the previous Saturday and were still together at 9.30 p.m. on Monday 12.vi.95.

Dr D. AGASSIZ said that he had found larvae of the gelechiid moth, *Neofriseria singula* (Staud.) at the base of sheeps sorrel, *Rumex acetosella* L. All of the plants with larvae were growing on active ant hills and he suggested that there may be some relationship between the moth larvae and ants.

Dr E. JARZEMBOWSKI spoke on the fossil evidence for the rise and fall of insects. Insects are today an extremely successful class of animal; just over half of all described animals are insects and when undescribed species are taken into account the proportion may be much higher. The fossil record has more insect families than any other type of animals or plants. There are over 1200 fossil insect families of which about two-thirds are extant. Most fossil insects are found as fragments rather than whole insects and they can be overlooked, as fossilized wings can be mistaken for leaves.

The earliest fossil hexapods occurred in the Devonian period and were apterous Collembola-type animals. The development of insects from earlier types of arthropods, such as the myriapods, is not shown by the fossil record but some people believe that a group of animals known as enthyarcinoids may be a link. Similarly the fossil record does not show insects in the process of evolving wings, but winged fossil insects are found as early as the Carboniferous period. The first winged insects included

dragonflies, mayflies, crickets, grasshoppers and cockroaches. The next group developed in the Permian period and had more specialized wing structures. These included bugs, psocids and thrips. Also developing during the Permian period were the more advanced insects which included the Diptera, Coleoptera, Lepidoptera and Hymenoptera. These insects undergo complete metamorphosis and this allows a division of feeding strategies between the adult and larval stages. All of the major groups of insects known today were in existence before the end of the Palaeozoic era.

The number of insect orders increased sharply at the beginning of the Carboniferous period, reached a peak in the Permian and then fell at the start of the Tertiary period. They then steadily increased again. Various theories have been put forward to explain the rapid radiation during the Carboniferous period. These include an increase in oxygen in the atmosphere and an increase in food sources to exploit due to the evolution of new plants. The number of insect families over the same period show a similar trend as the number of orders, although the line on a graph shows more pronounced fluctuations. There were marked extinctions of some families during the Carboniferous, Permian, Triassic and Cretaceous periods. The rate of extinctions has declined in more recent times.

Angiosperm plants began to develop rapidly during the Cretaceous period. Many insects declined in diversity at the beginning of this period, possibly because their food-plants were being displaced by the new flowering plants. Insect numbers later increased with bugs and Lepidoptera developing strongly in the Tertiary period, well after the angiosperms had become established. The first social insects, the termites, developed in the early Cretaceous, with ants appearing towards the end of this period. Bees are first found in the Tertiary period. The Tertiary is also an interesting time for changes in the geographical ranges of insects. The fossil distribution is often very different from the modern locations of extant species.

Dr Jarzembowski closed his talk with an appeal for entomologists to take more interest in the fossil side of their subject. There is a need for people with knowledge of insects and insect structures to search for and identify fossil material.

11 July 1995

The President, Dr M. SCOBLE announced the death of a member Mr Maurice Jackson, who had been Yorkshire Macrolepidoptera recorder for many years.

Dr I. F. G. MCLEAN exhibited a live adult shore fly, *Clanoneurum cimiciforme* Haliday (Ephydriidae), which resembles a plant bug, due to the wings being closely adpressed to the abdomen. The insect also progresses via sudden darting, skipping or jumping movements, atypical of most two-winged flies. This example was found at Holme Dunes NNR, a Norfolk Wildlife Trust reserve on the North Norfolk coast, on 10.vii.95. It was swept from a sand bank at the rear of saltmarsh.

Mr G. BOYD exhibited a micro-moth tentatively identified as *Ypsolopha ?parenthesella* (L.) (Yponomeutidae). This was beaten from vegetation at dusk in Southrey Wood near Bardney, Lincolnshire on 8.vii.95. The specimen does not fully conform to the illustrations for this species published by the BENHS some years ago, and was brought along to the meeting with the hope that an experienced microlepidopterist could confirm the provisional identification.

The following were announced as new ordinary members: Mr Tony Francis Marshall, Mr Adrian Thorne, Mr Ronald Gash, Mike Fox, Mr David G. Green, Ms Diane Susan Barker and Mr Stanley Dumican.

Preliminary reports were received from field meetings held on 17.vi at Dinton Pastures and 24.vi at Dawlish Warren.

Due to the sudden illness of the invited speaker, Mr ROB DRISCOLL of Norwich Castle Museum, the President kindly stepped in and prepared an illustrated talk at very short notice. Dr M. SCOBLE spoke on the work of the Geometridae Research Group at the Natural History Museum.

Dr Scoble began by introducing the work of the Geometridae Research Group which he leads at the Natural History Museum. Taxonomists are increasingly working in collaborative groups to tackle projects which require a mixture of skills and which would take many years for one specialist to complete. The Geometridae Research Group is an example of this approach, which includes taxonomic revisions, biological studies and database development within its scope.

The characters shared by Geometridae were outlined, including the reduction of prolegs (resulting in the typical 'looping' mode of progression), with the appearance of different subfamilies being illustrated with excellent colour slides of living individuals and set specimens. Many adult geometrids are drab moths, but there are some striking and colourful exceptions from tropical regions and elsewhere. It was emphasized that more work is required to resolve the higher classification of the Geometridae; it is interesting to note that similar colour patterns are repeated in different subfamilies defined by morphological and other characters. Adult geometrids possess hearing organs at the base of the abdomen, close to the point of attachment to the thorax. These are consistent in structure throughout the family, except in some wingless females.

The emerald moths are well-known because of their striking green coloration which gives them their English name. The pigment responsible for this green colour has been extracted, and has been called geoverdin. It is a substance degraded by light and may be derived from chlorophyll. Sophisticated biochemical techniques are increasingly used by taxonomists to generate additional characters for resolving the higher classification of many groups.

Work on Geometridae in Costa Rica was illustrated by slides of the habitats, species and field facilities which visiting entomologists use to explore this diverse and fascinating fauna. Parataxonomists, who are trained in field and basic laboratory techniques, make a great contribution in obtaining material for study, and this approach has much potential for improving knowledge of the fauna of countries other than Costa Rica where there are shortages of trained entomologists and an urgent need for more knowledge of the resident insects.

In conclusion, the Darwin initiative was introduced. This was established by the UK Government following the Earth Summit at Rio in 1992. It has been very successful in supporting international collaboration between British and overseas workers on biodiversity, and a Darwin fellow is currently investigating the Geometridae of Costa Rica. The lecture was followed by questions and discussion stimulated by a wide-ranging and stimulating talk.

13 September 1995

Joint meeting with the London Natural History Society

Mr R. SOFTLY, an honorary Vice-President of the London Natural History Society, took the chair for the joint meeting held at the Linnean Society's rooms. Mr Softly announced that Mr Plant's talk would be the first Brad Ashby Memorial Lecture.

The deaths were announced of Frances Murphy, a former BENHS President and Secretary, Eric Bradford, an honorary member and former curator of the BENHS insect collection, and Hugh Michaelis, a microlepidopterist, who had been a member since 1951.

Mr C. W PLANT showed a selection of the large number of solitary bees and wasps with red data book or nationally scarce status that has been recorded at various sites along the eastern Thames corridor in Essex and Kent. The significance of this area along the River Thames to the east of London for the Hymenoptera-Aculeata has only just been realized. The area is blessed with a number of former chalk quarries—long neglected and now with ecologically significant floras—and in many places these chalk exposures underlie Thanet sand deposits. Additionally there are a number of sand and gravel pits present, whilst elsewhere, Quaternary sands and gravels are present. Many of the pits on the Kent side of the river, including the famous Charlton Sand Pit, are now gone, either partially or totally, but on the Essex side many still remain, though almost all are under threat of development. A great many rare, vulnerable, endangered and nationally notable species have been discovered to breed here making it one of the most important areas of Britain for aculeates. One Essex site in particular—Mill House Wood Pit at Grays—has proved to have a nationally significant assemblage of bees and wasps, as well as the last remaining colony of grayling butterflies *Hipparchia semele* (L.) in the south-east of England (if one ignores the coastal colonies in Suffolk) and a large number of red data book Diptera. One hundred and sixty-eight Aculeata are so far recorded here including 38 red data book or nationally notable species, due largely to the efforts of Peter Harvey, the Essex recorder for aculeates. The site is currently being built upon and will be obliterated in the next couple of years. It appears that English Nature is either unable or unwilling to intervene. Another site, Dolphin Quarry at Purfleet, Essex, has been extensively surveyed by the exhibitor and also has many nationally significant species. It too is to be developed, though in this case the proposals as they stand are compatible with nature conservation. The insects shown, mostly taken in 1995, were: *Aporus unicolor* Spin. (Pompilidae), *Hedychrum niemelai* Linsenmaier (Chrysididae), *Sphecodes reticulatus* Thom. (Halictidae) and *Melitta tricincta* (Kirby) (Melittidae) from Mill House Wood Pit, Grays, Essex; *Cerceris quinquefasciata* (Rossius) (Sphecidae), *Philanthus triangulum* (F.) (Sphecidae) and *Sphecodes niger* Sichel (Halictidae) from Dolphin Quarry, Purfleet, Essex; *Lasioglossum malachurus* (Kirby) (Halictidae) from Cuxton Chalk Pit, Rochester, Kent; *Lasioglossum pauperatum* (Brullé) (Halictidae) from Rainham Marsh, Essex; *Nomada fucata* Panz. (Anthophoridae) from Richborough, Kent; *Hylaeus signatus* (Panz.) (Colletidae) from Ebbsfleet, Kent.

Mr Plant also showed a specimen of *Nineta inpunctata* (Reuter) (Neuroptera: Chrysopidae), a lacewing new to Britain. The example shown was a female taken at m.v. light on 26.vi.89 at Eastend Wood, Elsenham, North Essex. This species is confined to the Western Palaearctic and is only known from 15 sites. All records are from light traps and it may be associated with scrub woodland, particularly with small oaks. A paper adding *Nineta inpunctata* to the British list is in press (*Entomologist's Gazette*) and it is included in the exhibitor's forthcoming AIDGAP key to lacewings, which is currently at the testing stage.

Mr D. HACKETT showed specimens of the hoverflies *Xanthogramma pedissequum* (Harris) and *X. citrofasciatum* (Degeer). He had seen the former at three sites in the London area—Hampstead Heath, the Gunnersbury Triangle and Crouch End—during the summer. The scarcer *X. citrofasciatum* had been seen twice at one location in Tottenham. On one occasion a female was seen investigating an ant hill.

B. K. WEST showed a series of the marbled carpet, *Chloroclysta truncata* (Hufn.) (Geometridae) illustrating the range of colour forms taken in his garden at m.v. light during 1994 and 1995. The forms were *nigerrimata* Schaw., *perfuscata* Haw., *rufescens* Strom., *mixta* Prout and *saturata* Steph. He also showed an example of f. *russata*

Hübner, which is common in East Kent and may reappear in the London area as melanism declines.

Mr R. D. HAWKINS showed a live adult specimen of the eared leafhopper, *Ledra aurita* (L.) (Cicadellidae) found at Farthing Downs, Coulsdon, Surrey on 11.ix.95. The specimen had been beaten from the new growth of coppiced hawthorn scrub.

Mr F. ROCKWOOD showed a colour transparency of a moth that had been bred from some small caterpillars found on bottlebrush flowers (*Callistemon* sp.) brought into Britain as cut flowers from Western Australia. It appeared to be a *Eupithecia* sp. (Geometridae).

The following persons have been approved by Council as ordinary members: Michael Tickner, James Stollery and Matthew G. Sullivan.

Mr S. MILES said that the Wildlife and Countryside Act was undergoing its third quinquennial review and comments are required by 30 September. Butterfly Conservation wants to increase the protection given to the marsh fritillary, giving it full protection instead of restrictions on its sale.

Dr M. SCOBLE gave details of a course on the biology and taxonomy of parasitic Hymenoptera run by the Natural History Museum and Imperial College. It takes place at Silwood Park, Berks on 13–20 April 1996.

Mr D. HACKETT announced that he had recently become recorder for stag beetles in the London area and would be pleased to receive records.

Mr C. W. PLANT spoke on the subject of a red data list of Lepidoptera and other invertebrates in the London area. He outlined the history of publications listing scarce invertebrates. In 1983 the IUCN produced the first red data book which had just eight UK species, with the large blue butterfly being the only insect listed. The *British red data books: 2. Insects* and *3. Other invertebrates* were published in 1987 and 1991. These introduced the categories of endangered (RDB1), vulnerable (RDB2), nationally rare (RDB3), out of danger and endemic, with an appendix of extinct species. Additional categories of nationally notable A and B have been added for species which may be widespread but are known from small numbers of 10-km squares.

Seven hundred and fifteen macrolepidoptera have been recorded in the London area. Three are RDB1, five are RDB2, 18 are RDB3, 45 are Notable A and 88 Notable B, with 10 extinct. Almost 25% of London's moths come into some sort of category. National lists may not serve local needs. Some insects which are nationally uncommon may not be under threat in the London area. An example is Roesel's bush-cricket *Metrioptera roeselii* (Hag.), which nationally has notable B status, but is widespread throughout much of London. Some moths are either local or very local resident species in London. One hundred and four species are recorded in less than 10 of London's 815 tetrads but 81% of these are not RDB or notable category species in Britain as a whole.

Some insect populations have shown considerable fluctuations over the years. The royal mantle moth, *Catarhoe cuculata* (Hufn.) is restricted to chalk areas and is currently known from seven tetrads in southern London. In the nineteenth century it occurred in four tetrads but during the 1930s it underwent a rapid expansion before declining again. The bee wolf, *Philanthus triangulum* (F.) was once an RDB2 species but during the last 10 years has become widespread in southern England. Roesel's bush-cricket is another species currently expanding its range. Should these surges or declines in abundance, which may be only temporary, be counted as significant when considering distributions?

Some moths do seem to be genuinely scarce and absent from some apparently suitable habitats. The southern wainscot *Mythimna straminea* (Treit.) is found in the

east Thames corridor and Lea Valley but not in reed beds elsewhere in the London area. The pinion-streaked snout *Schrankia costaestrigalis* (Steph.) is currently known from seven widely scattered tetrads. The chimney sweeper *Odezia atrata* (L.) was formerly found across London but is now confined to meadow land in NW London.

There is a need to highlight species and habitats under threat and to establish management regimes for these sites. Species assemblages can also be used to identify locally important sites. The speaker proposed some additional categories for a London RDB list. These are locally notable A—species threatened in the London area, having declined in recent years and likely to become extinct unless the reasons for the decline are remedied; locally notable B—found in less than 10 tetrads after surveys of suitable habitats; locally notable C—found in more than 10 but less than 30 tetrads after surveys of suitable habitats. The surveys should look for evidence of breeding colonies rather than the simple occurrence of adult moths.

The lecture was followed by a discussion on the desirability and practicalities of compiling a local RDB list for the London area.

BENHS FIELD MEETINGS

Blackhill Mire, Helensburgh, Dumbartonshire, 20 May 1995

Leader: **Keith Bland**. This was a joint field meeting with Butterfly Conservation to a fine raised peat-moss on the outskirts of Helensburgh. The moss is under threat from the pending extension of the neighbouring golf-course. In spite of the unpromising weather forecast five people attended. However the rain held off and the sun came out allowing several thriving colonies of *Callophrys rubi* L. to be located. Among the smaller moths *Glyphipterix haworthana* Steph. and *Clepsis senecionana* Hübn. were active on the more open areas while *Micropterix aureatella* Scop., *Ancyliis myrtillana* Treit. and *A. uncella* D. & S. preferred more shelter. Larger species were also evident; among the many *Ematurga atomaria* L. and *Neofaculta ericetella* Geyer that readily took to flight was the occasional *Xanthorhoe designata* Hufn. and *X. spadicearia* D. & S. Two magnificent male *Saturnia pavonia* L. were seen and a freshly emerged *Acrionicta menyanthidis scotica* Tutt was discovered hardening off. Other imagines recorded were *Syndemis musculana* Hübn., *Epinotia tetraquetra* Haw., *Pieris napi* L., *Aglais urticae* L., *Eupithecia nanata* Hübn., *Lomaspilis marginata* L. and a single vacated cocoon of *Phragmatobia fuliginosa* L. Larvae of *Lampronia rubiella* Bjerk., *Hydriomena furcata* Thunb. and *Operophtera fagata* Scharf. were also noted.

A drop in temperature at dusk caused a poor response to light with only *Lampropteryx suffumata* D. & S., *Selenia dentaria* F. and *Cerastis rubricosa* D. & S. revealing themselves. Altogether some 25 species of Lepidoptera were recorded.

New Forest, Hampshire, 12 August 1995

Leader: **Paul Waring**. This was a joint field meeting with Butterfly Conservation and was assisted by Hampshire County Council. A total of 63 people attended the meeting, including a BBC film crew of eight and the resulting film was broadcast in the Nature Detective series on 3 September 1995. Eighteen members and friends came for the whole day and the rest turned up for the night work. The main objectives were to record whatever species of animals could be found in Frame Wood and on the surrounding heathland during the day-time and then in the evening to

divide into small teams for wine-roping, sugaring and light-trapping at a number of pre-selected places dispersed throughout the Forest, with the primary aim of surveying the light and dark crimson underwings *Catocala promissa* (D. & S.) and *C. sponsa* (L.).

During the day a number of species of interest were seen on the heathland between Frame Wood and Hatchet Pond, including several silver-studded blues *Plebejus argus* (L.) and grayling butterflies *Hipparchia semele* (L.), several female and some worn male bordered grey moths *Selidosema brunnearia* (Vill.), the beautiful yellow underwing *Anarta myrtilli* (L.), a grass emerald *Pseudoterpna pruinata* (Hufn.) and a larva of the small chocolate-tip *Clostera pigra* (Hufn.). This larva was about 5 mm in length when found between two leaves of creeping willow *Salix repens* L. which it had spun together. A few days later the pupa of a parasitoid formed within the larva, whose dead skin dried and tightened around it, and on 29 August a single reddish adult wasp was found to have emerged and was flying within the plastic box in which the larva had been kept alone. The wasp is now with Dr Mark Shaw, at the Royal Museums of Scotland, Edinburgh, for identification.

A water rail *Rallus aquaticus* L. was seen walking over boggy ground by Hatchet Pond while the party was looking for Hampshire purslane *Ludwigia palustris* (L.), which was found. Dragonflies included the emperor *Anax imperator* Leach, the common darter *Sympetrum striolatum* (Charp.) and the common blue damselfly *Enallagma cyathigerum* (Charp.). Several common lizards *Lacerta vivipara* Jacq. and three fledgling nightjars *Caprimulgus europaeus* L. were seen together on the heathland.

By day in Frame Wood, a large caterpillar of the buff-tip *Phalera bucephala* (L.) was found wandering across a path, a range of larvae was beaten from the oaks *Quercus robur* L., including grey dagger *Acronicta psi* (L.), light emerald *Campaea margaritata* (L.), scalloped hazel *Odontopera bidentata* (Clerck) and peppered moth *Biston betularia* (L.) and we were serenaded by the wood crickets *Nemobius sylvestris* (Bosc.) which were moving about amongst the leaf litter. Long-winged conehead bush-crickets *Conocephalus discolor* (Thunb.) were reported by one of the paths.

In the evening session, teams were sent out to six areas of mature oak woodland selected and visited the previous day by John Chainey and Paul Waring, each team equipped with light and sugar or wine-ropes, and accompanied by, or to be visited by, a radio operator from Hampshire County Council. In this way, stands of mature oak in the inclosures of Hursthill (H), Whitley Wood (W), Park Hill (P), Ladycross (L), New Copse (N) and Frame Wood (F), spread over a distance of some 12 by 4 km, were covered simultaneously. The idea was to have all groups in communication by radio and mobile phone and to exchange news as it happened, but in the event the radios and phones, which only became available that evening, were not powerful enough for everyone to keep in touch, because of the tree cover. Only groups close together were able to speak directly to each other. Nevertheless this equipment was of some use.

All groups were in place and sugar and wine-ropes set out before dusk. The BBC stayed with the largest group, in Frame Wood, and here a system of infra-red illumination coils and a special video camera and monitor were set up by Martin Harvey and Mike Bull of the Nature Conservation Bureau to demonstrate the use of infra-red radiation in observing moths unawares after dark on the wine-ropes. The system is the same as is used by night surveillance firms for security and was very successful in viewing the copper underwings *Amphipyra pyramidea* (L.) and *A. berbera* Rungs which began to arrive at the bait, as many as a dozen per rope. It was

a warm night, 18.5°C at midnight falling to a minimum of 15.5°C, with a very light shower of rain just about dusk.

The light crimson underwing was seen at all sites, the highest total being ten at one site (L), and the dark crimson underwing turned up at all but one site (N), as one or two individuals at each. This is a very encouraging result because lepidopterists had become concerned that the dark crimson underwing in particular had become restricted to a single small part of the Forest. The larvae of both species feed on oak leaves high in the canopy of big trees and seem to need large stands to support viable populations. They have disappeared from woods which have been extensively felled and replanted. Both species highlight the value and importance of conserving stands and belts of mature oaks, which are needed throughout the Forest if the moths are to remain widespread, and the Forestry Commission and English Nature have been reminded of this.

The third of the three *Catocala* species resident in Britain, the red underwing *C. nupta* (L.) also turned up at sugar during the meeting, at Ladycross and Frame Wood. A waved black moth *Parascotia fuliginaria* (L.) came to sugar among the old trees in Frame Wood and an old lady *Mormo maura* (L.) at New Copse. Other noteworthy records included the peacock moth *Semiothisa notata* (L.) (L,P,F), August thorn *Ennomos quercinaria* (Hufn.) (P,W), oak nycteoline *Nycteola revayana* (Scop.) (L), dotted border wave *Idaea sylvestraria* (Hubn.) (L), mocha *Cyclophora annulata* (Schulze) (L), bird's wing *Dypterygia scabriuscula* (L.) (F), bordered beauty *Epione repandaria* (Hufn.) (L,P), buff footman *Eilema deplana* (Esp.) (F) and pine hawk-moth *Hyloicus pinastri* (L.) (F).

Several species of moth associated with oak were well in evidence at most sites, including the black arches *Lymantria monacha* (L.), maiden's blush *Cyclophora*

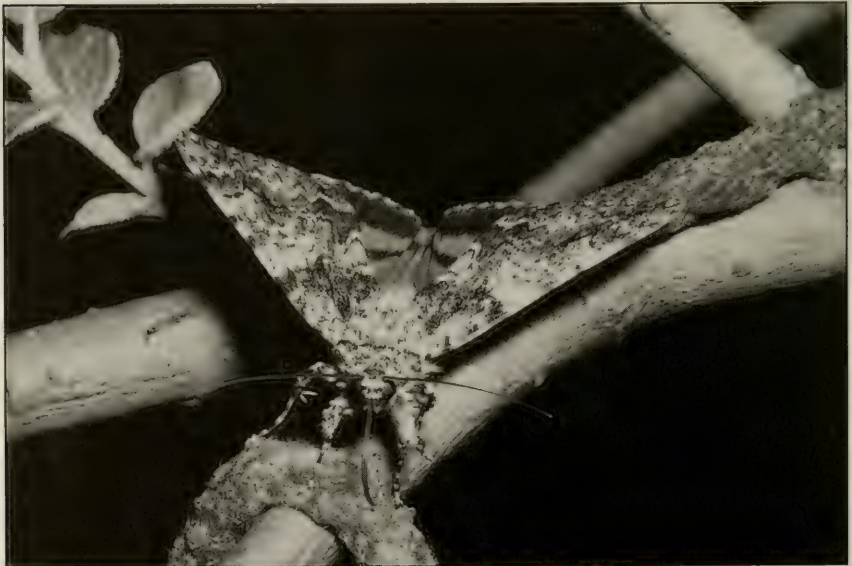


Fig. 1. Light crimson underwing *Catocala promissa* (D. & S.) visiting wine-rope.

punctaria (L.) and oak hook-tip *Drepana binaria* (Hufn.) and we found narrow-winged pugs *Eupithecia nanata* (Hubn.) from the heathers came to several of the lights. Numbers of moth species and individuals were not high however, the lull in numbers which is a feature of mid-August, before the autumn emergences begin, being particularly marked in this hot dry summer.

An active paper nest of the social wasp *Dolichovespula media* (DeGeer) was found about 1.5 m above ground in a small bush of common hawthorn *Crataegus monogyna* Jacq. on the edge of the wood at Clayhill Heath and hornets *Vespa crabro* L. were noted in some of the light traps.

The above results can be compared with a previous meeting held by our Society at Frame Heath, New Copse and Ladycross on 10 August 1985 (*Proc. Trans. Br. Ent. Nat. Hist. Soc.* 19: 65). That meeting followed several days of wet weather and it was cool but dry during the meeting. Three lights were set up and some oak trees were sugared. Two pristine light crimson underwings were seen at sugar and a third, a perfect male, was found at rest about 30 cm above ground on an unsugared trunk. No dark crimson underwings were seen and other insects were few. Only 12 other species of macro-moths were found. Evidently the season in 1995 was more advanced than in 1985 because some of our light crimson underwings were showing signs of wear and the later emerging dark crimson underwings were well out. Moths in general were undoubtedly a little earlier in emerging in the summer of 1995 than on average and readers may recall that the summer of 1985 was characterized by a lot of cool wet weather.

I would like to thank everyone for supporting this field meeting and enabling the simultaneous survey of multiple sites in the central and eastern parts of the Forest. I would particularly like to thank John Chainey, Tony Dobson and Rob Dyke for leading groups on the day, John, his parents and Jenny Spence for their hospitality to me, Rachel Thomas and Beth Waring during the reconnaissance and planning the day before the meeting, when they accommodated our tents on their lawn, and Peter Potts and his colleagues from Hampshire County Council for arranging the television and subsequent press coverage and for providing and operating the portable radios. I thank English Nature and the Forestry Commission for permission to hold this meeting, for providing keys to locked gates, and would like to thank Martin Noble and Jonathan Cook from the Forestry Commission for coming along to the start of the meeting. Copies of this report and the full list of species are being supplied to English Nature, the Forestry Commission and Barry Goater, the Hampshire moth recorder.

Wandsworth Common, Surrey (London), 26 August 1995

Leader: Colin W. Plant. The prolonged hot and very dry weather contributed little to the leader's expectations of a good 'tally' of insects from this particular field trip; the realization that the Wandsworth Common authorities had invited the general public to attend the meeting did not substantially improve his hopes! Around thirty people, including a few entomologists, gathered in the afternoon in the small flower garden outside the visitor centre, where Roger Hawkins proceeded to find a number of hoverflies (Diptera: Syrphidae) including *Chrysotoxum festivum* (L.) to start the ball rolling. Insects were decidedly scarce as we scoured the common in desperation before finally resorting to leaf-mines and plant galls as the only hope of raising the afternoon list into double figures. A number of common species were found on *Salix*, *Betula*, *Crataegus monogyna* and *Quercus robur*. Graham Collins managed to beat a number of Lepidoptera larvae from various trees, including those of *Hemiteha aestivaria* (Hüb.), *Cyclophora albipunctata* (Hufn.) and *Cabera pusaria* (L.) from

Betula pendula, of *Lomaspilis marginata* (L.) and *Laothoe populi* (L.) from *Populus tremula*, and of *Cyclophora punctaria* (L.) from a deciduous *Quercus*—probably *Q. robur*. The leader beat the lacewings *Hemerobius humulinus* L., *Hemerobius micans* Olivier and *Chrysoperla carnea* (Steph.)—all from oak foliage, whilst Dan Hackett found a number of beetles (Coleoptera) for people to look at, including the lesser stag beetle *Dorcus parallelipipedus* (L.), *Cylindrinotus laevioctostriatus* (Goeze) and *Platypus cylindrus* (F.) beaten from a Locust tree *Robinia pseudoacacia*, seven different species of ladybird (Coccinellidae), including the orange ladybird *Halysia 16-guttata* (L.) which is locally common in the London area and associated with mature sycamore *Acer pseudoplatanus* trees and several common ground beetles (Carabidae). The remains of a *Carabus violaceus* L. were also found in an owl pellet and the characteristic tunnelings of the elm bark beetle *Scolytus scolytus* (F.) were also examined. The highlight of the day as far as the Coleoptera were concerned was the discovery by Dan of the front leg of a stag beetle *Lucanus cervus* (L.) under a poplar tree. Several local people present reported having seen adults flying in the area earlier in the year.

After a lengthy break for food, the party re-assembled on the common for light-trapping. Five m.v. lights were set up by the leader and Graham Collins and the party waited anxiously for the first moth to appear. Wandsworth Common is not the most floristically diverse site in London, and the combination of this plus the prevailing drought conditions led us to think that we were not in for the most spectacular of evenings. Our expectations were realized, though we did have a list of some 28 macros and 17 micros by the time we had finished, the best of which was perhaps the orange sallow *Xanthia citrigo* (L.). A number of other insects also entered the traps, including the beetles *Heterocerus fenestratus* (Thunb.) and *Anotylus (Oxytelus) rugosus* (F.), and the lacewings *Hemerobius humulinus* L. and *Chrysoperla carnea* (Steph.).

Though this was certainly not the most thrilling of field meetings the Society has organized, it nevertheless was of great interest to the several non-entomologist 'guests' present, and it is earnestly hoped that some of the younger people present, at least, will have gained something from the experience.

**Macrolepidoptera dissection workshop held in the Department of Entomology,
The Natural History Museum, London
Saturday 16 September 1995**

Leaders: **Malcolm Scoble, Martin Honey, David Agassiz, Mark Parsons.** Eleven members and one non-member made this workshop fully subscribed. The purpose of the day was to demonstrate techniques for the dissection and slide-mounting of macrolepidopteran genitalia, and to allow participants to put the methods into practice.

Proceedings commenced with a video demonstration by Martin Honey of techniques involved in the dissection of male and female moths. Participants were then assigned bench space, allocated microscopes and other equipment, and allowed to practise techniques for the rest of the day with guidance from the leaders.

The techniques taught, if put into practice, will result in the production of genitalia preparations of high quality and of lasting value to entomological collections. A real sense of achievement was evidence by the end of the workshop.

LETTERS TO THE EDITOR

Capital letters for English names.—Following the publication of the letter to the editor by Roberts & Else (*Br. J. Ent. Nat. Hist.* 1995; 8: 119–120) and editor's reply, several correspondents have written to add their views to the debate. There are two camps—those who would use capitals and those who would not. The following are extracts from some of these letters, edited to avoid duplication. The editor would like to thank everyone for their comments.

I was much interested by the letter from S. Roberts and G. Else on this topic and by the 'Reply from the Editor'. I am writing mainly to point out that the former misrepresent Dony, Jury & Perring (*English names of wild flowers*, Edn 2, 1986) by omission. These authors recommend that capitals should be used for 'labels, captions to illustrations, notes on individual plants and lists of plants arranged in columns', but go on to write 'in the text of articles, nature trail guides and lists of plants in running order we recommend that, with obvious exceptions, the capital letter should be dispensed with'. They then give a sentence containing plant names repeating it twice, first using the lower case except for St John's-wort, and then the upper case, stating that the former is better. On comparing the two versions, most naturalists would agree.

The policy recommended by Dony, Jury & Perring is followed by *The moths and butterflies of Great Britain and Ireland* and also by the National Trust in its publications.

I find myself in full agreement with the editor's reply, though I hesitated for a moment over his use of a capital letter for 'Editor'.

Incidentally, how does one cite the authorship of the first edition (1974) of *English names of wild flowers*? On the cover one sees 'Dony, Rob & Perring' but on the title page 'Dony, Perring & Rob'. I use alphabetical sequence. However, alphabetical priority also creates a problem. Dr J. R. Langmaid and I have just returned from an eight-day touring holiday in Ireland, including the northern counties. Together we recorded six, I think, species new to Ireland and made just over 300 new county records of microlepidoptera, as well as 27 in South Wales and England on our outward and return journeys. In a forthcoming paper recounting our achievements, I will feature as the senior author since E precedes L, but John, who, though retired, is about a quarter of a century younger than I am, has sharper eyes and nimbler feet and in consequence more of the records were of his making.—A. M. EMMET, Editor, *The moths and butterflies of Great Britain and Ireland*, Labrey Cottage, Victoria Gardens, Saffron Walden, Essex CB11 3AF.

Capital letters should be used only where demanded by custom or common-sense. That invaluable publication, *Hart's rules for compositors and readers at the University Press, Oxford*, sets out very clearly (pp. 55–57) where capital letters or lower-case initials should be used, and may be regarded as authoritative. It does not specifically deal with the English names of animals and plants, but by exception from the list of cases where capital letters *should* be used implies that these should be spelled with lower-case initials.

Incidentally, and particularly since this is the *BRITISH Journal of Entomology and natural History* and not the *Journal of BRITISH Entomology and natural History* (presumably the title was given by design and not by accident), and therefore deliberately addressed to a wider and not necessarily anglophone readership, surely the use in print of English names for insects (except those names in everyday use and

included in standard dictionaries) should be actively discouraged. Who, in conversation, ever refers to a 'setaceous Hebrew character' or 'large garden humble-bee', or indeed uses any of the spurious 'English' names that have been concocted for species never likely to impinge on public consciousness?

As to plant names, the position is quite different. Most English plants have genuine and long-established English names, and many of these names are in part descriptive: 'round-leaved', 'bristly', 'barren'. *Not* to use capitals here would invite misunderstanding.—D. B. BAKER, Hope Entomological Collections, University Museum, Oxford OX1 3PW.

Having been writing and to a much lesser extent editing for over 50 years the problem of capital letters for common names has been a perennial one. The rule has always been to avoid beginning words with capitals as much as possible. Any serious editor will I think agree with that. One must admit at once to having been very inconsistent and often influenced by the type of publication for which one is writing. My own preference has been to avoid capitals even for very precise common names—I would therefore write 'the lesser spotted mud-streak'.

I asked our own editor here at Kew to read the letters at my morning coffee session and give his views. He thought that genuine common names such as cat, dog, cheetah, lion, elephant, bear, albatross, oak, fig should never begin with a capital save of course when they begin a sentence or stand alone in lists etc, but that a name such as 'grizzled skipper' should be spelt with capitals since it was a contrived name. 'What about grizzly bear' I asked but that he thought he would not capitalize, but doubt had crept in. Cat can be used as a generic or even family term so occasionally we shall need a precise term 'the domestic cat' but nothing is going to make me use capitals for that although it is as precise as 'the alternate-leaved golden saxifrage' or 'large garden humble-bee' (incidentally I have never heard an ordinary person use the name humble-bee—always bumble-bee). Yet someone as erudite as Humphrey Gilbert Carter could write 'the Paper Mulberry' in text but in books where one has common names after the Latin ones and also lists it may be tempting to use the same rule for the running text as well. In lists one might see '*Ficus carica* L. Common Fig' but in the text I would certainly write 'common fig'. I do not think even the most ardent capitalizer will put 'Fig' in his text.

I really feel one must stick to one rule and not adjust it according to how 'common' the names are. It should I think be emphasized that this is a problem in English language and there must be a good deal written about it in language literature. This is where one misses such people as the Rev. Prof. L. W. Grensted. It will of course rest with editors to strive for uniformity. BERNARD VERDCOURT, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB.

I was interested to read the letter concerning the use of capital letters. My feeling is that authors should follow the rules of English grammar, and little can then go wrong: a capital letter to begin each sentence, and initial capitals for proper names. Since I consider the English names of butterflies, for instance, to constitute proper names, I prefer to use initial capitals for these. Thus, the 'Speckled Wood' or 'Speckled Wood butterfly' to distinguish it from the speckled wood that a furniture maker might use to construct a table top of spotty finish, and from the ornamental butterfly a jeweller might shape from similar material—a speckled wood butterfly.

Where authors wish to style text, for effect, perhaps giving the text as a quotation followed by [sic] would be acceptable, for example 'A breeding experiment with the

Small Copper . . . [sic].—LEN WINOKUR, 55 Palmer Park Avenue, Reading, Berkshire RG6 1DP.

We have moved a long way back to the use of English names in our attempt to interest people in the study of insects who were previously put off by the use of Latin names. It seems essential therefore to make our meanings as clear as possible and if capitals help they should be used. I cannot accept the suggestion that they interrupt the flow of thought!

A report from a mainly botanical friend that she had seen several small blue butterflies on a flowery bank would have a completely different significance to a report of Small Blues by anyone with a knowledge of butterflies.

I keep the macro-moth records for Cheshire and some of the older ones are difficult to confirm. For instance there are two oldish records for 'Small Emerald' from people no longer with us. We have no wild clematis and my theory is that Little Emeralds became little emeralds which then became small emeralds and then completed the metamorphosis by becoming Small Emeralds, but of course we can never prove this!—C. I. RUTHERFORD, 'Longridge', Macclesfield Road, Alderley Edge, Cheshire SK9 7BL.

In response to the letter by Messrs Roberts & Else and the editor's reply, I consulted some twenty books and journal volumes in my library with the result that there is no consistency whatsoever in the use of capitals for English names of flora and fauna. On the whole entomologists in particular use capitals for all the English names of insects, but lower case only for plants and birds, although there are exceptions. In recent publications I see, for instance, green-veined white, Green-veined white, Green-veined White and (rather over the top!) Green-Veined White.

Capitalization, or otherwise, is generated and controlled by various sources: (1) the author; (2) his/her typist/keyboarder who may well have different ideas; (3) an editor; (4) the publisher. Publishers may have a house style which they are strict on or they may leave it to the discretion of the editor. The editor may have his own idiosyncratic usage and at least be consistent, or he may just not be bothered and accept whatever the author, or his typist, has submitted. A 5th possibility is now creeping in and that is the use of computers where whether a capital is used or not will depend on the initial input onto disc or memory for use in wordchecking or to call up whenever they are needed. For instance I have all the English names of species mentioned by Tutt in his *Practical hints for the field lepidopterist* on disc, all in lower case (except proper nouns) and there is no way I am going to change it!

Now from experience I know that manuscripts come in using all sorts of different formats and it is up to an editor to standardize usage. This is not always as simple as it may seem for how is an editor to know what capitalization was used in a quoted article and obscure journal published years ago? Unless he has access to a university or the British Library, and is prepared to spend the necessary time going down and searching, then he must take on trust the authors' quote. I believe almost all editors of scientific journals do the job on an unpaid voluntary basis and are busy in their own right. Just consider the time it may take to be constantly tracking down and verifying references. Far better to make up one's mind and stick to a regular system, such as only capitalizing the initial word, or using lower case only (except for proper nouns) in an article.—BRIAN O. C. GARDINER, 2 Highfield Avenue, Cambridge CB4 2AL.

CURRENT BENHS PUBLICATIONS

New British beetles: species not in Joy's practical handbook, by P. J. Hodge and R. A. Jones, 1995, 192 pp, paperback **£18** (£12 to members), + P&P **£2** (UK and overseas), hardback **£24** (£16 to members), + P&P **£2** (UK and overseas). There are over 650 British beetles not included in Norman Joy's *A practical handbook of British beetles*. Some of these are new arrivals from the Continent or further afield. Others have been confused or overlooked. Many groups have undergone revision and species have been 'split'. In order to make his handbook practical, Joy omitted many rare and doubtfully indigenous species. Several formerly rare species have recently increased and some doubtful species have been confirmed as occurring, or having once occurred in Britain. Many that were regarded as mere varieties or synonyms were also omitted by Joy, only to be reinstated later as good species. Many more modern keys have been published since Joy's book, but these are often scattered through sometimes obscure journals. *New British beetles* puts these changes into perspective, and offers the British coleopterist a new look at Joy's book, a reference to the current British fauna and the changes that have taken place in the last 63 years.

For each family, Joy's book is assessed, the most up-to-date and useful keywords are listed. For each 'new' beetle species, a short description and comparison with other species is followed by a list of journal and book references where the identification can be made and confirmed.

A modern taxonomic order of families is followed and the most up-to-date names available have been used. A full and comprehensive index allows complete cross-referencing to all specific, generic and family names used, including the many synonyms used by Joy and other workers.

A field guide to the smaller British Lepidoptera, ed. by A. M. Emmet, 2nd edn, revised and enlarged, 1988, 288 pp, paperback **£18** (£12 to members), + P&P **£1.50** (overseas £2.80), hardback **£22.50** (£15 to members), + P&P **£1.80** (overseas £2.80). This book is packed with information, much of it previously unpublished. It contains life histories of almost all of the 1500 'micro' species recorded from the British Isles. There is also an index of foodplants which refers the reader to all species known to feed on each plant; this makes it possible quickly to identify larvae found or to narrow the choice to a small number of species.

The second edition follows closely the format of its predecessor. The nomenclature has been brought up to date. Over 35 species added to the list since the first edition (1979) are included. Much more information about the life histories is incorporated.

British hoverflies: an illustrated identification guide, by Alan Stubbs, with colour plates by Steven Falk, reprinted 1993, 270 pp, 12 colour plates, hardback **£26** (£18 to members) + P&P **£2.80** (overseas £3.50). This is the most comprehensive book to be published on British hoverflies; 256 species are described and their identification is made easy by the extensive keys, which incorporate over 540 line drawings. The 12 superb colour plates show 263 specimens depicting 190 different species. Also contains a 16-page supplement which is also available separately at **£1.50** (£1 to members) + P&P **£0.30** (overseas £0.40).

The new aurelians: a centenary history of the British Entomological and Natural History Society, by M. J. James, 1973, 80 pp, 4 black and white plates, paperback **£1.50** (£1.00 to members) + P&P **£0.30** (overseas £0.40). This comprehensive history documents the formation of the then South London Entomological and Natural History Society in 1872, and the expansion and changes during the next 100 years.

Natural History of Buckingham Palace Garden, by D. McClintock *et al.*, 1963, *Proc. Trans. S. Lond. Ent. Nat. Hist. Soc.* 1963, part 2, 144 pp, 8 b/w plates. Results of a survey of the plants and animals of the gardens, 1960–1963, including all orders of insects, and *Monochroa hornigi* discovered there new to Britain.

Invertebrates in the landscape: invertebrate recording in site evaluation and countryside monitoring, ed. P. T. Harding, 1994, *Br. J. Ent. Nat. Hist.* 7 (Suppl. 1), 64 pp, paperback **£6** (£4 to members) + P&P **£0.30** (overseas £0.80). This special supplement to the journal contains 7 articles on invertebrate recording, site evaluation, monitoring countryside changes and invertebrate recording schemes.

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ANNOUNCEMENT

Public liability insurance.—It has come to the notice of the Society that some organizations issuing permits to enter their land to study insects are now asking that all those issued with such a permit should have public liability insurance, typically for two million pounds cover.

This may at first sight seem a somewhat daunting requirement. The Society has consulted its insurance brokers and it emerges that many members who have household insurance may already have public liability insurance included. It is suggested that if in doubt the policy document should be consulted. We discovered however that for a nominal sum the Society could extend its own public liability insurance to cover members of the Society while engaged on entomological pursuits. We have taken this option and are pleased to inform all members that they now have public liability cover of two million pounds while engaged on their own field work, research and entomological study in addition to such activities arranged by the Society. Typically this would give cover against claims by third parties for injury caused in the course of such pursuits. A copy of the schedule to the policy is available for inspection at Dinton Pastures.—A. J. Pickles, Hon. Treasurer, 2a Park Avenue, Lyngington, Hampshire SO41 9GX.

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Cover illustration: Pupa of the long-tailed blue, *Lampides boeticus* (L.) in teased wisteria flower; southern France. Photo: J. Feltwell.

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LADYBIRD POPULATION EXPLOSIONS

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This paper has been prompted by two recurring features of the last ten years, during which time we have co-ordinated a nation-wide survey of ladybirds in Britain. One involves the phone calls we receive from members of the media, almost every year in late July, or early August, asking us to comment on 'plagues of ladybirds' that have hit such-and-such a place. The second involves the commonest ladybird reminiscence of members of the public whom we have met while travelling around Britain either looking for, or talking about ladybirds: "the year that ladybirds went mad". Almost all are remembering the last 'great ladybird year'—1976; although a few also recall the preceding one, in 1959. Much has been written in the press, both local and national, about plagues of ladybirds, their causes and effects. A considerable proportion of these column inches is ill-informed. The impression we often get when talking to journalists is that their aim is to write something that is worth printing, even if it means making a proverbial mountain out of a molehill. In our opinion this is something of a shame, as regular and often exaggerated reports of natural phenomena, which are a little out of the ordinary, undoubtedly devalue reports of truly extraordinary natural phenomena. Ladybird 'plagues' provide an excellent example, for major ladybird population explosions are truly amazing events.

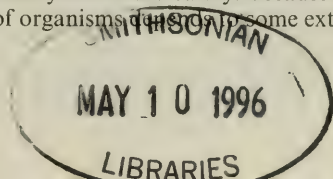
Ladybird plagues, whether widespread or local, are well-known natural phenomena. Records of swarms are scattered widely through the literature over the past century. In this paper we give an account of some of the reminiscences of the most recent major ladybird population explosion in Britain, that of 1976, put on record some of the sightings of ladybird swarms between 1984 and 1995, and comment on the causes and consequences of ladybird swarms.

THE 'GREAT LADYBIRD YEAR'—1976

The population explosion of ladybirds in 1976 was truly astounding. It extended across more or less the whole of England and Wales, and into some parts of southern Scotland. Exceptional numbers of ladybirds were also recorded in many parts of north-west Europe. The huge numbers of ladybirds were widely reported in newspapers, and on television and radio. In Appendix 1 are listed a small sample of the many reports and reminiscences of the plagues of ladybirds that year.

Rapid increases in the size of ladybird populations are due to a combination of factors rather than a single one. Principal among these are food availability, sunshine during the early summer, temperature during the middle of the summer, and the mildness of the preceding winter. Other factors, such as the abundance of parasitoids of ladybirds, also play a role. The way some of these factors fit together may be understood by considering the prevailing conditions prior to the population explosion in 1976.

The summers of both 1975 and 1976 were unusually warm and sunny. Because the extent of any change in the size of a population of organisms depends to some extent



on the base number of individuals, it is pertinent to start in the summer of 1975. This was a long warm summer, not exceptionally dry or hot, but with warmer temperatures than average and no significant long periods of bad weather. Both aphids, and the ladybirds that fed on them, did well. At least some species of ladybird such as the 2-spot *Adalia bipunctata* (L.), 7-spot *Coccinella septempunctata* L. and 10-spot *Adalia decempunctata* (L.) produced a partial second generation. Consequently, by the autumn of 1975, the populations of aphidophagous ladybirds that retired to their overwintering refuges were already larger than usual. The ensuing winter was remarkably mild, with a result that the winter mortality rate of ladybirds, which is usually in excess of 50%, was much lower than this figure, thereby increasing the number of ladybirds in the spring of 1976 still further, relative to the norm.

The spring of 1976 was not exceptional. If anything it was wetter and warmer than average. Aphid populations did well, reproducing rapidly on the lush plant growth, so that when ladybirds began to venture out in search of food, they found plentiful supplies. Cloudy weather in April and early May prevented most species from indulging in much mating early on, but when the sunny weather began in the middle of May, conditions were ideal. The ladybirds began to mate and oviposit at a very rapid rate. Larvae found plentiful supplies of aphids and, as temperatures rose to record levels, they fed up and completed their development in an abnormally short time for Britain. The hot sunny weather continued day after day through the rest of May and throughout June. By the end of June, the extent of the increase in ladybird numbers, in England, Wales and southern parts of Scotland, was already evident. They were everywhere. The species that showed the greatest increases were the aphidophagous generalists, such as the 7-spot, 2-spot and 14-spot *Propylea quattuordecimpunctata* (L.), but most other species did better than usual and 10-spot, 11-spot *Coccinella undecimpunctata* L. and cream-spot ladybird *Calvia quattuordecimguttata* (L.) were more abundant than we have seen them since.

This increase in the number of adult ladybirds, combined with the huge densities of ladybird larvae among aphid colonies (and high densities of other aphid predators and parasitoids) led to a dramatic crash in aphid numbers. Bluntly, the aphids were massacred. Even with their phenomenal reproductive rate, the aphids could not keep up with the losses due to predation. Worse still, the plants that the aphids were feeding upon were deteriorating rapidly under the scorching heat of that long hot summer.

By the middle of July, the aphids on the ladybirds' normal host plants had, more or less, been eaten out. The ladybirds then began to search for food elsewhere. They took to the air in huge numbers, billions upon billions of them. Some found food on unusual host plants, but the aphid populations there were soon decimated as well by the sheer weight of numbers of hungry ladybirds. Day after day, in the second half of July and on into August, the great swarms of ladybirds took to the air as the temperatures rose in the mornings. They flew hither and thither, partly being carried on the prevailing winds, until they came to the coast. Here they stopped, being brought to earth by the air currents at the coast and possibly by a reticence to cross wide expanses of water. Vast numbers were reported along all the coasts of England and Wales, with the south and east coasts being most affected.

The numbers of ladybirds were so legion by the end of July, that they drove holiday makers from the sea-side resorts. There were many reports of them 'stinging' or biting humans, although, in truth, all the starving beetles were doing was trying to find food. In their desperation, they tested the edibility of anything that might have been nutritious to them. They did not find humans palatable, but their attempts to

test whether we were edible left many people with little bite bumps as our own chemical defences reacted to the minute droplets of pre-digestive enzyme that ladybirds inject into their prey when they bite. Untold millions fell into the sea, or were washed off the coastal sands, muds and rocks as the tide rose and fell. Many were washed back onto the coast by ensuing tides, so that the tide-line appeared to comprise little but the corpses of ladybirds.

We once calculated the approximate number of ladybirds that would have been in the tide-lines along the southern and eastern coasts of Britain on a single day in late July 1976. Assuming all to have been one of our larger species, the 7-spot (which they were not), a conservative estimate gives a figure of some 23 654 400 000 ladybirds (estimated by counting the number of 7-spots in 15 200 mm sections of tideline and multiplied up by the amount of suitable coastline between Land's End and the east coast border between England and Scotland). This figure is difficult to comprehend, but it is about four times the current human population of the Earth and, of course, this was just the ladybirds in the tide-lines on a single day. It does not include any of those that stayed on land, or those that were washed out to sea, or those that were eaten by other starving ladybirds or other predators, or those that were killed on the roads or elsewhere by the devices of man. Not surprisingly, a crash in ladybird populations followed.

From this description, it may be seen that a whole sequence of conditions are involved in the run up to one of the great ladybird explosions: favourable conditions the previous year, a mild winter, plenty of food in the spring, a single and synchronized start to the reproductive season brought on by a sharp improvement in sunshine hours, and hot and sunny weather in the summer to promote mating, egg laying and rapid larval development. It is not often that all these conditions fall together, with the result that widespread ladybird explosions are rare in Britain, occurring, on average, about once every 15 years. We seem to be overdue for one now.

RECORDS OF LADYBIRD 'PLAGUES' IN BRITAIN: 1984-1994

During the Cambridge Ladybird Survey, we have received many reports of abnormal numbers of ladybirds being seen together. A few samples of these records are given in Appendix 2, together with notes on the observations culled from the reports sent in by recorders. The records come from two main periods of the year: the early spring, and what might be termed high summer, covering the last two weeks of July and the first two weeks of August.

The reasons that large numbers of ladybirds tend to be observed together in these two periods are different. Many species of ladybird aggregate together to pass the winter. Large numbers of individuals may find the same sheltered area out of the worst of the winter weather. When these first venture out from their overwintering sites they will often do so en masse. On bright spring days, ladybirds will often sun themselves to warm up. This means that large numbers will be seen in exposed positions sunning themselves before moving off to forage for food. Most of these spring records involve the 7-spot ladybird which tends to overwinter close to the ground, or occasionally underground, often in large aggregations. On leaving its overwintering sites, this species will first climb low spring vegetation to sun itself, to drink dew or rain drops to replenish its fluid reserves, and to look for whatever food it can find. Here, on low-growing green leaves, it is very obvious and easily seen.

It is in high summer that the largest numbers of ladybirds come together and sometimes form what may realistically be called swarms. At this time of year, the

adult population usually reaches its maximum. The new generation of adults has not yet begun to diminish because of the perils of life: lack of food, predators, parasites, disease, adverse climate or pure accident. The main activity for these young adults is to feed up for the winter. In many years, aphid populations decline dramatically in high summer, partly as a result of predation pressure and partly because their host plants are deteriorating. The consequence is that in areas where food has become scarce, ladybirds will often take to the air on hot summer days, to seek food elsewhere. The direction of ladybird flight is not entirely active. While ladybirds can fly in a direct way, when they take to the air on hot days their flight is aided by thermals. These thermals may take the ladybirds up hundreds, even thousands, of metres into the sky. At high altitude, they are then blown by the prevailing winds, often for many miles. Due to the nature of thermals in some places, and particularly along the coast, large numbers of these high-flying ladybirds may be brought back to earth in the same place, producing very high population concentrations. The prevailing south-westerly winds are thus responsible for the fact that swarms are more often recorded from the east coast of England than any other region.

THE NECESSITY FOR SYNCHRONIZED REPRODUCTION

Most of the factors that appear to be prerequisites for ladybird population explosions are easily understood. Good climatic conditions and high food availability the previous year lead to an increase in the number of ladybirds that feed up well prior to overwintering. The high fat reserves of these ladybirds, and/or a mild winter, will result in reduced mortality during this critical period. Conditions under which aphids flourish in the spring will lead to good supplies of food for the ladybirds when they leave their overwinter sites and begin feeding and reproducing. Warm sunny weather in late spring and early summer will induce high mating frequencies and rapid oviposition. The high aphid density and warm weather will allow rapid larval development and reduce the level of larval cannibalism. All this is intuitively sensible. However, the reason why a single and synchronized start to the ladybird reproductive season is crucial, is not so obvious. It is not easy to see why a somewhat staggered start to the reproductive season would not produce even greater numbers if the start of the season were extended earlier. Surely, one might expect that a staggered start would produce greater numbers because, at least in the early part of the season when aphid numbers are just building up, survival of larvae would not be reduced too much by competition between them.

Three factors appear to be important in reducing the benefit of an early and staggered start to the ladybird reproductive season. First, any significant predation early in the spring may greatly reduce the eventual numbers of aphids produced later in the year. Because aphids have such a phenomenal reproductive potential within a single year, the death of a single female in April may reduce the July population by many millions. Second, as female ladybirds are reluctant to oviposit on plants which are already inhabited by ladybird larvae (Hemptinne *et al.*, 1992), stretching the reproductive season will reduce the number of suitable oviposition sites for females later in the season. Third, and perhaps most crucially, parasitoids of ladybirds may benefit from the presence of immature stages over a protracted period. Monitoring of population demography in 1990 showed the influence that predators and parasitoids may have in years when the reproductive period for ladybirds is staggered.

Records in late 1989 indicated that numbers of several of the generalist species of ladybird were at their highest levels since 1976. The winter of 1989/90 was

exceptionally mild, and winter mortality was low. In East Anglia the 7-spot ladybird was about 20 times more common in the spring of 1990 than it had been in the spring of 1989. Similar reports of unusually large numbers of ladybirds came in from most parts of the country. In May, reports of exceptionally large numbers of aphids were published in the national press. Conditions appeared ripe for a major ladybird population explosion. However, it never materialized on a wide scale.

The winter of 1989/1990 was not only mild, it ended early, producing an abnormally early spring (for the second year running). Ladybirds of many species, including the aphidophagous generalists, began mating and ovipositing more than a month earlier than average. The first 7-spot matings were recorded on 26th February in 1990, compared to an earliest of 21 April during the years 1985 to 1988 inclusive. The progeny of this early bout of reproduction hatched, and because of the mildness of the winter, they found aphid food as the aphids had also begun to reproduce earlier than usual. Larval development was slower than usual because of the lower average temperatures during March and April 1990, compared to May and June in most years when larvae would normally be feeding up. However, the first pupae were recorded in the last week of April 1990, and the first newly eclosed adult appeared on 8th May. By this time, eggs and young larvae were very plentiful, and conditions for their development appeared ideal as aphid population densities were high.

So why did these good early signs not result in the expected population explosion? There were several contributory factors. Some sharp late frosts may have caused some mortality: ladybirds are known to be particularly susceptible to hard early and late frosts. The dullest June, according to records at Heathrow Airport Meteorological Station, since records began there in 1957, must also have slowed down the reproductive rate of many ladybirds. But neither of these climatic factors could account for the decline in numbers of ladybirds that occurred in late June. Surveys at a number of sites in southern England in May and June showed egg and larval densities to be very high and aphids to be plentiful still. The density of ladybird pupae on nettle-beds at Box Hill, Surrey, in late June, was the highest we have ever seen, with almost every nettle leaf having at least one pupa on it. One leaf had 13, and one single nettle stem had some 126 final instar larvae, pre-pupae, pupae and newly emerged adults upon it. One 550 square metre nettle-bed, in the grounds of Juniper Hall, near Dorking, Surrey supported a population of close on one hundred thousand 7-spots, 2-spots, 10-spots and 14-spots. By this time there were already indications of some cannibalism among the ladybirds as aphid populations began to decline under the burden of predation. But the main reason for the fact that excessive numbers of adult ladybirds never materialized is that the vast majority of pupae never hatched. They were hit by one main predator and two species of parasitoid.

The predator was the bug *Deraeocoris ruber* (L.). Both the nymphs and adults of this bug are predatory, usually feeding on a variety of types of prey. However, in June 1990 they appeared to be specializing on ladybird pupae, probably as a result of the abundance of the pupae and their relative defencelessness against this predator. While it is impossible to give an accurate estimate of the mortality level of ladybird pupae due to attacks by this bug, because of the difficulty of detecting attack marks, the level in June 1990 was certainly over 10% and may have been much higher.

The two parasitoids were the phorid flies *Phalacrotophora fasciata* (Fall.) and *P. berlinensis* Schmitz. These flies attack and kill ladybird pre-pupae and pupae. In 1990, about 60% of 2-spots and 75% of 7-spots were attacked (Disney *et al.*, 1994). These are the highest parasitoid rates of ladybird pupae by phorids that have been

recorded anywhere. The reason that the rate was so high in 1990 appears to be that the progeny of the ladybirds that bred early (in February, March and April) provided the phorids with hosts early in the year, so that they were able to produce an extra generation. The phorids that developed inside ladybird pupae in June/July in such large numbers were the grand-children of those that had overwintered.

A staggered reproductive period thus may allow parasitoids of ladybirds to increase their numbers by increasing the number of generations, to the eventual detriment of their hosts.

Other predators, including later-developing ladybird larvae and lacewing larvae that were running short of aphid food, undoubtedly accounted for still more pupae. In the end, given its early promise, 1990 ended up as a very disappointing year for ladybirds.

To our list of conditions for ladybird population explosions, we must then add that predators and parasitoids of ladybirds must not be abnormally common.

WHICH SPECIES OF LADYBIRDS ARE PRONE TO POPULATION EXPLOSIONS?

The ladybird that is most often recorded in swarms or plagues in Britain is the 7-spot ladybird. This is partly because it is a large and obvious species, and so large increases in its numbers are very noticeable. The 7-spot is also the most abundant British species of ladybird, and so starts from a higher population density base when it does increase in number rapidly. However, the 7-spot is not the only British ladybird that exhibits very rapid population increases. All the aphidophagous species of ladybird that do not exhibit strong host-plant preferences may increase in number spectacularly over a single reproductive season. These species include the 7-spot, 2-spot, 10-spot, 11-spot and 14-spot ladybirds, the cream-spot and Adonis' ladybird *Adonia variegata* (Goeze). All these species exhibit great fluctuations in numbers, although the increases in numbers of Adonis' ladybird and the cream-spot ladybird are rarely noticed as their usual densities are relatively low. All seven of these species lay eggs in clutches on a wide variety of host plants, as long as suitable aphid prey is available. This means that these species can respond to rapid increases in aphid numbers. Furthermore, they can also respond to declines in aphid colonies, which are notoriously ephemeral, by flying to other plant species to seek alternative aphids.

It is pertinent not only to say which species do show large-scale changes in population size, but also to explain why other species do not. In the case of the four species of British ladybird that are not predatory, the explanation of their relative stability in population size is simply a consequence of a relatively consistent food supply. These species, the mildew-feeding 16-spot *Tytthaspis sedecimpunctata* (L.), 22-spot *Thea vigintiduopunctata* (L.) and orange *Halyzia sedecimguttata* (L.) ladybirds and the leaf-eating 24-spot ladybird *Subcoccinella vigintiquatuorpunktata* (L.), are much less subject to the vagaries of the weather than the predatory species. For example, we have monitored orange ladybirds at Box Hill each year since 1987. The timing of the first reported mating of the year has only varied by eight days (9–16 June) over nine summers (1987–1995). Furthermore, the rate of larval development in these species is somewhat slower than that of the aphid-eating species, presumably because mildews and leaves are less nutritious than aphids.

The three British coccid-feeding ladybirds, the heather ladybird *Chilocorus bipustulatus* (L.), the kidney-spot ladybird *Chilocorus renipustulatus* (Scriba), and the pine ladybird *Exochomus quadripustulatus* (L.), do not produce massive

population explosions. This is probably a consequence of three factors. First, their preferred prey, coccids (scale insects) do not increase their numbers as fast as do many species of aphid. Second, there are less species of coccid than aphid, so that should one species of coccid-feeding ladybird increase in number so substantially that it ate out one species of coccid, it would have less in the way of potential alternative types of principal prey (prey that promotes oviposition and allows full larval development, Hodek, 1973). Third, and perhaps most significantly, these three species of ladybird all lay their eggs in batches of just one to three eggs underneath coccids, or adelgids in the case of the pine ladybird, or occasionally in bark crevices close to them. Ovipositing in this way, these species do not have the scope for reacting to particularly favourable conditions as fast as some of the aphid-feeders which may lay batches of several dozen, or in the case of the 7-spot, over a hundred eggs in a single clutch if conditions are right.

Aphidophagous host-plant-specialist ladybirds also rarely produce massive population explosions on a wide scale. Here the reason is again probably related to a lack of a range of different principal foods that would allow these species to maintain a high reproductive output once one prey species began to decline as a result of increased ladybird numbers. In addition, several of the host-plant specialists seem to show obligate univoltinism. For example, in Britain, both the eyed *Anatis ocellata* (L.) and striped *Mysia oblongoguttata* (L.) ladybirds apparently have a requirement of passing through a dormant period during the winter before they will begin to reproduce.

Having said that species other than the aphidophagous generalists do not produce population explosions on a wide scale, we have had records of local explosions for several of these species. These records include abnormally high numbers of larch ladybirds *Aphidecta obliterated* (L.) in conifer plantations in Suffolk and Perthshire during 1986 and 1989 respectively; very large numbers of pine ladybirds on Scots pines, at Lakenheath Warren and the King's Forest, Suffolk, in both 1985 and 1989; and exceptional numbers of hieroglyphic ladybirds *Coccinella hieroglyphica* L. at Chobham Common in 1985 and 1989. In each case the increase in numbers was probably a consequence of abnormally high local prey densities. In the cases of the increases in larch ladybirds and pine ladybirds, we know this to be the case, high numbers of adelgids being reported on conifers in each instance. In the case of the increases in hieroglyphic ladybirds, we assume that the heather leaf-beetle *Lochmaea suturalis* (Thomson, C. G.), whose larvae appear to be the main food of the hieroglyphic ladybird, must have been having bumper years, although, as we had not at that time recognized the association between these two beetles, we were not monitoring heather leaf-beetle numbers in 1985 or 1989.

CONCLUSION

Dramatic increases in ladybird population numbers are essentially the product of the interaction of three groups of organism: aphids, ladybirds, and the predators, parasitoids and parasites of ladybirds. These interactions are in turn dependent on climatic factors. Relatively minor fluctuations in climate, or in the interactions between these groups at one time of year, can have a greatly amplified effect later in the season. This means that predicting ladybird population explosions is very uncertain, as we found in 1990. However, the past history of reported explosions suggests that, although unpredictable, these events do occur with surprising regularity. For example, if 1996 does not produce a population explosion, the period 1977–1996 will be the longest period without an explosion this century.

ACKNOWLEDGEMENTS

We wish to acknowledge all the recorders of the Cambridge Ladybird Survey, and members of the local and national media who sent in records of ladybird swarms, or brought such incidences to our attention in other ways.

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APPENDIX 1.

ANECDOTAL ACCOUNTS DURING THE LADYBIRD POPULATION EXPLOSION OF 1976

“In 1976, on a hot summer’s day, I had occasion to visit an area between Elvedon and Barnham, about one mile south of Thetford, the exact spot being known as the Gorse Trading Estate. I must have been exceptionally lucky, or unlucky, as one of these ‘swarms’ had landed on the road passing through the estate, along which I had to travel. I can remember very clearly seeing the whole road covered in thousands of red ladybirds and the area involved must have been at least 18ft × 20ft. Unfortunately, I had to pass over them.” (Jack Easter)

“In the summer of 1976, my two daughters, who were then 15 and 12 respectively, had to curtail one of their usual summer activities, swimming at Ruislip Lido (Middlesex), because of ladybirds. They did not like going into the water because the surface was covered with millions and millions of ladybirds. The Lido has an artificial beach for the bathers, and the sand was often also thick with ladybirds. I do not know what type of ladybirds they were. Although my daughters are both grown up now, and both have children of their own, I know they still remember 1976, as I have heard them tell their children the story of when ‘ladybirds stopped play!’” (Sally Wheatley)

“In 1976 we had a plague of ladybirds here in Leeds. They were all over the place, on every pavement, and at times it was impossible to take a step without treading on them.” (Frank Haiste)

“During the plague of 1976, while on holiday at Minster, in Sheppey, everywhere one put one’s foot, it was thick with ladybirds. The posts along the sea-front holding up the chains were completely smothered.” (Brenda Madgwick)

“I remember the ladybirds of 1976 well. I then lived on the Norfolk coast, and used to take my dog for a walk along the sand each day. In 1976, for what must have been about six weeks, we daily had the company of millions and millions of ladybirds along the beach. The numbers appeared to fluctuate from day to day, but I guess the zenith was about the end of July, or perhaps early August. The numbers on the beach were quite extraordinary, and once the day got hot, many thousands were airborne. Eventually, we began taking our walk early in the morning so as to avoid the ladybirds when they were in flight. Remarkably, after this had been going on for many weeks, one day the whole lot just disappeared. I have no idea why, because, as far as I could see, the weather had not changed to any appreciable extent. One other

thing may be of interest. For most of the period when the ladybirds were about, the tide-line was solid with the corpses of dead ladybirds. I presume that these unfortunates had just drowned and been washed up." (John Trent)

"Beating trees and shrubs for moth larvae became a futile occupation in the latter part of the summer in 1976. After just one or two taps, the beating tray contained nothing but a seething mass of ladybirds. In Surrey, they were on almost every type of tree, with birch, oak, and sallow perhaps being the worst. Several species were present. *Coccinella septempunctata* was by far the most abundant, but several other species were also very common. These included *Adalia bipunctata*, *Adalia decempunctata*, *Propylea quattuordecimpunctata*, *Coccinella undecimpunctata* and *Calvia quattuordecimguttata* which was particularly common on the birches. In over 25 years of moth collecting I cannot remember anything else like it. For several weeks, I have entered in my notebook for 1976, 'Ladybirds stopped work!.' (Stephen Moore)

"In the summer of 1976, on a humid and very hot night, I was on duty in the boiler house of the Maelor Hospital, Wrexham. The air was heavy with greenfly. A light breeze brought them in their millions causing them to sway one way, then the other. Huge numbers were drawn into the one boiler that was on stream. With a long brush I swept and shovelled them away throughout the night, until a dawn breeze wafted them away. The next night, or the one following, the same conditions applied, but this time it was the ladybirds that came, again in their millions, covering everything." (anon.)

"I have just heard you on the radio talking about ladybirds biting people when they are starving hungry. I was most interested to hear what you had to say, because I can confirm every word from personal experience. It was one year, back in the seventies, and from what you say, it sounds like 1976, in the school holidays. I had three young boys to amuse for six weeks, and because it was such a nice summer, every day seemed to be sunny, I promised the boys that I would take them to the seaside. I guess the first attempt was about the middle of July. We went off to Brighton, getting to the beach about 11 o'clock. By ten minutes later we were back in the car. Both Robert, my youngest, and I had several little bumps on our arms and legs from bites from ladybirds. They were absolutely everywhere, and thousands were in the air. They landed on us all the time, and when we got back into the car, we had to spend quite a while taking them off each other and out of our hair.

It was quite possible to feel when one bit us. It was a slight sort of pricking sensation, not much more than a light tickle, but after a minute or two, it began to sting and itch, so that it was quite unpleasant. We tried to do a few things around Brighton, away from the sea-front, which was pretty unpopulated because of the ladybird hordes, and ended up going to the pictures in the afternoon. Really a rather abortive day, but I do not think I have ever seen so many of one kind of animal together as I did that day.

In the next week, still trying to keep my promise to the boys, we tried again twice, once going to a spot near Hastings, and then trying the east coast at Frinton, but it was more or less the same story each time. In the end we gave up. I still like ladybirds as much as ever, but had long resented the fact that these objects of my affections had turned on me that year. Now that I know from your broadcast that they were starving to death, I can forgive those that took a bite out of me, and indeed, I feel rather sorry for them. It's a shame that they did not get anything nutritious out of me." (Angela Snow)

"The ladybird swarms of 1976 were not confined to the land. On occasion, my daughter and her husband reported sailing through seas that were completely covered in ladybirds." (Bridget Chadwick)

"On 11 July 1976, I was piloting a light aircraft about 20 miles south of Manchester at 1500 ft when I flew into a large swarm of ladybirds. It was like flying into bird shot. I put down at East Midlands airport to clean the canopy and check the air intakes. There were hundreds of the little creatures, alive, crawling all over the plane." (Signature illegible)

APPENDIX 2.

SOME OBSERVATIONS OF SWARMS OR EXCEPTIONAL NUMBERS OF LADYBIRDS RECORDED DURING THE CAMBRIDGE LADYBIRD SURVEY

11 June 1984. "Very large numbers of many species of ladybird on trees and shrubs near Santon Downham. Most were on broom, maple and Scots pine. Species included: *Anatis ocellata*, *Exochomus quadripustulatus*, *Adalia bipunctata*, *Coccinella septempunctata*, *Adalia decempunctata*, *Calvia quattuordecimguttata* and *Harmonia quadripunctata*, in descending order of abundance. Aphids were very abundant on the trees and many of the ladybirds were mating." (Peter Kearns and Simon Albrecht)

February 1985. "On Lakenheath Warren, exceptional numbers of pine ladybirds *Exochomus quadripustulatus* sunning themselves on pine trees. The majority were sitting still on pine cones in the sun. Some pine cones had as many as 30 ladybirds on them. Everywhere we looked, the pine trees had these ladybirds. As we walked for several miles through pine woods, the number of pine ladybirds must have run into many millions." (Heather Ireland)

May 1987. "Along the banks of the River Aire, West Yorkshire, thousands and thousands of ladybirds on the undergrowth and particularly on nettles." (Hazel Dunning)

Mid-May 1989. "A large drift of ladybirds appeared on a beach at Bude, Cornwall." (Ian Cobbledich)

June 1989. "On the ferry from Harwich to Esbjerg, Denmark, the boat was covered in thousands of ladybirds. Many of them were dead." (Mrs G. Stoller)

4 August 1989. "Between 15.30 and 16.15 hrs a mass migration of *Coccinella septempunctata* took place, flying from east to west at altitudes from ground level up to 50–60 ft at Little Stambridge Hall, near Rochford, Essex (TQ887919). Estimated to have involved many hundreds." (Observer—L. Watts, reported by Roger Payne)

An extract from the 1989 *Annual report of the Norfolk Ornithologists Association*, communication by Alan Paine read as follows. "Ladybird: swarms on 20 July, flying east from 11 a.m. to 1 p.m. and again later in the afternoon".

Three years later I received a pair of linked reports from the same source. The 1992 *Norfolk Ornithologists Association Report*, again sent in by Alan Paine, described events that took place at Holme, Norfolk. "One of the largest swarms of hoverflies that I have ever seen started to arrive on 31 July and continued the next day until 1.30 p.m., in ever-increasing numbers, all flying non-stop down a south-westerly wind. Together with ladybirds, the mixed hordes meant a retreat to the HBO Centre

with door and windows firmly shut! 'Hundreds' even reached North Sea oil-rigs on 16 August and again 12 September."

And later, "Large swarms of 7-spot ladybird downwind (with hoverflies) on 31 July reaching a peak next day between 2 and 4.30 p.m., when flower spikes of marram grass were festooned. A few continued to arrive on 2 August and there were swarms everywhere. Some were so hungry they were eating hoverflies and their dead companions".

"The summer of 1989 was spectacular for ladybirds at Bettystown, near the mouth of the river Boyne, on the east coast of Ireland. There were literally thousands to be seen each day on the local golf course, and nobody locally could remember a more prolific year. In the memories of my children, 1989 will always be referred to as the ladybird summer." (Hugh Leech)

In the spring of 1990, we received reports of exceptional numbers of ladybirds from many parts of Britain. To give just a few examples: F. M. Unsworth reported from Hexham, Northumberland, "large numbers of ladybirds on open peat of previously burned moorland"; H. Bremner, from Biggin Hill, Kent, "thousands of ladybirds in my garden"; L. Owen, from Kirriemuir, Angus, noted "a great many ladybirds, all 7-spots, on our lawn"; C. Hurcombe, from Caversham, Berks., "I have a plague of ladybirds in my garden"; from Stamford Bridge, H. Goodwin reported "large numbers in garden, rose stems encrusted with the beetles, clusters of ladybirds hidden just underneath the topsoil throughout the front and back gardens"; and from Catherine Brown in Wigan, "last weekend thousands of ladybirds were basking in the sunshine of our south facing garden".

17 March 1990. "While on a walk on the North York Moors, I came across a swarm of ladybirds. They were in dense clusters all over the ground between low stunted heather bushes (*Calluna vulgaris*) no more than 4 ins in height." (J. Salter)

17 April 1990. "Astounding numbers of ladybirds all over the garden and surrounding area (alt. 750 feet) this spring. Location: Far-Ben, Dunsmore, Wendover, Bucks." (V. Piery)

Late July 1990. "A large plague of ladybirds, mainly 7-spots, at Weston-Super-Mare." (P. Lenin). This swarm was noteworthy enough to be mentioned in the *Daily Mail*.

Summer 1991. "Noticed 1000+ 7-spot ladybirds gathering on a concrete wall adjacent to the River Thames at Cliffe Marshes, Kent. Many were mating. A kestrel was sitting on the wall, possibly eating ladybirds." (Dr L. Love)

8.00 p.m., 7 August 1991. "Rushen Gout, North of Aust (ST582906): many thousands of 7-spots on the nationally scarce grass *Alopecurus bulbosus* on grazed saltmarsh beside the River Severn." (M. Kitchen)

21 April 1992. At Leigh (TQ5646): "Literally hundreds of 2-spot ladybirds in every crack and crevice on a telegraph pole, in the middle of a field. They appeared from about one foot off the ground, to a height as far as I could observe. One week later they had all disappeared." (Vic Measday)

Several recorders sent me the same cutting from the *Eastern Daily Press* of 28 July 1994. Under the headline "Basher barnee bee army breezes in. Holidaymakers took to their heels yesterday as a red army blew into town. The Norfolk seaside town of Wells was so over-run by an invasion of ladybirds that tourists and locals were driven inside to escape. In places the town looked prepared for a royal visit—with an

unblemished carpet of red bishee barnee bees (as ladybirds are called locally) covering the roads and pavements. Barry Franklin, from Derby, said: 'I've never seen anything like it. They're all over the place, you just can't escape them. I don't usually mind ladybirds, but this is just making me uncomfortable'. And Jane Hood, from Clacton, said: 'My two young children are sitting in the car because they're frightened, and we're about to get away from Wells'."

Late July–early August 1994. "2–3 mile stretch on the coast between Heacham and Hunstanton. Thousands flying everywhere. On a 16-metre long section of sea wall, 13 000, mainly 7-spots, were counted." (Richard Rockcliffe)

5 August 1994. At Hunstanton: "I parked my car near the Old Lighthouse. On the ground were very many stationary 7-spot ladybirds (20–40 per square foot of turf or tarmac). Later, walking back towards town, I found ladybirds as thick as chipping on a newly dressed road. There could have been a million." (H. Shelton)

From *The Bristol Evening Post*, 9 August 1994. "A village near Bristol has been invaded by a swarm of ladybirds. The streets of Severn Beach are running red with tens of thousands of the insects. Villagers said it is the largest invasion since the drought year in 1976."

Alan Paine reported reading, on the board of sightings at the Landguard Nature Reserve/Bird Observatory for 14 August 1994: "Huge arrival of ladybirds". No indication of numbers or species was given.

In addition we received these reports of events before the Survey.

"I remember visiting our small coastal town of Southwold when I was five years old (1964), and the car, us, and all in this one spot by the sea were covered with ladybirds." (Carmela Robinson).

May/June 1982. "While on holiday in France, at Sables d'Or, Brittany, we saw at the edge of the sea, coming in on the tide and walking up the beach, rows and rows of ladybirds. They were on the water being washed in, and many had managed to walk quite a distance up the beach (opposite to the lemming syndrome)." (Gillian Siddy)

SHORT COMMUNICATION

Leiophora (Arrhinomyia) innoxia (Meigen) (Diptera: Tachinidae) parasitizing the ground-hopper *Tetrix undulata* (Sowerby) (Orthoptera: Tetrigidae).—I collected an adult female *Tetrix undulata* (Sowerby) and a larva on Arbrook Common, Esher, Surrey on 6.v.1992 and retained them isolated in individual containers with a view to photography. The female died c. 10.v and a dipterous puparium was noted in the container shortly afterwards. A male *Leiophora innoxia* Meigen emerged 25.v.1992. No exit hole was visible; the neck membrane was intact. Presumably the parasite emerged from under the pronotal extension above the abdomen. The similarity of this structure to a beetle's elytra may have some bearing on why a parasitoid previously recorded from the flea beetles *Halticus* should attack a ground-hopper.—R. W. J. UFFEN, 4 Mardley Avenue, Welwyn, Hertfordshire AL6 0UD.

**KRENOPSECTRA NOHEDENSIS N. SP. AND THE PUPAL EXUVIAE
OF MICROPSECTRA AUVERGNENSIS REISS (DIPTERA:
CHIRONOMIDAE) FROM THE EASTERN PYRENEES**

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A hydrobiological programme is being undertaken in the natural reserve of Nohedes, eastern French Pyrenees: ecosystem analysis and biological quality assessment are the main aims. An extensive collection of invertebrates from the upper stream of the Nohedes valley has provided two interesting Tanytarsini, one a new *Krenopsectra*, and the other, the unknown pupa of an uncommon montane *Micropsectra*. Both species have been collected in other nearby tributary streams of the Tet River.

Terminology follows that of Sæther (1980), except that the flattened setae on the pupa are referred to as taeniae (Langton & Armitage, 1995). Abbreviations used: AR antennal ratio (ratio of length of apical flagellomere divided by the combined length of the more basal flagellomeres); LR leg ratio (ratio of metatarsus length to tibial length); BR bristle ratio (ratio of longest seta of tarsal segment 1 divided by the minimum width of tarsal segment 1), and VR venarum ratio (ratio of length of Cu to length of M).

***Krenopsectra nohedensis* n. sp.**

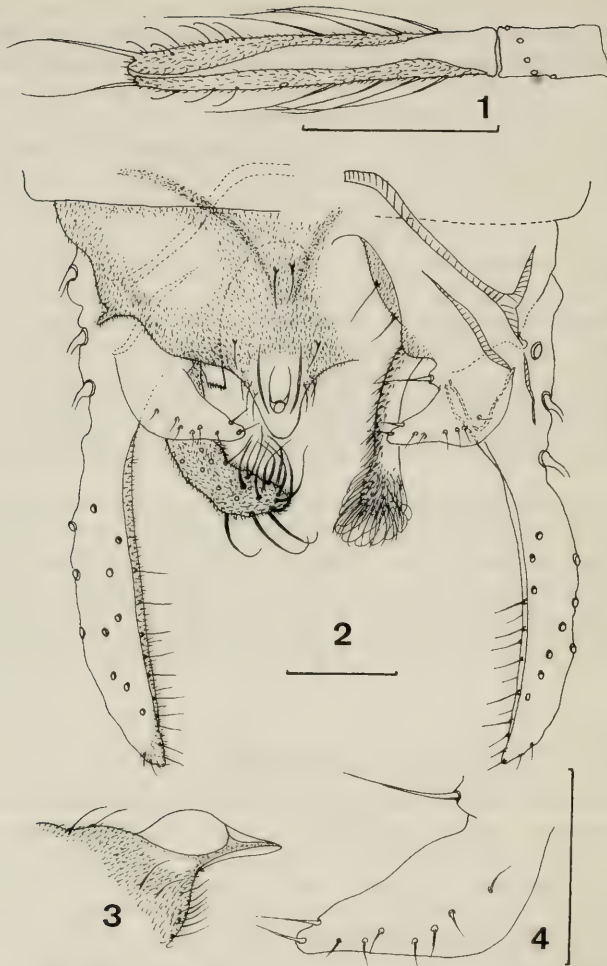
Material: Holotype 1 pharate adult male, 6.vi.1993, upper stream of Nohedes valley, eastern French Pyrenees, 1600 m asl. Paratypes 14 males, 12 pharate adult males, 6 females, 5 pharate adult females, same data as holotype. Holotype deposited in Zoologische Staatssammlung, Munich; paratypes in the authors' collection.

Adult male ($n=7$), length from anterior margin of thorax to apex of gonocoxites 3.0–3.25 mm. Yellowish, head and scutum slightly greenish, thorax brownish, abdominal segments VII and VIII darkened. Scutellum very prominent.

Head. Antenna 870–885 μm long; penultimate and ultimate flagellomeres as in Fig. 1; ultimate flagellomere 163–170 μm long, with a wide groove extending to its base, bearing at apex sensilla chaetica and 2 setae 54–59 μm long; AR 0.42–0.48. Coronal and frontal setae replaced by numerous microtrichia; inner verticals 12–14; outer verticals 2–3; postoculars 2–3. Clypeus with 16–18 setae arranged generally in 4 rows. Lengths of palp segments: 43, 46, 133, 123, 132 μm ; sensilla clavata absent.

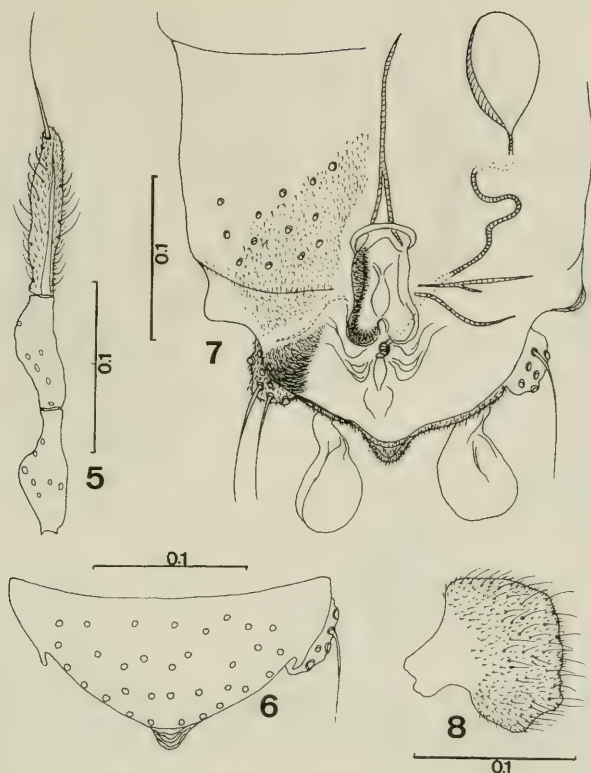
Thorax. Halteres transparent, densely covered with microtrichia and bearing 5–6 short uniserial setae. Scutellum pubescent with 8–10 setae in a single row. Anteprenotals absent; acrostichals 19–20 (biserial); dorsocentrals 14–15; prealars and supraalars 0. Wing length 1.95–2.05 mm; membrane with dense macrotrichia 35–37 μm long; numerous setae on veins except M which is bare; anal lobe and squama absent; 2 sensilla campaniformia; VR = 1.30–1.32. Foreleg LR 1.34–1.38, BR 2.8–3.0.

Hypopygium as in Fig. 2. Tergite IX with 1–2 central setae and 12–16 basal setae, all subequal in size (18–22 μm long). Anal point laterally as in Fig. 3; 32–34 μm long,



Figs 1-4. *Krenopsectra nohedensis* n.sp. male imago. 1, penultimate and ultimate flagellomeres; 2, hypopygium in dorsal view; 3, anal point in lateral view; 4, superior volsella. Scale = 0.05 mm.

31-34 μm wide at base; broad and rounded apically and reaching the apex of the superior volsella. Superior volsella (Fig. 4), with 4-6 short setae dorsally and 2, rarely 1, stout setae apically; inner basal margin with 1 very stout seta 36-40 μm long. Median volsella 93-98 μm long; slightly curved and reaching tip of inferior volsella; inner margin with fine setae increasing distally into a brush containing 6-9 inwardly directed lamellae. Inferior volsella 94-98 μm long, 17-19 μm wide; gradually curved distally. Gonocoxite with 3-4 setae laterobasally; medially slightly swollen and



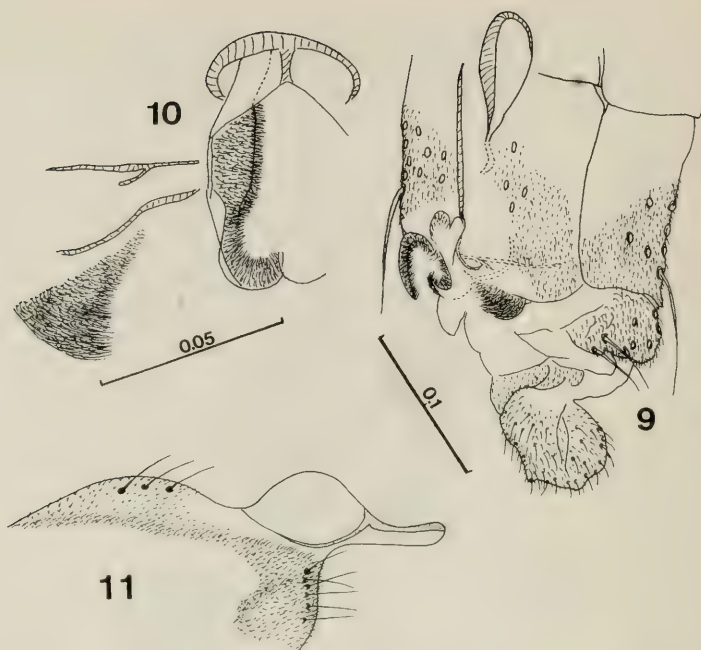
Figs 5-8. *Krenopsectra nohedensis* n.sp. female imago. 5, three last flagellomeres; 6, tergite IX in dorsal view; 7, genitalia in ventral view; 8, cercus in lateral view. Scales in mm.

bearing 2-3 (usually 2) setae on inner margin. Gonostylus 144-150 μm long; moderately narrowed toward tip; internally over apical half with 2 rows of 6-7 projecting setae. Gonocoxite 0.60-0.65 length of gonostylus. HV (ratio of body length measured as above to gonostylus length $\times 10$) = 2.05-2.15.

Adult female ($n = 5$). Length 2.9-3.1 mm. Coloration and morphology of thorax as in male.

Head. Inner verticals 14-15; outer verticals 3; postoculars 3; coronals and frontals 0. Lengths of palp segments: 45, 29, 91, 96, 120 μm ; sensilla clavata 0. Antenna 348-354 μm long; AR = 0.42-0.44; last 3 flagellomeres as in Fig. 5; ultimate flagellomere 103-106 μm long, with sensilla chaetica and 1 apical seta 60-63 μm long. Clypeus with 20-21 setae arranged in general in 5 rows (7, 5, 4, 2, 2).

Thorax. Anteprenotals 0; acrostichals 20-21; dorsocentrals 22-23; prealars 3; scutellars 10 in a single row. Halteres transparent, 290-310 μm long, with 5 short setae. Wing 2.15-2.25 mm long; membrane with dense macrotrichia 51-54 μm long; anal lobe and squama absent; numerous setae on veins except on M; sensilla campaniformia 2; VR = 1.30-1.32. Foreleg LR 1.23-1.28, BR 3.10-3.20.



Figs 9 & 10. *Krenopsectra nohedensis* n.sp. female imago. 9, genitalia in lateral view; 10, lobes of gonapophysis VIII, dorsomesal and ventrolateral lobes. Scales in mm.

Fig. 11. *Micropsectra auvergnensis* Reiss male imago: anal point in lateral view.

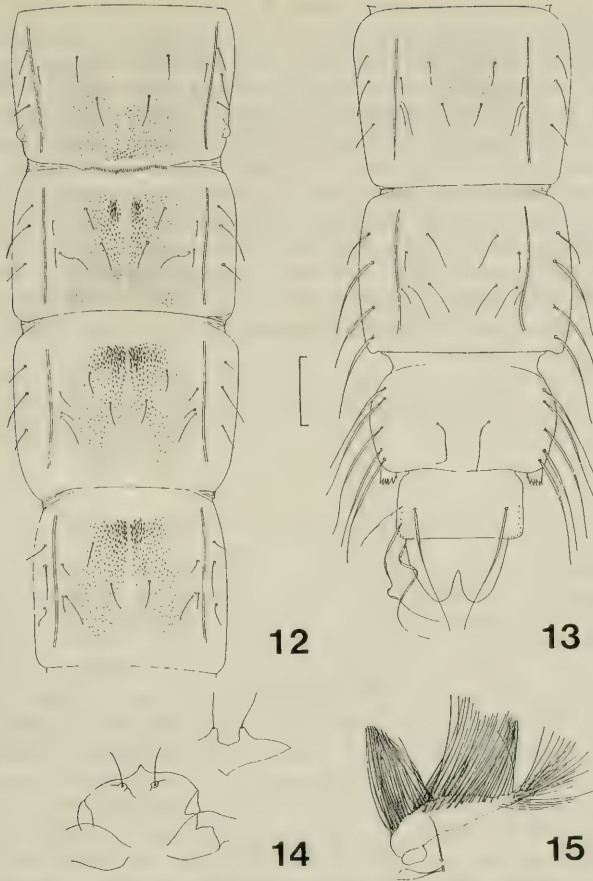
Genitalia (Figs 6, 7 & 9). Tergite IX as in Fig. 6; semicircular, undivided, and with two lateral expansions 7–9 μm long; with 31–34 setae. Gonocoxite 56–64 μm long, with 6–7 setae. Seminal capsule 73–78 μm long, 23–25 μm wide, pear-shaped. Sternite VIII (Fig. 7) with 23–28 setae. Notum 88–96 μm long; ramus 29–31 μm long; notum ratio (length of notum divided by length of ramus) = 1.35–1.7 ($m = 1.51$, $n = 5$). Lobes of gonapophysis VIII as in Fig. 10, clearly divided from each other; dorsomesal lobe flat ventrally, hook-like laterally; without differentiated setae at base; ventrolateral lobe densely covered with short setae which are longer towards the median margin. Cercus in lateral view as in Fig. 8; 53–60 μm long, 70–73 μm wide.

Pupa

Material: 26 pupal exuviae, 6.vi.93, a stream in upper Nohedes valley, 1600 m asl (J.M.); 1 pupal exuvia, 12.viii.94, Carança Torrent, 940 m asl, Pr pyr n es (P.H.L.).

Total length 3.6–4.1 mm ($m = 3.89$ mm, $n = 27$). Cephalothorax smudged brown, wingsheaths margined with brown; abdomen colourless with segments II and VIII lightly browned, lateral apodemes golden and anterior median stronger points of IV and V highlighted with golden brown; comb brown; IX golden brown.

Cephalothorax. Frontal setae 141–240 μm long ($m = 194.5$, $n = 17$). Frontal apotome with incipient granulation. Cephalic tubercles (Fig. 14) broad-based



Figs 12-15. *Krenopsectra nohedensis* n.sp. male pupa. 12, dorsal view of segments II-V; 13, dorsal view of segments VI-IX; 14, appearance of cephalic tubercles on flattened and folded frontal apotome; 15, thoracic horn and precorneal setae. Scale=0.1 mm.

elongate cones 64-130 μm high ($m = 77.1$, $n = 11$). Thoracic horn (Fig. 15) set at right angles to basal bulb, 384-576 μm long ($m = 474.9$, $n = 24$), 3.3-7.0 times as long as broad ($m = 4.9$, $n = 21$), with a broad band of long setae about 7 setae wide from base to apex, towards apex the band widening to encompass the horn, longest setae 304-450 μm long ($m = 406.1$, $n = 24$), 0.7-1.2 times horn length ($m = 0.83$, $n = 24$). Nose of wingsheaths small; pearl row absent. All setae of cephalothorax hair-like, not flattened. Lengths of lateral anteprenotal setae 70-173 μm (104.4, $n = 16$), median anteprenotal setae 141-225 μm ($m = 196.5$, $n = 15$), precorneal setae 1-3 186-272; 150-208; 112-160 μm ($m = 222.9$; 184.9; 149.9, $n = 15$), dorsocentral setae 1-4 93-154; 77-173; 102-163; 96-141 μm ($m = 128$; 114.3; 138.8; 123.7, $n = 20$), occasionally forked.

Abdomen (Figs 12, 13). Segment I unarmed. Tergite II nearly covered with small points that are a little larger posteriorly; the posterior median longitudinal smooth space only weakly closed anteriorly, the lateral bands diverging to produce a V-shaped median bare patch; hook row 0.31–0.44 segment breadth, of 73–96 hooks ($n=10$); pedes spurii B well developed. Tergite III similar to II but lateral point patches rectangular with a narrow bare longitudinal band medially; antero-median points larger and somewhat darkened. Tergites IV and V as III but antero-median larger points more extensive. Tergite VI as V but points sparser laterally and no differentiated points anteriorly. Tergite VII with or without a pair of small antero-median point patches. Tergite VIII with antero-lateral corners armed with very small points. Comb of segment VIII with 4–7 elongate marginal teeth. Sternites, paratergites and parasternites unarmed. Tergite IX unarmed; anal lobes truncate behind, 0.87–1.19 as long as broad, fringe starting about half-way back. Chaetotaxy: (S=taeniae)

	I	II	III	IV	V	VI	VII	VIII	IX
dorsal	2	2	5	5	5	5	5	1	1S
lateral	0	3	3	3	3	3			
lateral S							4(3)	4	8–13
ventral	2	3	4	4	4	4	4	1	

Larva unknown.

Taxonomic remarks

Two species of *Krenopsectra* Reiss have been described previously: *acuta* (Goetghebuer, 1934) and *fallax* Reiss (1969b, 1974). Only *fallax* hitherto has been recorded from rivers in the Alps and Pyrenees (Reiss, 1969b; Serra-Tosio & Laville, 1991). The adult male of *nohedensis* can be separated from the other two species by the combination of the following characters: anal point uniformly broadened; superior volsella large, not so narrowed towards the tip as in both *acuta* and *fallax*; median volsella bearing 6–9 broad lamellae at tip; basal inner margin of gonocoxite swollen medially.

Key to adult male *Krenopsectra*

- 1 Anal point broadly rounded and swollen medially, with nipple-like apex.
 *K. acuta* (Goetghebuer)
- Anal point uniformly broadened to base, not swollen medially 2
- 2 Superior volsella gradually narrowed to tip. Median volsella with less than 10
 apical lamellate setae *K. nohedensis* n.sp.
- Superior volsella strongly contracted before tip, the apical part nearly parallel-
 sided. Median volsella with more than 12 apical lamellate setae
 *K. fallax* Reiss

The adult female of *nohedensis* is characterized especially by its low notum ratio, the shape of tergite IX (undivided and bearing lateral expansions), the morphology of gonopophysis VIII and particularly by the flattened dorsomesal lobe.

The pupal exuviae of *nohedensis* run to *Krenopsectra fallax* at couplet 125 of the key to Tanytarsini in Langton (1991). The pupa of *acuta* has also been described (Reiss, 1969b) and was overlooked in the construction of the West Palaearctic key. The three species may be incorporated as follows:

- 125 Fringe of anal lobes restricted to the posterior half of the lobes, of 15 taeniae or fewer 125a
 — Fringe of anal lobes complete, usually of many more taeniae 126
 125a Thoracic horn extending from the basal bulb, not strongly bent at base
 *Krenopsectra acuta* Reiss
 Thoracic horn bent at right angles at attachment to basal bulb. 125b
 125b Tergites III–V, apart from the smooth median longitudinal band, nearly covered with points. Only one dorsal taenia on the anal lobes
 *Krenopsectra nohedensis* sp. nov.
 Tergites III–V with the point patches on either side of the smooth midline truncated triangular, narrow anteriorly and spreading towards the lateral margin of the tergite posteriad. *Krenopsectra fallax* Reiss

Micropsectra auvergnensis Reiss

When *M. auvergnensis* was described by Reiss (1969a) from the Massif Central, the pupa was unknown. A partly eclosed adult male establishes as *auvergnensis* a new pupal form from a stream in the upper Nohedes valley, type locality of *Krenopsectra nohedensis*, and a stream a few kilometres to the west. The lateral view of the male anal point (Fig. 11) was not figured in the original description.

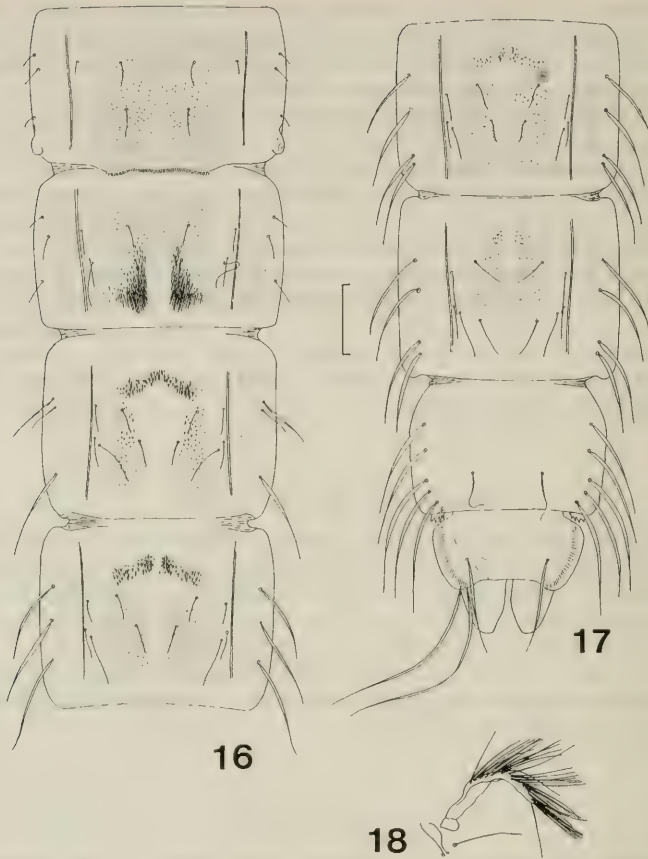
Material: 1 partly eclosed adult male and two damaged pupal exuviae, 6.vi.93, stream in upper Nohedes valley, 1600 m asl (J.M.); 1 pupal exuviae, 31.v.94 Aude stream, 950 m asl, Prépyrénées (P.H.L.).

Description of pupa

Total length 3.7, 4.2 mm. Colourless to faint golden brown anteriorly and posteriorly, in addition golden brown smudging of cephalothorax and of tergites where the stronger armament is situated; comb golden-brown.

Cephalothorax. Frontal setae 220–240 μm long. Cephalic tubercles very weak. Antennal sheath base with weak rounded-conical projection. Thoracic horn (Fig. 18) 304–384 μm long, 38–54 μm broad, 5.6–10 times as long as broad; longest horn setae 208–230 μm long, 0.68–0.71 times as long as horn. Nose of wingsheaths small; pearl row absent. All setae of cephalothorax hair-like, not flattened. Lengths of lateral anteprenotal setae 90–130 μm , median anteprenotal setae 150–170 μm , precorneal setae 1–3 166–192; 90–128; 90–109 μm , dorsocentral setae 1–4 80; 64; 96; 77 μm . Posterior thoracic mound moderately swollen.

Abdomen (Figs 16 & 17). Segment I unarmed. Tergite II almost covered with points; hook row 0.38–0.45 breadth of segment II, of 72–88 hooks. Tergite III with the point patch deeply emarginate postero-medially, the points on each side of the emargination replaced by spines 51–64 μm long. Tergites IV and V with an anterior pair of slightly oblique bands of strong points, narrowly separated medially, from the lateral ends of which extends a point band which widens posteriad. Tergites VI and VII similar to tergites IV and V but the anterior bands progressively weaker, hardly recognizable on VII; VII also with the lateral bands ceasing at about level seta D5.



Figs 16-18. *Micropsectra auvergnensis* Reiss male pupa. 16, dorsal view of segments II-V; 17, dorsal view of segments VI-IX; 18, thoracic horn and precorneal setae. Scale = 0.1 mm.

Tergite VIII with a small patch of minute points antero-laterally. Sternites unarmed. Paratergites II-VII armed with small points. Comb of segment VIII with 4 or 5 marginal teeth. Anal lobes rounded, 1.1-1.2 times as long as broad. Pedes spurii B of segment II conspicuous. Chaetotaxy (S = taeniae):

	I	II	III	IV	V	VI	VII	VIII	IX
dorsal	2	3	5	5	5	5	5	1	1S
lateral	0	3	3	1					
lateral S				2	3	4	4	5	29-34
ventral	0	2	3	4	4	4	4	1	

Taxonomic remarks

The pupa of *M. auvergnensis* founders at couplet 126 of the key to Tanytarsini in Langton (1991). It has in common with other members of the *attenuata* group the armed paratergites (inaccurately referred to as 'pleura' in the key); however, the conspicuous anterior point patches of tergites IV and V would direct the user to a point later in the key. *M. auvergnensis* may be included in the key as follows:

- 126 Tergites IV and V nearly covered with strong points, the points of the anterior transverse point patches similar in size but more dense than elsewhere on these segments and may be rendered conspicuous by a golden or brown colouring of the cuticle around them. (Paratergites of mid abdominal segments extensively armed with small points.) 127
- If tergites IV and V with extensive armament, then the points of the anterior point patches much stronger than those behind. 127a
- 127 (unchanged)
- 127a Paratergites II–VII armed with small points
 *Micropsectra auvergnensis* Reiss
- Paratergites II–VII unarmed, or rarely with a restricted area of small points 128

Ecology

Reiss (1969a) for species of the *Micropsectra attenuata* group states 'Although larvae are not available, the rearing and collecting conditions of adults give rise to the impression that the larvae are cold stenothermic, oxybiontic inhabitants of lenitic [sic] areas in springs and upper stream courses'. The fast-flowing montane streams that have yielded both *Krenopsectra nohedensis* and *Micropsectra auvergnensis* in the Pyrenees, fall within this general classification. Their larval habitats within the streams are being investigated.

M. auvergnensis has been previously recorded for the Auvergne in France and Westfalen in Germany (Reiss, 1969a). It is unlikely that *K. nohedensis* is restricted to the eastern Pyrenees.

ACKNOWLEDGEMENTS

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SHORT COMMUNICATION

The occurrence of seaweed flies (Diptera: Coelopidae) on the Isle of Islay.—The two British species of seaweed fly, *Coelopa frigida* (F.) and *C. pilipes* Hal., breed on beds of decomposing wrack formed by seaweed deposited on the shore during high tides or during storms. An early map describing the distribution of the genus in Britain was concerned primarily with mainland shores and therefore largely ignored the islands lying off the west coast of Scotland (Dobson, 1974). A more recent map (Phillips *et al.*, 1995; primarily from data collected by T. H. Day at the University of Nottingham), concerning the wider European distribution of the genus, does signify the presence of *C. frigida* on Uist in the Outer Hebrides but gives no information for any of the other Hebridean islands. To augment the knowledge of the distribution of the genus in this area, I recently (5.xi.95 to 8.xi.95) sampled four sites on the Isle of Islay in the Inner Hebrides. The sites covered the extreme east and west of the island and the shores along Loch Indaal in the centre of the island. To sample, I disturbed wrack material on the shore and gathered any flies which emerged by 'aspirating' using a portable car vacuum cleaner (Black & Decker Ltd, Spennymoor, Co. Durham). Each sample consisted of the flies collected in a 15-minute period. The flies collected are summarized below.

Machair Bay (NR207630)—*C. frigida*; males 8, females 17. *C. pilipes*; 0.

Bowmore (NR310600)—*C. frigida*; males 24, females 44. *C. pilipes*; 0.

Black Rock (NR305630)—*C. frigida*; 0. *C. pilipes*; 0.

Port Askaig (NR432693)—*C. frigida*; 0. *C. pilipes*; 0.

Although there is some inconsistency, the results confirm the occurrence of *Coelopa frigida* on Islay and provide no evidence of the presence of *C. pilipes*. This data supports Phillips *et al.* (1995) who suggested that *C. pilipes* is relatively scarce in the north-west of the British Isles, possibly reaching the edge of its geographic range.

I wish to thank the Percivals (S. M., T., B. D. & S. D.) for their encouragement with this project.—S. HODGE, Ecology Centre, University of Sunderland SR1 3SD.

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THE RELATIONSHIP BETWEEN *DROSOPHILA* OCCURRENCE AND MOULD ABUNDANCE ON ROTTING FRUIT

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Some species of *Drosophila* belong to a functional guild of species which are detritivores of rotting fruit. This guild includes mammals and birds, a variety of invertebrates and a number of species of micro-organisms. Therefore, *Drosophila* may have to compete with a number of other species, from a wide range of taxa, for access to their resource. These potential competitors include species of mould which grow on the surface of the decomposing fruit. Janzen (1977) suggested that some characteristic qualities of rotten fruit are a 'deliberate' strategy of fungi to make the resource unattractive to higher animals, a form of interspecific interference effect. Moulds are often a pest of *Drosophila* cultures in the laboratory and the use of fungicides or the maintenance of high larval density are often needed to restrain fungal growth (Demerec, 1950; Ashburner & Thompson, 1978). On more natural resources the performance of *D. immigrans* and *D. melanogaster* has been shown to be reduced by the presence of *Penicillium* on citrus fruits (Atkinson, 1981).

The aim of this paper is to examine the occurrence of *Drosophila* and the extent of mould growth on pieces of fruit left out in the field. It is hoped that this may give some further insight into whether mould/*Drosophila* interactions are of general significance to the structure of the communities in which these taxa occur.

METHODS

Association between mould and Drosophila on pieces of fruit

Experiments were carried out at two field sites. The first site, Hendon (NZ403559), an urban district of Sunderland in north east England, consisted of an urban garden containing a few herbaceous plants. Populations of *Drosophila* had been observed in the garden in a previous year's pilot study, centred mainly around a small compost heap. The local area consists mainly of urban terraced housing with some nearby parkland.

The second site used was at West Learmouth (NT386638), near to Cornhill-on-Tweed on the English-Scottish border. The site consisted of a small patch of woodland adjacent to a road verge. The woodland had once been part of a cottage garden and contained apple, cherry and elder trees. Thus there were a number of naturally occurring breeding resources for *Drosophila*.

To examine the distribution of moulds and *Drosophila*, pieces of banana (≈ 20 g) were placed in plastic cups (open end 60 mm diameter) with screw-on plastic lids. Nine holes (4 mm) were drilled through the lids to allow entry of flies. The baits were left exposed in the field for six days and then returned to the laboratory. The plastic cups were then fitted with lids with air-holes covered with fine nylon gauze. The pieces of fruit, along with any *Drosophila* eggs or larvae, were maintained at 25°C in an insect room, with relative humidity at 45–55% and a 16/8 hour light/dark cycle. The fruit was retained for 21 days and a note was made of whether the growth of mould on the fruit covered the entire exposed surface (100% cover). A record was also made of which pieces of bait gave rise to emergent adult *Drosophila*. Eighty

pieces of bait were left exposed in the field on each of three occasions: twice at West Larmouth (July & August 1993) and once at Hendon (September 1993).

Effects of the presence of Drosophila larvae upon fungal growth

In an intensive study of the biogeography of Catalonian *Drosophila*, Monclus (1964) suggested that the coastal basin near to Barcelona is one of the most diverse in terms of number of species. Therefore, a more detailed examination of the effects of *Drosophila* larvae on the growth of moulds was performed in Calella del Mar on the northern Mediterranean coast of Spain (2° 40' longitude, 41° 36' latitude) in May/June 1994. Trapping of *Drosophila* was carried out in a pine woodland, consisting mainly of aleppo pines, stone pines and cork oaks, near to the El Faro lighthouse. Strawberries which had first been topped were placed into plastic-cup traps (described above) and were left exposed in the field for up to 3 weeks. In total 45 traps were used, distributed at random throughout a patch of woodland approximately 20 by 20 m.

The traps were examined each day at around 4.00 p.m. and the percentage cover of moulds on the surface of the fruit was estimated. The presence or absence of *Drosophila* larvae on each piece of fruit was recorded. Larval identification was carried out by comparison with specimens of known taxa and, for further assurance, some larvae were allowed to complete their development and the adults identified on emergence (from work on adult *Drosophila* in the same area the most common species were *D. subobscura* Collin, *D. immigrans* Sturtevant and *D. simulans* Sturtevant).

RESULTS

Association between mould and Drosophila

The collecting period for this experiment was poor in terms of numbers of *Drosophila*, with *Drosophila* adults emerging from less than 15% of fruit baits (mainly *D. subobscura* Collin). There were generally more than one species of mould present on the fruit, such as *Penicillium*, *Aspergillus* and *Mucor* species. However, for the purposes of this investigation moulds were not separated into distinct taxa. The classification of fruit pieces was analysed using a chi-square (χ^2) procedure to examine for association (Table 1). The data were validated as suitable for pooling and then analysed using Cochran's method for calculating χ^2 suitable for data which gives rise to some low expected values (Zar, 1984, Table 1d).

Overall, there was a highly significant negative association between *Drosophila* emergence and complete fungal cover ($\chi_c^2 = 217.2$, for 1 d.f., $P < 0.001$). When there was complete fungal cover of the surface of the fruit there were very few cases of *Drosophila* emergence. Conversely, when the fungal cover was less than 100% *Drosophila* adults emerged in every case. It appeared, therefore, that there was a complementary distribution of complete fungal cover of the fruit surface and the emergence of *Drosophila*.

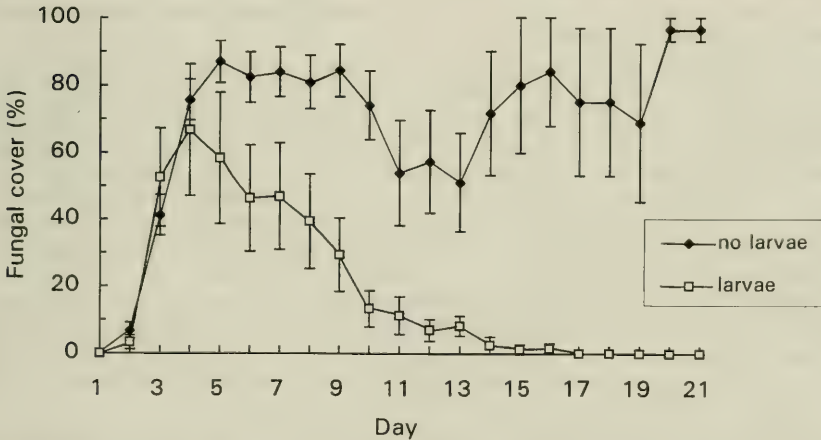
Effects of the presence of Drosophila larvae upon fungal growth

The development of fungal growth on the surface of the strawberries is illustrated in Figure 1. Again, there was a mixture of fungal species present which were pooled

Table 1. Contingency tables for association between *Drosophila* emergence and complete fungal cover of fruit.

(a) July 1993— West Learmouth				(b) August 1993— West Learmouth			
		Complete fungus cover				Complete fungus cover	
		Yes	No			Yes	No
<i>Drosophila</i>	Present	0	8	<i>Drosophila</i>	Present	0	16
	Absent	72	0		Absent	64	0
$\chi^2 = 79.2, P < 0.001.$				$\chi^2 = 79.8, P < 0.001.$			

(c) September 1993— Hendon, Sunderland				(d) Pooled data			
		Complete fungus cover				Complete fungus cover	
		Yes	No			Yes	No
<i>Drosophila</i>	Present	2	11	<i>Drosophila</i>	Present	2	35
	Absent	67	0		Absent	203	0
$\chi^2 = 64.9, P < 0.001.$				$\chi^2_c = 217.2, P < 0.001.$			

Figure 1. The pattern of fungal growth on strawberries with and without *Drosophila* larvae (mean \pm SE).

and treated as a single taxon. The data on percentage fungal cover of the fruit pieces were analysed using the generalized linear interactive modelling system (GLIM; Baker & Nelder, 1978), defining the fungal cover as binomial (i.e. a proportion of 100%). The 'repeated measures' nature of the data was compensated for to some extent by including 'time' as a factor in the analyses. A significant statistical interaction was found to occur between the age of the fruit and the presence of *Drosophila* larvae in their effects on fungal growth ($F_{20, 380} = 2.43, P < 0.01$).

Fungal cover rapidly increased on all pieces of fruit for the first 4 days. By the fifth day the trends for fungal growth on pieces of fruit which contained *Drosophila* larvae and those which were unoccupied began to diverge, the fungal growth on the surface of pieces of fruit which contained *Drosophila* larvae being reduced. At the end of the investigation pieces of fruit which had contained *Drosophila* larvae tended to have no fungal cover on the surface whereas fruits which were assumed to have contained no larvae had virtually complete cover.

DISCUSSION

The complementary distributions of complete fungus cover and *Drosophila* emergence may be taken as evidence for negative interspecific effects; complete fungus cover debarring *Drosophila* development and/or the presence of *Drosophila* larvae in the resource preventing absolute cover by mould. There are potential mechanisms which could give rise to these effects. Some fungi produce mycotoxins which have a deleterious affect on insect performance (e.g. Keller & Zimmermann, 1989) and *D. melanogaster* has been shown to be negatively affected by at least one of these mycotoxins (aflatoxin) produced by the fungus *Aspergillus flavus* (Matsumura & Knight, 1967). In laboratory cultures mould infection can cause serious reductions in *Drosophila* population size (Demerec, 1950; Ashburner & Thompson, 1978). Conversely, some insects are known to feed on the hyphae of fungi growing on the shared resource and thus reduce the fungal standing crop (e.g. Wicklow & Yocom, 1982; Lussenhop & Wicklow, 1985).

However, there is a danger in using distributional data to infer competitive mechanisms (Connell, 1975; Schoener & Adler, 1991; Stone & Roberts, 1992) especially when the distributions are biased to certain classes (Wright & Biehl, 1983). Differences in qualitative aspects of the habitat may produce complementary distributions, regardless of any interactions which may occur. For example, fruit suitable for *Drosophila* emergence may be unsuitable for rapid fungal growth and conversely fruit which promotes fungal growth may be unsuitable for *Drosophila* development. Even if negative effects are inferred there is no indication of any causal mechanisms.

However, the data from Calella gives some indication that there is at least one negative effect occurring between the two taxa. The growth of mould on the surface of the strawberries is reduced if *Drosophila* larvae are present. There was no suggestion that the larvae were feeding on the mould, thus reducing its standing crop by trophic means. The mechanism of the fungal reduction appeared to be one of physical interference. Larvae were observed feeding on, or just under, the surface of the fruit and the movement of the larvae had a mixing effect on the fruit substance. This behaviour tended to undermine and churn up the fungal mat so causing a decrease in fungal cover. A similar effect has been observed in dung systems where fungus-gnat larvae have been observed to have a mixing effect on the substrate and decrease the density of fungal hyphae (Lussenhop *et al.*, 1980; Lussenhop & Wicklow, 1985).

As nearly all pieces of rotting fruit will have some mould growth then the likelihood of *Drosophila* ever encountering mould-free fruit will be extremely scarce. Mould contamination is known to reduce *Drosophila* populations size in the laboratory and the results presented here suggest that interactions between moulds and *Drosophila* may also be important in determining the local community structure of a resource patch in the field.

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SHORT COMMUNICATIONS

***Cicones undata* Guér.-Mén. (Coleoptera: Colydiidae) still common under sycamore bark in south-east London.**—Since I first found this pretty beetle under sycamore bark in Nunhead Cemetery in October 1991 (Jones, 1992, 1993), I have frequently examined dead sycamores killed by the sooty bark disease, an ascomycete fungus *Cryptostroma corticale* Ell. & Ev., and I am happy to report that the beetle continues to thrive in the area. Nunhead Cemetery (TQ3575; VC17, Surrey) has a large number of dead standing sycamore trees and the *Cicones* is without doubt the commonest beetle under their bark. It is often possible to find 10 to 20 specimens within a few minutes of searching on each tree. Specimens have been found on several BENHS field meetings to the cemetery, and on many other occasions during the last 5 years.

The neighbouring Honor Oak Park (One-Tree Hill; TQ3574), also has a considerable growth of young sycamores and *Cicones undata* was plentiful under the bark of cut sycamore logs on 25.viii.95 and 4.xi.95, in company with many thousands of *Enicmus brevicornis* (Mannerh.) (Lathridiidae) crawling about the soot-like fungus.

Another colydiid beetle attached to sycamore, *Synchita separanda* (Reitt.), is much less common than the *Cicones*, but I found several in the park under bark of sycamore logs on 25.viii.95. This beetle seemed less associated with the sooty bark and occurred in areas infected with the coral spot fungus *Nectria cinnabarina* (Tode ex Fr.) Fr. Examination of photographs of this beetle when it was first found in London (Jones, 1987) show that the sooty sycamore log on which it was found also had coral spot, so it may be associated with either of these fungal diseases.

Several specimens of *Diplocoelus fagi* Guér.-Mén. (Biphyllidae) were also present on the sycamore logs in the park on 25.vii.95 and 4.ix.95. The West Kent/Surrey vice-county border passes over Honor Oak Park, but most of the sycamores are on the Surrey side. Of the beetles mentioned above, only *Diplocoelus fagi* occurred in the West Kent part of the park.

Further into West Kent (VC 16), *Cicones undata* also occurred sparingly under bark of dead sycamores in Beckenham Place Park (TQ3870) on 20.ix.95 (in company with a few *Enicmus brevicornis*) and on Blackheath Hill (TQ383766) on 3.x.95. It is obviously still a common and widespread species throughout the area.—RICHARD JONES, 13 Bellwood Road, Nunhead, London SE15 3DE.

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Large tortoiseshell in East Sussex.—I would like to report the presence of the large tortoiseshell, *Nymphalis polychloros* (L.), in East Sussex in late July 1995. It was seen basking on open ground in the parish of Catsfield by Mr D. Goldsmith, a woodsman with an excellent working knowledge of butterflies in the field. The last reported sighting in the parish, and perhaps in the neighbourhood, was in April 1981 when a post-hibernating specimen was photographed basking on an apple tree in my garden (Feltwell, 1981). The current locality is about one mile distant from the former site. The general area is a rich pattern of semi-natural ancient woodland, improved pastures, hedgerows and a few houses. It is incidentally on private land well away from public access, and its reported presence 'in the parish of Catsfield' is deliberate to protect the privacy of the owner and habitat. This current sighting, and those for Essex mentioned in Butterfly Conservation's *Conservation News* (1995; **60**: 16), should be set in the context of the large tortoiseshell being 'thought extinct' in Britain by about 1980 (Wynne *et al.*, 1995).—JOHN FELTWELL, Marlham, Henley's Down, Battle, East Sussex TN33 9BN.

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THE BUTTERFLIES OF STARA PLANINA (SERBIA) WITH EMPHASIS ON *M. JURTINA* LINNAEUS

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A total of 243 species of butterfly are to be found on the territory of the former Yugoslavia (Jaksic, 1988). Early in my stay in Yugoslavia I met Predrag Jaksic, and he laughingly said 'In Britain you only have 66 species. I can take you to Stara Planina and you will catch that many in one day!' In July 1992 I was able to take him up on the offer, and I was not disappointed.

Stara Planina means literally the old mountain, and is the name of a massif running across Bulgaria and into south Serbia, with the summit of Midzor at 2169 m, close to the border. The whole flora and fauna of the area is rich (Misic *et al.*, 1978; Mesaros *et al.*, 1984), as it includes an important relict area focused on the village and valley of Topli Do (lit. warm valley). Here a delightful abundance of butterflies is to be found in a remote and unspoiled setting.

What follows includes an account of the species we took together that weekend, but is really the result of a much wider exploration by Jaksic during the month of July in 1991 and 1992, when he visited localities that span a broader range of biotopes than the deciduous foothill and montane woodlands of Topli Do. It incorporates observations on the population of *M. jurtina* L. in that isolated locality.

BIOMES AND LOCALITIES

All the collecting localities fell within 3 adjacent UTM grid squares, but the area embraced 3 separate biomes between 550 and 1750 m: (a) submediterranean oak woodlands (oak); (b) southern European; mostly deciduous foothill and montane woodlands (S. Eur.), and (c) rocky ground; pasture and woodland on Mediterranean mountains (rocky).

Ten localities were investigated, as shown in Table 1.

Table 1. Details of localities 1–10.

Serial	Biome	Locality	Elevn	UTM Grid
1.	S. Eur	Temska	550 m	FN 29
2.	S. Eur	Zavoj	650 m	FN 39
3.	Oak	Beside River Temseica	750 m	FN 29–FN 39
4.	S. Eur	Topli Do	750–800 m	FN 39–FP 30
5.	S. Eur	Beside River Toplodolska	800–1000 m	FP 30
6.	Oak	Kucnicko Krajiste	900–1000 m	FN 39
7.	Rocky	Beside River Rakitska	1350 m	FP 30
8.	Rocky	Beside River Ilijina	1400 m	FP 30
9.	Rocky	Babin Zub	1500 m	FP 30
10.	Rocky	Zarkova Cuka	1750 m	FP 30

Table 2 (continued). Results.

Species	Localities:									
	1	2	3	4	5	6	7	8	9	10
<i>Polyommatus amandus</i> Schneider	*	.	*	.	.	.
<i>Meleageria daphnis</i> D. & S.	.	.	.	*	*
<i>Polyommatus icarus</i> Rott.	*	*	.	*	.	*
<i>Polyommatus thersites</i> Cant.	*
<i>Polyommatus eroides</i> Friv.	*	.
SATYRIDAE										
<i>Kanetesia circe</i> F.	.	.	*	.	.	*
<i>Hipparchia fagi</i> Scop.	*	*
<i>Hipparchia volgensis</i> M.-P.	.	.	.	*	*	*
<i>Erebia ligea</i> L.	*	.	*	*	.	.
<i>Erebia euryale</i> Esp.	*	.	*	*	.	.
<i>Erebia orientalis</i> Elwes	*	*	*
<i>Erebia aethiops</i> Esp.	*	.	*	.	.	.
<i>Erebia medusa</i> D. & S.	*	*
<i>Erebia albertanus phorcys</i> Frey.	*	.	.	*	.	.
<i>Erebia ottomana</i> H.S.
<i>Erebia oeme</i> Hübn.	*	.	*
<i>Melanargia galathea</i> L.	*	*	*	*	*	*	*	*	.	.
<i>Maniola jurtina</i> L.	*	*	*	*	*	*	*	*	.	.
<i>Hyponephele lycaon</i> Kuhn	*
<i>Aphantopus hyperantus</i> L.	.	.	*	*	*	*	*	.	.	.
<i>Coenonympha pamphilus</i> L.	*	*	*	*	*	*	*	*	.	.
<i>Coenonympha rhodopensis</i> Elwes	*
<i>Coenonympha leander</i> Esp.	*	.	*
<i>Coenonympha arcania</i> L.	*	.	.
<i>Coenonympha glycerion</i> Bork.	*	*	*	*	.	.
<i>Pararge aegeria</i> L.	*	*	*	.	.
<i>Lasiommata maera</i> L.	*	.	.
NYMPHALIDAE										
<i>Araschnia levana</i> L.	.	.	.	*	*	*
<i>Inachis io</i> L.	*	.	*	.	.	.
<i>Vanessa atalanta</i> L.	*	.	.	*	.	.
<i>Vanessa cardui</i> L.	*	.	.	*	.	.
<i>Aglais urticae</i> L.	*	.	.	*	.	.
<i>Nymphalis polychloros</i> L.	.	.	.	*
<i>Polygonia c-album</i> L.	.	.	.	*	*	*	*	.	.	.
<i>Argynnis paphia</i> L.	*	.	*	*	.	.
<i>Argynnis aglaja</i> L.	*	.	*	*	.	.
<i>Argynnis niobe</i> L.	*	*	*	.	.	.
<i>Argynnis adippe</i> D. & S.	.	.	*	.	*	*
<i>Issoria lathonia</i> L.	*	.	*	.	.	*
<i>Brenthis hecate</i> D. & S.	*
<i>Brenthis daphne</i> D. & S.	*	.	.	*	.	.
<i>Melitaea didyma</i> Esp.	*	*
<i>Melitaea cinxia</i> L.	*
<i>Melitaea athalia</i> Rott.	*	.	*	.	.	.
<i>Apatura ilia</i> D. & S.	.	.	.	*	*
<i>Apatura iris</i> L.	.	.	.	*	*
<i>Limenitis reducta</i> Staud.	*	.	.	.
<i>Neptis rivularis</i> Scop.	.	.	*	*	*

RESULTS AND OBSERVATIONS

A number of specifically central European species were found. In relation to the fauna of the Carpathian, Dinaric and Sar-Pindus mountain systems, they are expressly isolated, and their closest connections are with the ancient Bulgarian Rhodopi massif. Species: *Aricia eumedon* Esp., *Hipparchia volgensis* M.P., *Erebia orientalis orientalis* Elwes, *Erebia alberganus phorcys* Frey., *Coenonympha leander* Esp.

The full results are shown in Table 2 and they make a worthwhile contribution to the established faunistic knowledge of this part of Serbia. Many of them are new records for these particular UTM squares.

A number of species are at the edge of their recorded range. *Plebejus sephirus* Frivaldsky is at the northern limit of its range in Yugoslavia. *Aricia eumedon* Esp. is at the most easterly edge of its range in Yugoslavia. *Polyommatus ripartii* Frey. is at the northeastern limit of its range in Yugoslavia. *Hipparchia volgensis* M.P. is at the northern limit of its range in Yugoslavia. *Coenonympha rhodopensis* Elwes is at the northwest limit of its known range.

Two new records for Yugoslavia have been published separately (Jaksic, 1995)—*Erebia alberganus phorcys* Frey. and *Erebia orientalis* Elwes.

Maniola jurtina

Particular attention was paid to the population structure of *Maniola jurtina* L. Early work by Thomson and others focused on the male genitalia and the number of

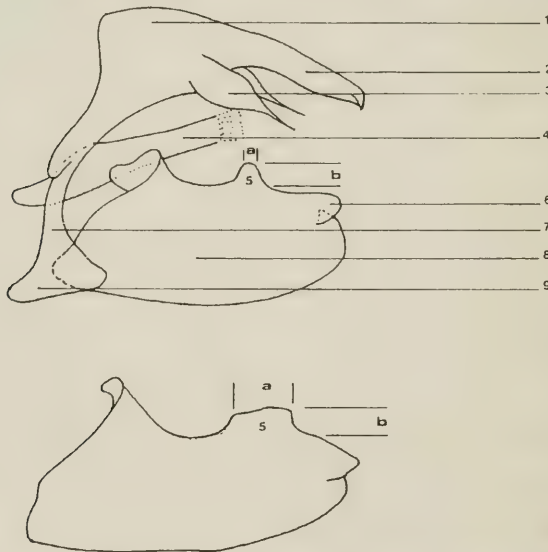


Figure 1. Diagrammatic representation of the two main *jurtina* valve types, showing terms used by Thomson (1987) and measurement parameters. Maniolini male genitalia (*Maniola jurtina* 'western' above, 'eastern' below). Anatomy and taxonomy of the armature and measurement parameters used: 1 tegumen, 2 uncus, 3 gnathos, 4 aedeagus, 5 dorsal process, 6 distal process, 7 vinculum, 8 valve, 9 saccus, a=dorsal process width, b=dorsal process length.

ocelli on the hind wings of the males. Thomson (1973) identified two distinct types of valve in the male genitalia, which he called the eastern and western types. These are illustrated in Fig. 1 for reference, although intermediate or transitional forms also occur. Thomson went on to correlate valve type with geographic distribution, and his map (Fig. 2 Thomson, 1987) shows that Stara Planina lies in an area where the eastern valve type is to be expected.

The valve types found at Topli Do are illustrated at Fig. 3 with examples from the wider area of the Balkans shown at Fig. 4. It comes as no surprise to note that they are of the eastern type, nonetheless, they are published to assist future research.

Brakefield's extensive work (1984) on hindwing eyespot development is summarized in Kudrna (1990) and Fig. 5 shows the standard notation used in this connection.

In the sample of 90 males collected in the vicinity of Topli Do, 72 (80%) have two spots in the splay configuration (S2 type). This correlates well with a sample of 124 males collected in the vicinity of Pristina, Jaksic's home town, amongst which 74 (60%) were found to be of the S2 type. There was no correlation between the valve type and the eyespot pattern in either population. It was judged that the two populations are morphologically indistinguishable.

CONCLUSION

The ancient relict area of Stara Planina holds an impressive diversity of flora and fauna. On this expedition we took a total of 94 species, including no less

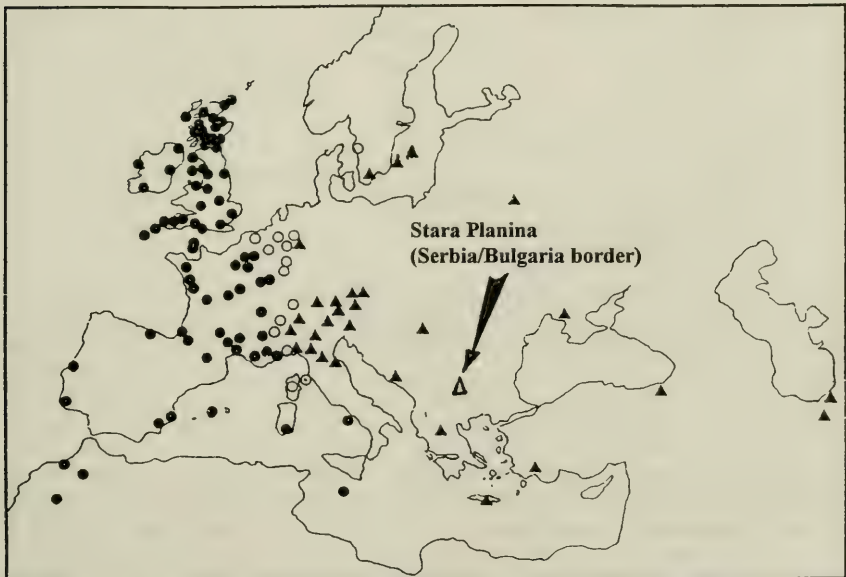


Figure 2. The distribution of valve types in *Maniola jurtina*, showing distribution of 'eastern' (▲), 'western' (●) and 'transitional' (○) male genitalia forms.

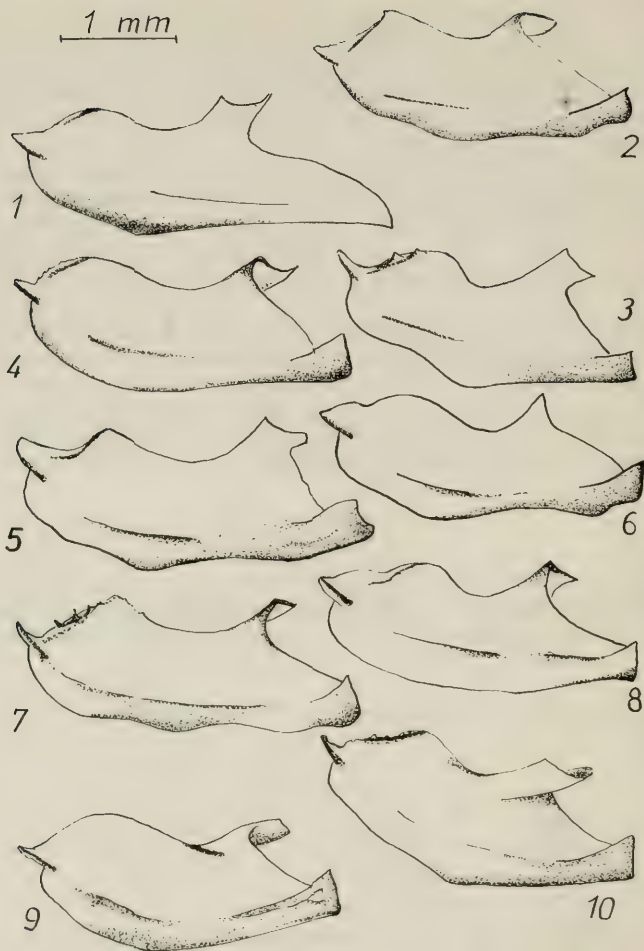


Fig. 3. Male genitalia (valva) of *Maniola jurtina* L. Serbia, Stara Planina: Topli Do. 800 m, 11–14.vii.92, all Jaksic leg. 1 prep. no. 1855. 2 prep. no. 1856. 3 prep. no. 1857. 4 prep. no. 1858. 5 prep. no. 1860. 6 prep. no. 1859. 7 prep. no. 1862. 8 prep. no. 1861. 9 prep. no. 1864. 10 prep. no. 1863.

than 72 at and above Topli Do (localities 4 and 5 in Table 1). These records include some species isolated from adjacent mountain systems, and a number of more widespread species which are at the edge of their range, as well as two that are new for Yugoslavia. The study of *Maniola jurtina* L. (spotting and genitalia) accords well with Thomson (1975, 1987) and suggests that the population on Stara Planina is no different to that from the vicinity of Pristina.

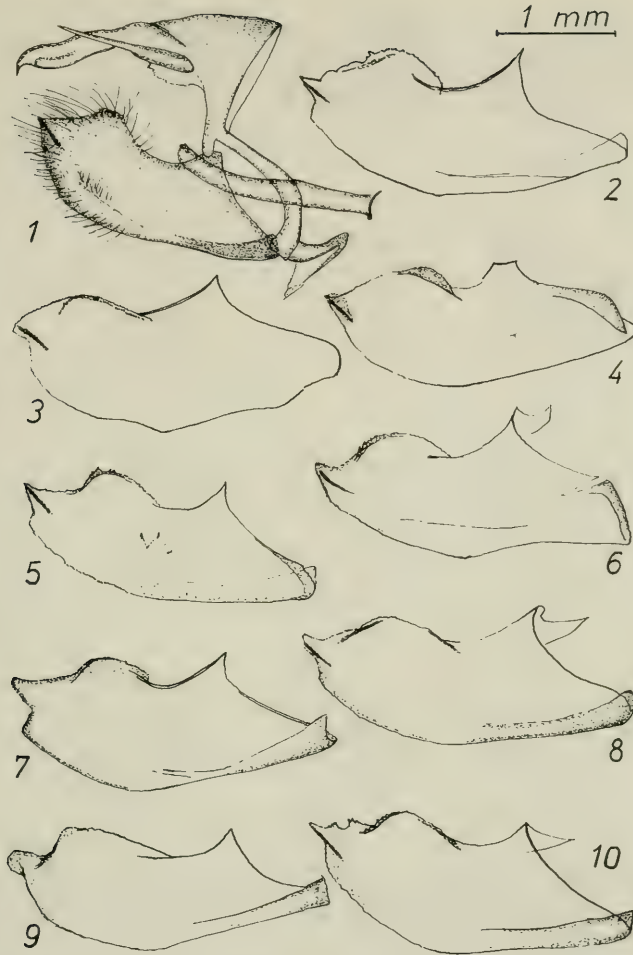


Fig. 4. Male genitalia (valva) of *Maniola jurtina* L. 1 Montenegro, Durmitor: Dobrilovina, 800 m, 23.vii.91, prep. no. 1791, Jaksic leg. 2 Slovenia, Nanos, 1000 m, 13.viii.87, prep. no. 1797, Sukic M. leg. 3 Vojvodina, Sonta, 80 m, 11.vi.84, prep. no. 1789, Siladjev S. leg. 4 Serbia Kopaonik: Baciste, 1600 m, 3.viii.86, prep. no. 1369, Jaksic leg. 5 Montenegro, Durmitor: Tara-Vrelo, 600 m, 30.vii.84, prep. no. 1792, Jaksic leg. 6 Montenegro, Durmitor: Tara-Vrelo, 600 m, 30.vii.84, prep. no. 1368, Jaksic leg. 7 Serbia, Stara Planina: Kaludjerske bare, 1000 m, 9.vii.85, prep. no. 1787, Jaksic leg. 8 Serbia, Pristina: Grmija, 700 m, 4.vii.74, prep. no. 3066, Jaksic leg. 9 Macedonia, Pletvar, 900 m, 20.vii.83, prep. no. 1793, Jaksic leg. 10 Greece, Olimp: Litochoron, 100 m, 19.vi.84, prep. no. 1796, Jaksic leg.

Aside from the scientific observations, memories of Topli Do include Apollos floating around open glades, eight silver-washed fritillaries sunning themselves on the side of a barn, hundreds of Idas blues assembled drinking at moist patches on the path and orange-tips flying inexplicably late in the season.

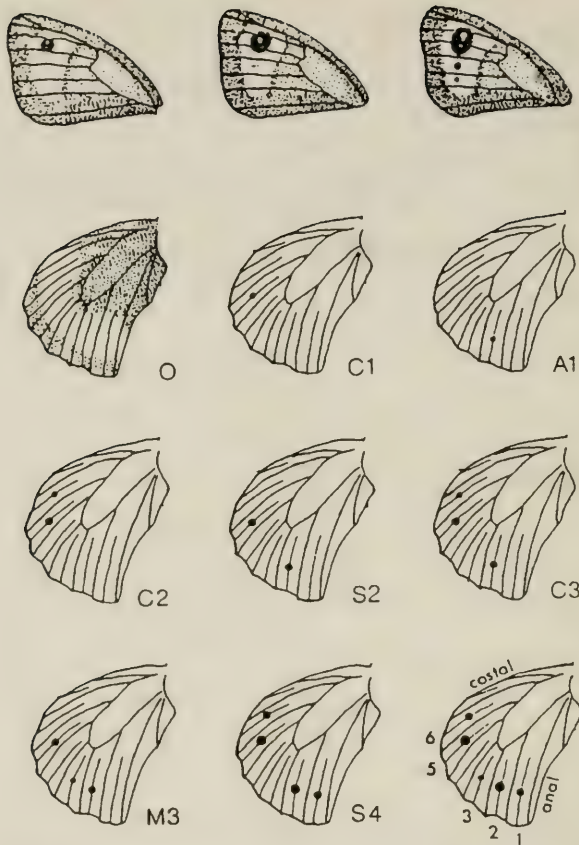


Fig. 5. *Maniola jurtina* hindwing eyespot development (after Kudrna 1990, with minor alterations). Diagram of variation in the spot pattern on the ventral surface of the wings of *Maniola jurtina*. **Top row:** variation in the forewing eyespot (unshaded area is of brighter fulvous coloration); left: small black eyespot with single white pupil (characteristic of males); middle: larger spot with single pupil (characteristic of females); right: a more extreme female phenotype showing a very large eyespot with two pupils (*f. bioculata*) and with two additional spots (*f. addenda*). **Bottom three rows:** illustrate nine of the thirteen commonly occurring hindwing spot phenotypes: **0** nought spot, **C1** costal 1, **A1** anal 1, **C2** costal 2, **S2** splay 2, **C3** costal 3, **M3** median 3, **S4** splay 4 and all 5 spots (not shown: **A2**, **A3**, **C4** and **A4**). The nought spot specimen illustrates the position of the lighter band within which the spots lie. The reference numbers of the spots are indicated. Different sized hindwing spots present an idea of changes in relative (not absolute) spot size.

ACKNOWLEDGEMENTS

The authors are indebted to George Thomson for his assistance in putting the findings on *Maniola jurtina* into context and particularly for his authority to reproduce Figs 1 & 2 from his PhD thesis (Thomson, 1987). Otakar Kudrna's consent to reproduce Fig. 5 (after Kudrna, 1990, with minor alterations) is similarly appreciated.

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SHORT COMMUNICATION

Some observations on *Agrilus sinuatus* (Ol.) and *A. pannonicus* (Pill. & Mitt.) in south-east London.—Previously both regarded as extremely rare insects and accorded Red Data Book status 2 “vulnerable” by Levey (1987), these jewel beetles have more recently been shown to be quite widespread. Exit holes and larval workings allow fairly confident diagnosis of the species, and although their presence does not necessarily mean that there is a thriving colony, it is usually fairly obvious how old these signs are. Both species have now been “down-graded” to Notable A status (Hyman & Parsons, 1992).

Both of these species have been found widely in north London (Foster, 1987; Hackett, 1994), so I was pleased to find them recently in south-east London. On 6.vi.95, I found *A. sinuatus* borings under the bark of a dead hawthorn on the eastern edge of Beckenham Place Park, between Lewisham and Bromley (TQ 378710; VC 16, West Kent). And on 19.vi.95 I discovered exit holes in another dead hawthorn near the western boundary of the park (TQ386706). On 4.ix.95 and 10.x.95, I found exit holes in several old hawthorn trees just outside the entrance to St Augustine’s Church, Honor Oak (TQ358745; also VC16, West Kent).

On the occasion of 4.xi.95, I also found extensive exit holes of *A. pannonicus* in the stump of a large tree, probably oak, in the grounds of St Augustine’s Church. This stump also produced *Platypus cylindrus* (F.) (Platypodidae), *Bitoma crenata* (F.) (Colydiidae) and a large dead female stag beetle *Lucanus cervus* (L.) (Lucanidae).

The twisted tunnels of *A. sinuatus* have previously been illustrated (Alexander, 1990), but those that I found in Beckenham Place Park showed a more regular sinuous character (Fig. 1a), which I took to be the initial borings of earlier larval instars. The characteristic D-shaped exit holes of the two species are slightly different in shape; those of *A. sinuatus* are broader and flatter and more nearly semi-circular (Fig. 1b), while those of *A. pannonicus* are generally rounder and more highly arched (Fig. 2a). It is probably as a consequence of the relative sizes of the respective tree species which are burrowed, that whereas exit holes of *A. sinuatus* occur sparingly in



Fig. 1a (left). Sinuous burrows made by the larvae of *Agrilus sinuatus*, Beckenham Place Park, 6.vi.95. The hawthorn branch is about 125 mm (5 inches) in diameter. Fig. 1b (right). D-shaped exit hole of *Agrilus sinuatus* in a hawthorn branch, Honor Oak 4.ix.95. The hole is about 3.0–3.5 mm across.

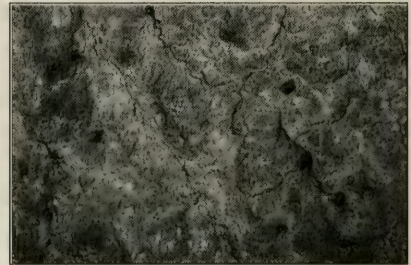


Fig. 2a (left). D-shaped exit hole of *Agrilus pannonicus* in an oak stump, Honor Oak, 4.xi.95. The hole is about 3.0–3.5 mm across. Fig. 2b (right). Seven closely grouped exit holes of *Agrilus pannonicus* in an oak stump, Honor Oak, 4.ix.95. The large stump, 1.3 metre (4 feet) across and 1 metre (3 feet) high had about 50 exit holes in its sides.

any one hawthorn branch, the exits of *A. pannonicus* often occur together in numbers (Fig.2b).—RICHARD A. JONES, 13 Bellwood Road, Nunhead, London SE15 3DE.

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NOTE ADDED IN PROOF

Various London records, including several in south London, have recently been published in Hackett, D. S. 1995. The jewel beetle *Agrilus pannonicus* in the London area. *London Naturalist* 74: 161–164.

A HAZARD TO MOTHS ON THE LOZERE MASSIF

JOHN FELTWELL

Marlham, Henley's Down, Battle, East Sussex TN33 9BN.

I would like to report the presence of a gigantic moth trap in the Massif Central in France which is presumably having a deleterious effect on moth populations. It is in fact a new tourist attraction at a newly constructed 'aire', or motorway service station—the Aire de Lozère at St Chély d'Apcher, north-west of Mende in the department of Lozère. This is on the new A75 autoroute which links Clermont Ferrand with (eventually—when more habitat is cleared) Millau, Lodève and thus to Spain. The site has hundreds of lights glaring into the night sky. You don't have to stop to see this spectacle; it's visible as you pass on the autoroute. And this is in addition to the usual lights of any normal service station. Moths which are attracted to lights find it irresistible.

The autoroute authorities obviously thought fit to construct an aire where picnickers would get a taste of the historic countryside through which they are travelling, and decided to erect 100 granite pillars (each about 3 m tall), geometrically laid out in a perfect square—covering about 0.8 ha. The local countryside does have plenty of similar-looking prehistoric menhirs, but not in such concentration. Figure 1 gives an overview of the site.

Each pillar is illuminated at night by two 70-W tungsten high-energy lamps which are sunk in the ground and which point nearly vertically against the pillars. Thus



Fig. 1. Aire de Lozère granite 'menhirs' and lamps.

there are 200 lights each pointing upwards into the night sky. The locality is thinly forested and is at about 1000 m.

Moths are clearly drawn to this site every night. I was alerted to the presence of huge numbers of moths (hawk-moths were described) by friends who happened to stop in mid-August. In early September I stopped there to assess the situation. The moth carnage was all too apparent and appalling. Scores of moths and moth remains littered the ground. Hawkmoths rested on most of the pillars. They were to be found in the grass around each pillar, and were squashed on the drive-in areas. Wings of many other moths littered the ground where the local birds had soon learnt that easy pickings were to be had every morning. The pillars were pretty unsavoury places to picnic around, since each pillar had been used by dogs in lieu of trees, and there was a general lack of refuse bins etc. The carnage of moths was not very pleasant either, and knowing the disgust that many people have of 'bugs', these were pretty unsavoury places for tourists.

A calamity has obviously befallen the resident and itinerant moths of the area. The situation of these glaring lights on top of a plateau over which migrants have to pass must surely have its effect on luring species which otherwise might have enjoyed a few hundred more miles to fly. The sight of so many sphingids being drawn to their destruction was distressing. And it clearly is happening every night of the year. Moths which arrive during the night remain inactive in the day, if they survive predators, man and car, and remain around the lights at dusk when the lights come on again.

The environmental impact of these bright lights has possibly been very severe in this first year that the aire was opened (1995). This is because moths will have been drawn exhaustively from the local pool of species, apart from drawing on the

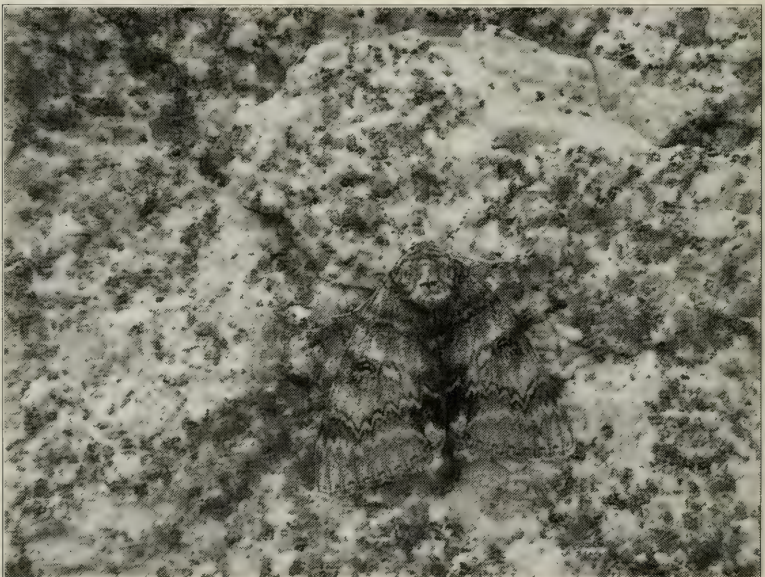


Fig. 2. The Clifden nonpareil, *Catocala fraxini*.

migratory stream of moths which pass overhead. In such an interesting part of the rural countryside I imagine that the impact on moths will continue, especially on migrants. I am not aware of any study on the impact of lights on insects (but would be pleased to learn of any); however I did draw attention to powerful arc lights at Orly airport and their impact on beetle movement (Feltwell, 1967).

The main species found on the pillars were the convolulus hawkmoth *Agrius convolyuli* (L.) and the pine hawk-moth *Hyloicus pinastri* (L.), copper underwings *Amphipyra pyramidea* (L.) or *A. berbera* Rungs (specimens were not collected), broad-bordered yellow underwings *Noctua fimbriata* (Schreb.), angle shades *Phlogophora meticulosa* (L.), as well as various prominents, thorns and footmen. Perhaps the most interesting moths found during my very short stay were three specimens of the Clifden nonpareil *Catocala fraxini* (L.) which is an increasingly rare and localized moth in Europe (Figure 2); it is a scarce immigrant to Britain, several having been recorded in 1995.

ACKNOWLEDGEMENTS

I would like to thank Jane and Michael Evans for alerting me to this site, and Dr Jacques Lhonoré (Le Mans University) and Dr Paul Waring for their comments.

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SHORT COMMUNICATIONS

***Helops caeruleus* (L.) (Coleoptera: Tenebrionidae) in south-east London.**—I was surprised to come across a single specimen of this local beetle on a wooded bank behind some derelict factories on Blackheath Hill (TQ383766; VC 16, West Kent) on 3.x.95. It was sheltering under the loose bark of a small sycamore branch, less than 25 mm in diameter, about 1.5 metres from the trunk. Although known from some urban areas, this beetle is predominantly coastal (Hyman & Parsons, 1992).

The precipitously steep slope on Blackheath Hill is in danger of collapse and several of the sycamore trees lean precariously. A few large logs showed signs of beetle larvae boring within them, but whether these trunks were fallen trees or had been dumped, together with much other rubbish and spoil, is difficult to determine. It is possible that the beetle was introduced to the site if the timber had been tipped there.

I have previously found this Notable-B beetle in sodden drift-wood washed up on the Chichester Harbour saltmarsh at West Itchenor, West Sussex (SZ7899), on 11.ii.78 and in a pile of old railway sleepers near the gravel pits at Rye Harbour, East Sussex (TQ9419), on 26.viii.81.—RICHARD A. JONES, 13 Bellwood Road, Nunhead, London SE15 3DE.

REFERENCE

Hyman, P. S. & Parsons, M. S. 1992. *A review of the scarce and threatened Coleoptera of Great Britain. Part 1.* UK Nature Conservation no 3. Joint Nature Conservation Committee, Peterborough. p. 415.

Acupalpus exiguus Dejean (Coleoptera: Carabidae) "swarming".—My father, Mr A. W. Jones, recently sent me numerous specimens of a small ground beetle which he had found on the roof of his car while it was parked at Greatham Bridge, over the River Arun, Coldwaltham, West Sussex, on 13.ix.95. They all proved to be *Acupalpus exiguus*. This species is accorded Notable B status by Hyman & Parsons (1992). Apparently the roof of the car was dotted with many dozens of the beetles, mostly dead. They may have been encouraged to take to the air following a brief shower which quickly filled up the dykes which run through the river valley. The descent of beetles onto car roofs is an often observed phenomenon and usually involves water or dung beetles which presumably imagine the shiny surface to be a pond or pat. Being a stream-side mud-inhabiting species, the *Acupalpus* seemingly made the same mistake.—RICHARD A. JONES, 13 Bellwood Road, Nunhead, London SE15 3DE.

REFERENCE

- Hyman, P. S. & Parsons, M. S. 1992. *A review of the scarce and threatened Coleoptera of Great Britain. Part 1.* UK Nature Conservation no 3. Joint Nature Conservation Committee, Peterborough. p. 100.

BOOK REVIEW

Integrated pest management by D. Dent. Chapman & Hall, 1995, 356 pp, hardback £45—In the brave new world of the 1950s and 60s a wide range of highly effective insecticides, fungicides and herbicides became available which revolutionized farming practices. The yield and quality of crops improved as intractable pests, diseases and weeds became a thing of the past. This allowed increasingly intensive crop production, but before long problems began to appear. Pesticide-resistant strains have developed, new pests have been created when their natural enemies were wiped out by insecticides, allowing formerly minor pests to breed unchecked, and there is growing awareness of the consequences of allowing chemicals to pollute the soil and waterways. This has led crop-protection scientists to develop integrated pest management (IPM) programmes for some crops with the aim of reducing reliance on chemicals.

This book covers the principles of IPM and the theoretical side of the development of infestations and their control, before moving on to the factors to be considered in devising an IPM programme. This involves keeping pests below the population levels that cause economic damage by using a variety of methods. These include resistant or pest-tolerant crop varieties, cultivation techniques that discourage pests, reducing chemical use by more accurate application, monitoring of the pest population to determine the most effective time for treatment, the use of more selective pesticides, and the introduction of natural enemies. Those requiring further reading will find that each chapter is supported by several pages of references. The final chapters describe some IPM programmes that have been used on olives, wheat, cotton and glasshouse crops. These examples are biased towards pest management rather than disease or weed control, since that is where IPM programmes have had most success. The main readership for this book will be people who are engaged in crop protection but anyone who is interested in "greener" forms of crop production, and the difficulties associated with this, will find something of interest here.

POSSIBLE BREEDING BY THE ROSEMARY BEETLE, *CHRYSOLINA AMERICANA* L. IN BRITAIN

A. J. HALSTEAD

RHS Garden, Wisley, Woking, Surrey GU23 6QB.

During May and June 1994 specimens of *Chrysolina americana* L. (Coleoptera: Chrysomelidae) were found at the RHS Garden, Wisley, Surrey. Despite its specific name, this leaf beetle is normally found mainly in the Mediterranean region of Europe, north Africa and the Middle East. Its principal food plant is rosemary, *Rosmarinus officinalis* L., but it will also feed on lavender, *Lavandula* spp. Adult beetles emerge in the spring and feed on foliage at the shoot tips. During mid-summer they enter a period of aestivation, becoming active again and laying eggs in late summer. The brown eggs are deposited singly or in small groups on the underside of leaves. The larvae, which are grey in colour, are present during the autumn. They feed on the foliage, reducing the leaves to the central vein, and may continue feeding into the winter. When fully fed they go down into the soil to pupate (Balachowsky, 1963).

Chrysolina americana has been recorded once before in Britain. On 1.xii.63, six adults were found in a house at Disley, Cheshire (Johnson, 1963). The origin of these beetles is uncertain. Lavender was growing in the garden of the house just outside the room where they were found, although a search for further specimens on the plant and in the soil beneath it was unsuccessful. During August 1963 the occupants of the house had gone on holiday to Portugal and had brought back four pine cones which had been placed in a cupboard in the room where the beetles were subsequently seen. It is possible that these cones contained aestivating adults which later emerged in December. However the cones were removed from a large conifer and cork oak forest and the collectors could not recollect seeing any rosemary or lavender in the area. *Chrysolina americana* is superficially similar to the very scarce British beetle *C. cerealis* (L.); Johnson indicates the distinguishing features in his paper.

The first beetle to be found at Wisley Garden was discovered by a student gardener, Sarah Walton, on 12.v.94. The students are required to make a collection of 25 pests during their year at Wisley and so are on the look-out for suitable insects. It was spotted on a pot-grown plant of *Rosmarinus officinalis* in a nursery area outside a glasshouse in the propagation department. There were 11 similar plants together in the nursery bed and they were carefully examined in the following weeks. Two other adults were found singly on 20.v. and 1.vi.94. All were found at the shoot tips where they were causing a small amount of feeding damage. The three beetles were kept in a container on a rosemary plant. They became dormant in mid-summer and settled in close proximity to each other on the stems. Despite their bright iridescent colours and 6-7 mm length they nestled in the leaf axils and could be overlooked without careful searching. In late summer the beetles began moving around but they died within a period of 5 days in early September without laying any eggs.

The plants on which the beetles had been found were grown from cuttings taken from a plant at Wisley in October 1992. The rooted cuttings over-wintered in a glasshouse and were stood outside during 1993. The fact that *C. americana* had been found in Britain on only one previous occasion suggests that it is unlikely to be an insect capable of migrating to Britain by its own efforts. The discovery of three adults appearing over a 3-week period on a small group of pot-grown plants is

strongly indicative of adults emerging from overwintering sites, having developed as larvae the previous year. It is not known how the beetle may have arrived at Wisley in the first place. No plants from countries where the rosemary beetle occurs had been received by the propagation department during the period when the beetles were found, or in the preceding months. The Garden is close to the M25 and A3 roads and it is possible that a beetle may have hopped off a passing lorry. More likely perhaps is that the beetle may have arrived amongst plants obtained from elsewhere in Europe for the Garden or for its plant sales centre. During the summer of 1994 plants of rosemary and lavender growing at Wisley Garden were examined for signs of feeding, and beaten to try and dislodge aestivating adults, but none was found. It would appear that if *C. americana* did manage to breed at Wisley it had very limited success.

The three specimens of *C. americana* now reside in the collections of the Natural History Museum, London, the BENHS at Dinton Pastures Country Park, Berks, and the RHS at Wisley Garden.

ACKNOWLEDGEMENTS

I would like to thank Sharon Shute of the Department of Entomology, Natural History Museum for confirming the identity of the beetle and directing me to references about its biology and previous occurrence in Britain.

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SHORT COMMUNICATIONS

***Rhopalum coarctatum* (Scop.) (Hymenoptera: Sphecidae) nesting in a case of *Taleporia tubulosa* Retz. (Lepidoptera: Psychidae).**—A solitary wasp labelled as having been reared 23.vi.1972 from a psychid moth case taken at Pirbright, Surrey, was amongst aculeates in the collection of the late E. S. Bradford, now being added to the BENHS collections. Eric Bradford was a microlepidopterist. The data label queries whether the unexpected emergence betokened unwanted parasitism. The psychid case was not retained, so it is not possible to exonerate the wasp, which more usually stores its aphid prey in plant stems.—R. W. J. UFFEN, 4 Mardley Avenue, Welwyn, Hertfordshire AL6 0UD.

Early hibernation of a queen wasp?—On 27.vii.95, I unearthed a hibernating queen of the social wasp *Dolichovespula media* (Retz.) from beneath a rotten log in the woods of Beckenham Place Park, south-east London (TQ385706; VC 16, West Kent). Although this species is known to finish its season early (M. E. Archer, personal communication), the end of July seems a particularly early date to find a queen ready to “overwinter”. Elsewhere in the park, subterranean nests of the “common” wasp, *Vespula vulgaris* (L.) were active well into October 1995.—RICHARD A. JONES, 13 Bellwood Road, Nunhead, London SE15 3DE.

SOME OBSERVATIONS ON THE BEHAVIOUR OF *PHILANTHUS TRIANGULUM* (F.) (HYMENOPTERA: SPHECIDAE)

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The following observations were made as part of an A-level biology course, to examine ways in which a selection of variables affects the behaviour of a chosen organism, a species of solitary wasp, *Philanthus triangulum*.

P. triangulum is indigenous to hot heathland slopes and sandy banks. It is found mainly in central Europe and was, until recently, considered to be a rare species in Britain (Falk, 1991), although its numbers have increased dramatically in the past 10 years and it is now recorded from around one hundred 10-km squares. Its activity can be observed from mid to late summer. This wasp appears to prey only on the common honeybee, *Apis mellifera* L., and is sometimes known by the common name of bee wolf.

A local entomologist reported seeing a colony on Ambersham Common, near Midhurst, West Sussex. There was no guarantee that they would be present and, as I had only seen evidence of a nest hole once before, I was not entirely sure that I would be able to find the colony. All I had to go on was a map reference.

The land there was a very loose sandy soil containing a great deal of flint deposits. The surrounding area is open, dry heathland with bracken and heather. The woods that surround the area contain a mixture of pine, birch and a small number of oak saplings.

The heath is criss-crossed with bridle-paths and access routes for electricity pylons. It was along one such bridle-path that I found a long south-facing sandy slope which is typical of that used by *P. triangulum*.

Nest tunnels were clearly visible because of the huge fans of excavated material dug out by the wasps. These lay directly below each nest entrance. The nest holes had large D-shaped openings. Around most entrances lay the remains of honeybees. I noted that there were two holes to each nest, the second one being to the right of the D-shaped one. This smaller hole was the one most used by the wasp and, in some cases, the only hole being used.

I studied the wasps on two consecutive days, on 9 and 10.viii.1995, which were the two hottest days and likely to bring results as both bees and wasps would be active. Each day I made close observation of the site, temperature, weather conditions and detailed behaviour of the wasps for 7 hours. I took temperature readings and made notes on the wasps' movements.

I started my observations at 8 a.m. each day. Small flies and other insects were already active, but I had to wait until 10.30 a.m. before *P. triangulum* first emerged. The number of wasps flying in and out of nests increased with the temperature and reached its maximum level at 2 p.m. when the temperature was around 32°C. At higher temperatures the activity of flying wasps declined dramatically to only a few departures and arrivals per hour.

The first behavioural pattern of *P. triangulum* that I observed was when it first appeared at the nest entrance. The wasp did not exit for about 20 to 30 seconds, but would sit half emerged from the nest entrance and appear to warm itself. Excavation of the burrow then took place as the wasp cleared out material from inside the entrance with its hind legs. The debris was cast below the hole in a large fan-shaped heap of spoil. Excavation took the wasp 2 or 3 minutes to complete.

The wasp then sealed up the nest entrance with some of the discarded material, by walking backwards to shovel sand over the hole in use. It seems likely that the

entrance was concealed as a precaution against intrusion from predatory wasps or other insects. This was noted by another researcher who was studying the behaviour of *P. triangulum* on the same days. I could always tell when a wasp was out hunting because the hole was concealed so that only a slight depression was visible. When the wasp was inside its burrow, the hole was left open.

After the nest was sealed, the wasp began to fly in a slow circling motion around the nest site, as if to acquaint itself with the immediate nest area before flying off in search of prey. Often, before a long flight, the wasp would feed on heather, taking nectar to provide it with enough energy for its journey across the heathland.

I observed that when the sun was at less than 195° from magnetic north (before 2 p.m.) the wasps flew to and from the south. When the sun was at a greater angle, the wasp flew out to the north. Because the nesting bank faced almost due south, when a wasp flew out from its nest it would always keep the sun to its left side if it flew south in the morning and north in the afternoon. I believe it may do this for navigational purposes as well as using its polar orientation. This may help prevent over-exploitation of a particular hunting area, so the wasp would be able to feed in new parts of the heathland without exhausting others. However, this flight behaviour may also be brought about by the fact that bees might be feeding in different areas of the heathland if nectar flow in the flowers ceased by mid-day because of the heat and lack of moisture.

I next recorded details of the hunting behaviour of *P. triangulum*. A bee would sit on a sprig of heather, collecting its nectar and pollen. *P. triangulum* would approach from down-wind, as if to pin-point the scent. When totally sure of its prey's position, the wasp would pounce on the bee and appeared to sting under the bee's head to immobilize it. The bee was then slung beneath the wasp. This slowed the wasp's flight considerably and made it much easier to spot.

On returning to its nest site with prey, the wasp would undergo a sweeping flight similar to when it left, but this time it swept down to the nest area. It would find the burrow, dig through the sealed entrance and drag its prey into the hole.

On the second day I decided to see how the wasp would react upon returning to its nest to find a change in the local landscape. I placed a fist-sized rock just to the right of the sealed hole while the wasp was away. When it returned the wasp approached the area as expected, but appeared confused and disturbed at the change in surroundings since its departure. It began a frantic flight around the area. This continued for about 45 seconds but then the wasp flew high over the nest site and began a second, more detailed, descent and this time was able to find its nest hole. Without this change to its surroundings the wasp would usually take around 10 seconds to complete this task. When it left again, it took a good reconnaissance flight over most of the area as if to ensure that it could record every landmark.

My conclusions from this study are that the wasps not only have a large hole to the nest, but also have a smaller one in constant use to the side of it. They prey entirely on honeybees. They use the angle of the sun from magnetic north for navigational purposes. On leaving the nest they seal the hole as a precaution against intruders and take careful note of the surrounding area so that they can find the nest hole again. Wasp activity increases with a rise in temperature, but has its greatest level at around 32°C .

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THE INSECTS ON A SMALL, ISOLATED, DERELICT METALLIFEROUS MINE SITE IN CORNWALL

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Wheal Johnny is an old mine site at Kehelland in west Cornwall near Camborne, about 2 kilometres from the sea at an altitude of 80 metres. It was a small-scale copper, silver and lead mine, well-capitalized between 1878 and 1887, and has been abandoned for 108 years (Buckley, pers. comm.). It was part of a larger complex of mines, to which it would have been connected by tracks or tramways. The mine shaft was 60 fathoms, with a pumping engine in site. Wheal Johnny is now an ecological island (about 0.7 hectares) in an agricultural landscape, being surrounded by fields; access is by a lane from the nearby road. The nearest similar habitat is about 200 metres across a field. The old mine has left a hummocky terrain around an old shaft. The site has been colonised by *Ulex europaeus* L. scrub, with some *Salix cinerea* L. and *Rubus fruticosus* L. agg. in the lower areas. Around the shaft there is a considerable amount of bare ground, which has been compacted by industrial activity; there is some loose clinker on the surface, remnants of slag from smelting. Contamination of the ground in places is shown by surface discoloration. Parts of this area have been colonized by *Calluna vulgaris* (L.) Hull, and form relict heathland. Nectar sources for insects are chiefly provided by *Ulex europaeus* and *Calluna vulgaris*, but there was also *Sedum anglicum* Hudson, *Lotus corniculatus* L., *Hypochaeris radicata* L., *Digitalis purpurea* L., *Gladiolus byzantinus* (Miller) A. P. Hamilton (a garden escape) and some *Crataegus monogyna* Jacquemont. These mine sites have been shown to be nationally important for wildlife (e.g. Bradshaw & Chadwick, 1980; Box, 1992; D.O.E., 1994), especially in Wales (Johnson, Putwain & Holliday, 1978) and in Cornwall (Spalding, 1995). Most survey work on derelict land sites has been done on higher and lower plants, mammals and birds, although some work has been done on invertebrates (e.g. Coldwell, 1993 and Fowles, 1994). The bryophytes of Wheal Johnny have been surveyed (Holyoak, 1995) although nothing of great importance was discovered. Despite the small area of the site, it was found to be of considerable interest for insects during a special survey in 1994-5.

METHODS

This survey formed part of a larger survey of metalliferous mine sites in west Cornwall. Wheal Johnny was visited by day on 11 and 23.viii.1994, 24.iv.1995, 4.v.1995, 6.vi.1995 and 10.viii.1995; no more than 1 hour was spent on the site at any one time. Recording was by observation, sweeping and netting of flying insects. There was no trapping by mercury vapour lamp. Difficult species were collected for examination at home. Mining bees were identified by Mike Edwards and E.C.M.H. Total population counts were made of the grasshopper *Myrmeleotettix maculatus* (Thunb.) on 23.viii.1994 and 10.viii.1995; this was done by collecting all specimens seen which were then released unharmed at the end of the count.

RESULTS

Species of insect recorded included 32 Lepidoptera, four Orthoptera, two Neuroptera, one Dermaptera, 10 Hemiptera, 16 Hymenoptera, 16 Diptera and four Coleoptera. They are listed in the Appendix.

Of these, six were heathland species and five were bare-ground specialists; some of these are sedentary insects almost certainly resident here (Table 1). There were large populations of the moth *Cydia succedana* D.& S. on the gorse bushes, and the moth *Agonopterix nervosa* Haw. was also recorded here. Heathland insects included the moth *Eupithecia nanata* Hübn, the Heteropteran bug *Alydus calcaratus* (L.) and the grasshopper *Myrmeleotettix maculatus*. The population of *Myrmeleotettix maculatus*, according to counts in 1994 and 1995, was apparently stable but very small (Table 2). Six *Tettigonia viridissima* L. were found in 1995, although none were seen in 1994.

DISCUSSION

The insects recorded here can be divided into two classes: resident, sedentary species and mobile, adventive species. The presence of resident, sedentary species (Table 1) indicates long-term historical continuity. Species such as *Myrmeleotettix maculatus* indicate that the site is of possible high quality for invertebrates and should be investigated further (Spalding & Haes, 1995). *Myrmeleotettix maculatus* although winged is not a mobile species. Its presence here indicates that there was extensive heathland present when mining activity started here and that a small area of heathland has survived here ever since. The same is probably true for *Alydus calcaratus*. It is one of the fastest flying of all the British Heteroptera (Southwood & Leston, 1959), but has a close association with dry heathland. It may also occur on the nearby mine site which lies about 200 metres east of Wheal Johnny, but it is otherwise now isolated in this vicinity. The same may be true for the two moth species in Table 1.

An interesting find was the nationally rare green variety of the grasshopper *Chorthippus brunneus* (Thunb.). This form has been recorded regularly on the

Table 1. Resident, sedentary species recorded at Wheal Johnny.

<i>Alydus calcaratus</i>	(Hemiptera, Heteroptera)
<i>Ematurga atomaria</i>	(Lepidoptera)
<i>Eupithecia nanata</i>	(Lepidoptera)
<i>Myrmeleotettix maculatus</i>	(Orthoptera)
<i>Ulopa reticulata</i>	(Hemiptera, Homoptera)

Table 2. Population of *Myrmeleotettix maculatus* at Wheal Johnny 1994-5.

Date of count	23.viii.94	10.viii.95
Females	6	7
Males	7	7
Total	13	14

calcareous dunes along the nearby coast, but this is the first Cornish inland, non-dune record for this distinctive variety. It would be significant if found at other metalliferous mine sites, as it could be linked with the presence of normally maritime/boreal relict plants such as *Armeria maritima* (Miller) Willd. and *Plantago maritima* L., which are widespread on larger mine sites in Cornwall (although not on this site).

The large bush-cricket *Tettigonia viridissima* has a minimum 2-winter dormancy in the egg stage. It is likely that a small population here produces adults only in odd years, which explains why none were seen in 1994. However, as the species is widespread on wasteland and in larger gardens and Cornish hedges in the district, the specimens seen in 1995 could be the progeny of an itinerant gravid female in 1993. This site certainly appears to provide suitable habitat for *Tettigonia viridissima*, which needs scrub as an adult but bare ground for laying and coarse herbage for nymphs.

Bare compacted ground is typical of the contaminated slag heaps at mine sites and can be relatively extensive, even around a small isolated site such as Wheal Johnny. It can be a significant habitat for invertebrates in its own right. It provides two key requirements: warm basking sites, especially for the Orthoptera, diurnal Lepidoptera and Hymenoptera, and nesting sites particularly for solitary Hymenoptera and in consequence a hunting ground for their invertebrate predators (Kirby, 1992; Fry & Lonsdale, 1991). During the survey at Wheal Johnny insects observed using bare sun-warmed slag for basking included *Lasionmata megera* L., a species noted for perching on bare ground (Thomas, 1991), and a transient *Macroglossum stellatarum* L. Hymenoptera clearly associated with this habitat at the site were the ant *Lasius niger* (L.) and the solitary bees *Andrena haemorrhoa* (F.), *Lasioglossum smeathmanellum* (Kirby) and *Pauurgus banksianus* (Kirby) (a locally frequent species around the Cornish coast). A cuckoo bee *Nomada fabriciana* (L.) was probably attracted to the nest burrows of some or all of these bees. A widespread solitary wasp *Mellinus arvensis* (L.) was seen nectaring on flowers in the vicinity, although no nest burrows were located; it is also a bare-ground nesting species, stocking its nests with hoverflies, some of which were numerous here.

One insect readily using the bare ground for basking was *Myrmeleotettix maculatus*. Although this distinctive grasshopper can be very numerous on extensive dune, heath or large mine-tip sites, it is also able to persist in tiny populations, so long as the habitat remains suitably open and exposed to the sun (Marshall & Haes, 1988). Wheal Johnny supported what was clearly just such a small population. The opportunity was therefore taken to estimate the population size of this relatively easily studied insect, partly to demonstrate one facet of the natural history of this site which could be useful for educational purposes. The remarkable closeness in the counts in two successive years (Table 2) indicates a very stable population. Future counts of this grasshopper would prove invaluable for indicating the general stability of the bare ground and associated heathland at this isolated but accessible site.

Heathland is an important but declining wildlife habitat in Cornwall, as elsewhere in north-west Europe. Even a small area, as at Wheal Johnny, justifies careful investigation. At this site the dominant plant of the heathland area is *Calluna vulgaris*. This plant is tolerant of metal contamination and grows well on toxic compacted ground where other plants cannot survive. *Calluna vulgaris* is an important nectar source in the second half of the summer for a wide variety of insects (hence the siting of bee-hives at Wheal Johnny). Six species of bumble-bee,

several solitary Hymenoptera and Lepidoptera, and six kinds of hoverfly were recorded nectaring on the blossom. Insects recorded here, which depend on *Calluna vulgaris* as a foodplant, include the flightless leafhopper *Ulopa reticulata* (F.), the leaf beetle *Lochmaea suturalis* (C. G. Thomson) and the larvae of the moths *Ematurga atomaria* L. and *Eupithecia nanata*. *Myrmeleotettix maculatus* feeds on the adjacent stunted grasses and *Alydus calcaratus* is an active predator in this habitat. Unfortunately, part of this small area of heath was landscaped by grading and grassing when the mine shafts were capped during winter of 1994/5, despite the fact that the importance of the bare ground/heathland area for wildlife was emphasized to the district council. No *Myrmeleotettix maculatus* were seen on the "improved" area in 1995. It is still unfortunately true that bare ground is considered by many to be inimical to nature conservation.

ACKNOWLEDGEMENTS

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APPENDIX. LIST OF INSECTS RECORDED AT WHEAL JOHNNY 1994/1995

- Orthoptera
Tettigonia viridissima L.
Chorthippus brunneus (Thunb.)
Chorthippus parallelus (Zett.)
Myrmeleotettix maculatus (Thunb.)
- Dermaptera
Forficula auricularia L.
- Hemiptera Heteroptera
Piezodorus lituratus (F.)
Palomena prasina (L.)
Dolycoris baccarum (L.)
Alydus calcaratus (L.)
Nysius thymi (Wolff)
Nabis rugosus (L.)
Anthocoris nemorum (L.)
- Hemiptera Homoptera
Ulopa reticulata (F.)
Eupteryx sp.
Philaenus spumarius (L.)
- Neuroptera
Chrysoperla carnea (Steph.)
- Mecoptera
Panorpa communis (L.)
- Lepidoptera
 a) Butterflies
Thymelicus sylvestris (Poda)
Ochlodes venata (Bremer & Grey)
Pieris brassicae (L.)
Pieris rapae (L.)
Pieris napi (L.)
Lycaena phlaeas (L.)
Polyommatus icarus (Rott.)
Vanessa atalanta (L.)
Cynthia cardui (L.)
Aglais urticae (L.)
Inachis io (L.)
Pararge aegeria (L.)
Lasiommata megera (L.)
Pyronia tithonus (L.)
Maniola jurtina (L.)
Coenonympha pamphilus (L.)
 b) moths
Zygaena filipendulae (L.)
Agonopterix nervosa (Haw.)
Eupoecilia angustana (Hüb.)
Epiphyas postvittana (Walk.)
Cydia succedana (D.&S.)
- Macrothylacia rubi* (L.)
Euthrix potatoria (L.)
Eupithecia nanata (Hüb.)
Pseudopanthera macularia (L.)
Ematurga atomaria (L.)
Macroglossum stellatarum (L.)
Arctia caja (L.)
Phragmatobia fuliginosa (L.)
Tyria jacobaeae (L.)
Diarsia rubi (Vieweg.)
Autographa gamma (L.)
- Diptera
Tipula oleracea L.
Bibio marci (L.)
Dilophus febrilis (L.)
Chloromyia formosa (Scop.)
Syrphus ribesii (L.)
Leucozona lucorum (L.)
Rhingia campestris Meig.
Episyrphus balteatus (Deg.)
Merodon equestris F.
Eristalis tenax (L.)
Eristalis pertinax (Scop.)
Eristalis arbustorum (L.)
Urophora cardui (L.)
Tachina fera (L.)
Scathophaga sp.
Sarcophaga sp.
- Hymenoptera
Lasius niger (L.)
Lasius flavus (F.)
Mellinus arvensis (L.)
Vespula vulgaris (L.)
Vespula rufa (L.)
Andrena haemorrhoa (F.)
Lasioglossum smeathmanellum (Kirby)
Panurgus banksianus (Kirby)
Nomada fabriciana (L.)
Apis mellifera L.
Bombus terrestris (L.)
Bombus lucorum (L.)
Bombus hortorum (L.)
Bombus lapidarius (L.)
Bombus pascuorum (Scop.)
Bombus pratorum (L.)
- Coleoptera
Coccinella 7-punctata L.
Oedemera nobilis (Scop.)
Lochmaea suturalis (C. G. Thomson)
Apion ulicis (Forst.)

BENHS INDOOR MEETINGS

10 October 1995

The President, Dr M. SCOBLE, announced the death of Mr H. W. Mackworth-Praed who had been a member since 1960. His collection and books have been left to the Society.

Mr A. J. HALSTEAD showed some larvae of the lesser stag beetle, *Dorcus parallelipedus* (L.) (Coleoptera: Lucanidae). These were causing damage to some logs which had been set into the soil as stepping stones in a garden in Epsom, Surrey.

Mr S. L. MEREDITH showed a twig of sloe, *Prunus spinosa* L., on which there were two eggs of the brown hairstreak. It was one of several that the exhibitor had rescued after the sloe bushes had been trimmed by a hedge cutter. He reported that on 14.viii.95 between 3.30 and 4.30 p.m. at Noar Hill, near Alton, Hants, he had seen at least 50 adult brown hairstreaks feeding on hemp agrimony flowers.

It was announced that Mr Rex Johnson, Dr Chris Tyler-Smith and Mr Vic Williams have been approved by Council as ordinary members.

Mr S. L. MEREDITH said that while on Noar Hill he had found a strange animal feeding by grazing the surface of a hawthorn leaf. It had a black slimy appearance and he had sent it to the mollusc department at the Natural History Museum. They had passed it on to the entomology section where it was identified as the larva of the pear and cherry sawfly, *Caliroa cerasi* (L.) (Hymenoptera: Tenthredinidae)! This species feeds on a wide range of trees and shrubs in the Rosaceae family and is sometimes a pest.

Mr R. J. KEMP said he had seen a male pale or Berger's clouded yellow butterfly at Magdalen Hill Down, Winchester, Hants on 17.vii.95. A Camberwell beauty was seen at Grendon Underwood near Aylesbury, Bucks., on 5.viii.95. He also noted that in 1994 and 95 in mid-Bucks., the brown argus appears to be spreading. Its usual foodplant is absent from that area and so it is possibly using a new food plant.

Mr KEN WILLMOTT spoke on "British hairstreaks and their conservation". His talk was based mainly on observations he had made between 1970 and the mid-80s, and many of his photographs had been taken in the field. Hairstreak butterflies belong to the Theclinae subfamily and there are over 2000, most of which are New World species. Britain has just five species. The most widespread is the green hairstreak and in this species there is considerable variation in the extent of the hairstreak marking on the hind wings. This may be reduced to a few spots or may be completely lost. It has several hostplants, including bird's foot trefoil, rock-rose and gorse. Eggs are often placed on flower buds or leaves at the shoot tips. The first-instar larvae are brownish-red but later instars are green with paler stripes. The pupal stage is possibly associated with ants. The pupae are able to make a squeaking noise and this may be a means of communicating with ants. The green hairstreak is an adaptable species that can colonize new sites. The speaker described a meadow near Leatherhead, Surrey, where tipping had raised the soil level by several feet. The green hairstreak was absent originally but appeared in the meadow once suitable food plants became established.

The brown hairstreak shows variation in the extent of the red patches on the female's forewings. The butterfly is active in mid- to late summer and these red patches may give the female some camouflage when sitting on shrubs with red berries, such as hawthorn and rose. White eggs are laid on blackthorn twigs, often in

the axils of stems. This species seems to suffer from less parasitism of the egg stage than other British hairstreaks. The pale green larvae feed initially by grazing the underside of leaves but later eat whole portions of leaves. Pupation occurs in the hedge bottom. Males hold territories around the tops of trees, especially ash. They have been seen with their mouthparts inserted into lenticels in ash bark from which they may be able to suck up a sugary sap. The main conservation threats to this species are from hedge grubbing and the loss of eggs from blackthorn, when farmers and local authorities trim hedges in late summer.

The purple hairstreak rarely visits flowers but will come down from the tree tops in early morning to drink dew. Eggs are laid on the dormant buds of oak, including turkey oak. The body markings on the larvae give them good camouflage against the remaining bud scales attached to the base of new stems. The mature larvae often pupate in ant nests.

The white-letter hairstreak is associated with elms and it became very uncommon after most elm trees were killed by Dutch elm disease in the 1970s. It has made a comeback as sucker growth in hedgerows has developed into small trees. Dutch elm disease is now again widespread and may send the butterfly back into decline. It lays its eggs on English elm stems, especially at the junction of the current year's growth with that of the previous year. The mature larvae turn into hairy pupae which are attached to the foliage or twigs.

The black hairstreak is the most local British species. In 1978 a thriving introduced colony was discovered in Surrey by the speaker. Eggs are laid on blackthorn and they hatch into larvae that resemble the foodplant's bud scales. The older larvae are pale green and they feed at the shoot tips. The pupae resemble bird droppings and they are found on the foliage and twigs. The Surrey colony began to decline and, despite management at the site to encourage new blackthorn growth, it has now died out. This is probably due to changes in land use outside the site, which included the felling of surrounding woodland that provided shelter and other needs of the adult butterflies.

14 November 1995

Dr D. J. L. AGASSIZ showed a specimen, provisionally identified as *Metzneria torosulella* Rebel, taken at light in his garden at Gravesend, Kent, 18.viii.1995, which had at first been misidentified as *Sitotroga cerealella* (Ol.). This cannot confidently be counted as British, since seedheads of thistle were collected in Tenerife in April 1995, from which a *Metzneria* species was bred. In the late summer, date not recorded, these seedheads were put on the garden compost heap and it is conceivable this was the source of the specimen.

Mr R. K. MERRIFIELD showed a fossil from Praa Sands, Cornwall, probably the cast of a marine tube worm, impregnated with iron ore. It was found at the base of a cliff in a dark stratum which was probably estuarine mud, iron ore being in the cliff strata above.

Mr N. A. CALLOW reported that at Smitham Hill, East Harptree, Mendip on 21.x.95 at 2.30 p.m. over 500 Chloropid flies *Chlorops hypostigma* Meigen were seen in a 12 ft vertical column on the sunny side of a telegraph pole. Their activities included courtship and attempted mating.

Mr R. D. HAWKINS announced the publication of the Society's latest book: *New British Beetles* which was available in paperback at £12 and hardback at £18 to members.

There then followed a discussion on the Annual Exhibition.

The President began by thanking and congratulating Mr M. J. Simmons on the organization of a successful Exhibition. Mr Simmons reported that both attendance by members, and the number of exhibits had remained steady. There had been fewer exhibits of Diptera and Coleoptera than in recent years, but an increase in the number of Lepidoptera exhibits.

The discussion was then followed by members' slides. Mr R. K. MERRIFIELD showed slides of the natural history of the Scilly Isles and Cornwall; Mr N. L. SAWYER, of insects in Turkey; and Mr N. A. CALLOW, of insects etc. in Greece and the UK. The President thanked members for their contributions.

BENHS FIELD MEETINGS

Dawlish Warren, Devon 24 June 1995

Leader: **R. McCormick**. The night was reasonably overcast with a very light breeze which abated as the night wore on. Thirteen people attended of whom nine were from the BENHS and two were members of The Devonshire Association. Two were part of the ever-increasing group of people with whom the leader had made contact in Devon, and two were wardens from the site.

After introductions, the leader instructed the members present on the rules of the Dawlish Warren Nature Reserve regarding the parking of vehicles and the taking of specimens. The assembled entomologists then made their way on to the site to set up their equipment. There were about 12 lights in operation. The leader and several of the group went on the rounds to see as many of the lights as possible, and a sizeable list soon built up. The temperature stayed around the 20°C mark all the time the meeting was in progress. Because it was such a good night the meeting did not pack up until around 03.00 hours or later, and the general feeling was that of an enjoyable field meeting. There were recorders of three orders of insects on site, two coleopterists, one hymenopterist and five lepidopterists, with lists of species seen from most of the visitors. The lists of Lepidoptera have been amalgamated into a list of 159 species; a lot of the Microlepidoptera were identified by Bob Heckford but there are still some that have yet to be named. A list of Hymenoptera was also produced and provided by A. A. Allen.

Interesting species that were seen include *Pediasia contaminella* Hübn., which is relatively new to the Devon list; *Anerastia lotella* Hübn., this species is restricted to sandy localities; *Epirrhoe galiata* D.& S., galium carpet, a nationally scarce species that is found in many localities throughout Devon; *Callimorpha dominula* L., scarlet tiger, which is thought to be restricted but in actual fact is widespread throughout Devon; *Meganola albula* D.& S., Kent black arches, this species is found commonly on the Warren and on some other sites; *Agrotis ripae* Hübn., sand dart, a species that is also restricted to sandy localities which are very few in Devon; *Larrias clorana* L., cream-bordered green pea, this species was only found as isolated records until it was discovered to be breeding on the Warren. There were five species of parasitic Hymenoptera identified, the most important of which seems to be *Macrocentrus collaris* (Spinola), female, a gregarious parasite on noctuid larvae, not seen on the Warren before.

Maidscross Hill, Lakenheath, Suffolk, 15 July 1995

Leader: **David Young**. The weather conditions for the field meeting to this well known site were not as good as we might have wished, and no doubt partially explained the low number of members who turned up for the meeting. On the other hand, weather conditions were not as bad as is usually the case when I volunteer to lead a field trip. Whilst the morning was pleasantly sunny, a heavy storm in the afternoon, combined with a brisk wind throughout the day, effectively reduced insect activity during the daylight hours.

Undaunted by the conditions, searching the site, especially in the more sheltered places, gave a promising start to the day's recording efforts. Thirteen species of butterflies were recorded including both *Thymelicus sylvestris* (Poda) and *T. lineola* (Ochs.), a few *Polygonia c-album* (L.), fresh males of *Hipparchia semele* (L.) and plenty of *Maniola jurtina* (L.), the females of which seemed to be more brightly marked on the underside than normal. The larva of *Tyria jacobaeae* (L.) were common and many of the campion seed heads contained larvae of *Hadena bicruris* (Hufn.). A large and unidentified ichneumon was seen hunting for these larvae, probing her ovipositor deep into the seed heads. Sweeping the low herbage, at least until the storm brought an abrupt end to the daytime proceedings, produced a variety of larvae, many of which turned out to be *Heliothis virescens* (Hufn.), a species later recorded at m.v. light.

Only a few records of orders other than the Lepidoptera were made. A female *Sympetrum sanguineum* (Müller) (Odonata) was seen. Other records included *Chloromyia formosa* (Scop.) (Diptera), and *Crabro cribrarius* (L.) and *Cerceris arenaria* (L.) (Hymenoptera).

Weather conditions improved considerably as dusk approached. The wind dropped, cloud cover increased and the temperature, along with our spirits, rose steadily. Several m.v. traps were run in sheltered positions with one trap placed well out into the exposed part of the site and surrounded by viper's bugloss. Tony Dobson kindly festooned a conveniently situated wire fence with wine ropes which duly produced a good number of moths including a few species which were not recorded at the m.v. traps.

The date chosen for this field meeting was too late for such Breckland specialities as *Lithostege griseata* (D. & S.), and was between broods of *Scopula rubiginata* (Hufn.) with only one fresh example being noted. There was no sign of *Heliophobus reticulata marginosa* (Haw.), a species which now seems to be difficult to find, and there were no *Noctua orbona* (Hufn.) amongst a steady trickle of *N. comes* (Hübner.). However there was much of interest amongst a large number of moths recorded. Amongst the Pyralidae were several specimens of *Evergestis extimalis* (Scop.), and *Sitochroa palealis* (D. & S.) was common.

OBITUARY

FRANCES MARY MURPHY 1926–1995

Frances was born on 29 April 1926. Her parents were both interested in birds and, so Frances recalled, probably also in flowers and gardens, and she soon developed a keen interest in natural history. Following the death of her mother when she was seven, Frances and her younger brother Edward continued to live with their father in the Yorkshire countryside. When she returned from boarding school during the school holidays she spent much of her time wandering in the surrounding fields. Later she recalled that even at this early age she seemed to have long known all the common flowers and birds of the area.

Frances was taken to the Natural History Museum whenever she visited her London relatives and was fascinated by the giant skeletons of the giant prehistoric saurians. Having read the second chapter of Wells's *History of the world*, which concerned dinosaurs, she then read the first chapter which gave an outline of astronomy. This led to a fascination with the stars which endured throughout her life. She once commented that in the early 1940s cosmologists believed the universe to be 10 million years old, while geologists put the Earth at about 100 million years old. The teenage Frances had considered this "an unsatisfactory arrangement".

In 1943 Frances went to Bedford College, London University, to read mathematics. It was an old-fashioned course, but she enjoyed the freedom of life for a year in Cambridge and then in London. In 1945 she became ill with very high blood pressure through kidney disease. Frances thought she "had had it", but luckily the trouble only affected the left kidney and after it was removed she recovered. Because of her illness, Frances lost a year's education and finally took her degree in 1948. She later considered it "not a very good degree", but it had taken her some time to get over the operation. With hindsight she thought that she should perhaps have taken a year off, but in typical positive fashion she wanted to get on with things.

After graduating Frances went to work at Fairey Aviation in the guided missile section, where her mathematical training was put to use calculating stability and flight paths. She found the work interesting and progressed well, ultimately having a small section to assist her. It was at Fairey's that she met John Murphy, and they were married in December 1949. The accompanying portrait of Frances at 40 was painted by Ted Watson, another colleague at the company.

In the late 1950s and early 1960s Frances suffered from a sort of general blood poisoning which left her very tired. It was at this time that Fairey's was taken over by Vickers another aviation company which Frances dryly described as "the merchants of death". She did not get on with the new company and stayed only a year.

It was at this time that her interest in spiders developed. She joined the forerunner of the British Arachnological Society and went on a Field Studies course on spiders at Platford Mill. One of the inspirations for her interest was W. S. Bristowe's *The world of spiders*. At first she wanted to photograph them because she could not draw "for toffee", and in order to do this she kept many in captivity, rearing them to maturity. In this she became quite expert and wrote several small books based on her experience.

Frances was quickly drawn in to the study of spiders and was a member of many arachnological groups. She was a founder member of both the British and American Arachnological Societies and also belonged to the British Tarantula Society, the Spider Club of Southern Africa, the Australasian Arachnological Society, the Centre International de Documentation Arachnologique and the Société Européen d'Arachnologie. Her wide interest in general natural history enabled her to



Frances at 40, painted by Ted Watson, a colleague at Fairey Aviation.

contribute to the London Wildlife Trust, the Wildlife Society and the London Natural History Society. Her childhood fascination with dinosaur bones was repaid when she became a founder and committee member of the Friends of the Natural History Museum.

In 1962 Frances joined the BENHS, which was then the "South London", and during her membership she contributed greatly to the Society. During the 1980s Frances was Secretary of the Society and in 1989 became President—the first and (so far) only woman to be appointed to the position. Later she was one of the BENHS representatives on the Joint Committee for the Conservation of British Insects (later Invertebrates). It was during her presidency that the Society received news that it would have to quit its long-held rooms at the Alpine Club in Mayfair's South Audley Street, and Frances spent much time and effort finding new premises for the Society.



Frances at the 1989 AES exhibition.

With a resurgence of her previous kidney problems a few years ago, Frances prepared a résumé of her life and sent it to Canon David Agassiz with the request that, whenever it might come, he should officiate at her funeral. I have drawn heavily on that résumé (and David's funeral oration) in preparing this notice, and reading through it I can still hear Frances' voice speaking to me. Frances died on 20 July 1995 and her funeral on the 28th of July was so well attended by family, friends and colleagues from the many societies to which she belonged, that there was standing room only for many of us.

Frances will be sadly missed by us all, but in particular by her husband John to whom our deepest sympathy is offered.

A PERSONAL APPRECIATION

Anyone who met Frances was immediately struck by the strength of her character. Some, who knew her less, mistook her outspokenness and hearing her acerbic wit failed to appreciate her dry sense of humour—their loss.

In 1980 when I first attended BENHS indoor meetings in the crusty rooms of the Alpine Club, I was immediately aware that the Society still had something of an archaic (but charming) atmosphere; at the time I likened it to a Victorian gentlemen's club. And yet here in the middle of the enthusiastic bustling males was a woman, and not a woman entomologist but an arachnologist to boot. Despite these ironies, Frances was not out of place; she cut a swathe through the Society, held her own on all occasions and commanded the respect of others on equal terms.

Even in the pub after evening meetings, Frances would join us other reprobates for a beer before home. When her renal problems reappeared, she was obliged to give up her usual half of Guinness, so took to ordering a small brandy instead.

One of the first things which struck me about Frances was that she and John were always zooming off on exotic holidays to strange parts of the globe. On several occasions she gave lectures to the Society detailing her adventures and showing spectacular slides. These were not at all wholly of spiders and you could always be certain that whenever she spoke, Frances would colour her narratives with bizarre anecdotes and amusing asides.

Frances once gave an account of her travels in New Zealand and I tempted my partner, Catrina, along to hear it since this was the land of her father. My glowing accounts of Frances' skills as a speaker were rewarded when Catrina later compared the measured but enthusiastic delivery to that of Joyce Grenfell. As ever, it was a delightful evening.

It was through her world travel that Frances was an inspiration to me. A few years ago Catrina and I had, as usual, left our holiday planning until the very last minute and were at a loss wondering where to go. The destinations we selected were impossible to reach, for this was the time of failing travel companies and consolidation of many flights meant that package deals and cheap flights were full or cancelled. Costa Rica in Central America came into our minds and I remembered that Frances had been there a few years before. I telephoned her to ask what she thought of the place and her immediate response was to invite us over to her house for a private slide show.

Here we were entertained with as professional a travelogue as we could wish to hear anywhere. And afterwards Frances showed us some of her pets, including one she just happened to have from Costa Rica—a large amblypygid tailless whip-scorpion sitting almost motionless in its case. It was now that Frances admitted she had a cunning trick to get through US customs quickly and easily whenever she travelled that way. She would inform officials that she was transporting live spiders in her baggage. This was not against regulations, but it meant she was ushered through a different customs route, one which was inevitably less congested.

Our holiday in Costa Rica was a spectacular success and one of the most exciting moments was peeling back a bit of bark to reveal an amblypygid—just like the one Frances had. On BENHS field meetings Frances was sometimes ribbed by the discovery that an interesting web was made, not by a moth caterpillar, but by a spider—a “Murphy”—and now I cannot see a spider without thinking fondly of her.

RICHARD A. JONES

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OBITUARY

CHARLES BRADWIN ASHBY 1920–1994

Charles Bradwin Ashby (known as 'Brad' for short) who died on 9 January 1994 joined the BENHS in 1965, known then as the South London Entomological and Natural History Society. Over the years he attended many of the indoor meetings and those in the field, when by that time his main interest lay in the Lepidoptera.

He was born on 13 June 1920 and lived his early years with his parents in West London. His father had an electrical business in the King's Road, Chelsea. At the age of ten the family moved to Carshalton, Surrey, and the following year young Brad entered the nearby Sutton Grammar School. The author of this obituary was at the same school and, though in a form lower, remembers Brad, not as a member of the school natural history society, but as a participant of the art group where a fellow artist drew the accompanying cartoon.



Cartoon of Brad Ashby by Snoaden, Art Group, Sutton Grammar School, 1936.

On leaving that school in 1937 Brad joined his father's business, attending night-school to obtain the Diploma of the Institute of Electrical Engineers. He took his final exams just at the outbreak of World War II. When it was time for him to be called for military service, his electrical qualification and experience were considered of sufficient consequence for him to be drafted into the services of the Ministry of Aircraft Production. At first Brad was based at their headquarters at Millbank on the Thames, but for most of the next five years he was sent up and down the country examining crashed aircraft. This, at times, became a very harrowing experience for him. He had, in each case, to assess what electrical faults, if any, might have contributed to the crash.

Soon after the end of the War in 1945, Brad was released by the Ministry and then rejoined his father's business which was still in the King's Road. When Ashby senior died, Brad took over, first as manager and then later as director of the firm. In 1985 he had been considering retirement at the end of that year, but decided to stay on until 1988 in order to celebrate the firm's one hundredth year of establishment.

Brad Ashby first became interested in natural history during World War II and his earliest leanings lay towards ornithology. In this connection he joined the London Natural History Society, becoming involved on its Ornithology Committee and serving on that of the *London Bird Report*, remaining with it until 1960. After the publication in 1957 of that Society's first edition of *The birds of the London area since 1900*, Brad turned his attention towards microscopy, ecology and entomology. To satisfy the first mentioned he joined the Quekett Microscopical Club, becoming particularly interested in the smaller denizens of pond life. For ecology and entomology he transferred his attentions in the LNHS from birds to the section that catered for these topics, at the same time seeking membership of the BENHS as has already been mentioned. In our Society he became increasingly absorbed in the Lepidoptera. With a friend he operated a mercury vapour moth lamp on Bookham Common, Surrey intermittently between the years 1965 and 1968. From this study he contributed a number of new moth records to Colin Plant's *Larger moths of the London area* (1993), on the cover of which appears Brad's colour photograph of the elephant hawk-moth.

Each year Brad and his wife Hilda took their annual holiday in Sweden, partly to visit their younger married daughter living there, and then to continue by motoring to distant parts of that country, watching birds and butterflies whenever possible. It was during one such yearly visit that Brad had the good fortune to be introduced to one of Sweden's leading lepidopterists, Stig Torstenius (also a member of our Society). This first meeting blossomed into a real friendship which brought about the presentation by Torstenius to the BENHS of a representative of each of Sweden's Lepidoptera from his own collection. At the end of each year's holiday Brad would bring back to England several store boxes of mounted specimens and Stig, when he came over here, would bring a similar amount. During the ensuing twelve months Brad would find the time to change, where necessary, the staging-pin size (and add further specimens mounted from Stig's papered reserve collection to fill any gaps), so that the whole could be re-arranged in Hill cabinet drawers set aside for this purpose by our Society's Council. Anomalies and difficulties in the nomenclature from earlier Continental lists were ironed out by Ashby, so that there is now a catalogue prepared by him for members subsequently using the collection. One cannot fail to appreciate the vast amount of work he put into getting the collection into working order, especially when one considers that it involved somewhere between three and four thousand specimens. It is an effort for which our Society can be forever grateful. The



C. B. Ashby 1920–1994.

story of this *Torstenius* collection was fortunately written up and published by Ashby in our Journal just before he died (*Br. J. Ent. Nat. Hist.* 7: 37–46, 1994).

Not only did he work hard on the *Torstenius* Lepidoptera collection, as has just been described, but he also gave considerable attention, when the time came, to detailing the arrangements for moving the Society's collections to Dinton Pastures. At our annual exhibition meetings he also gave much unsung assistance in ensuring that such functions ran smoothly. It was not unusual for him to turn up early for these meetings to help in setting up the tables for the exhibits, and he made certain that the slide equipment was in the right place at the right time. Furthermore, in his capacity as a member of both our Society and the LNHS, he made certain that arrangements for the annual joint meeting between the two organizations were satisfactory each year, presiding over several of these events on the appointed evening. When Stanley Jacobs died in 1989, Ashby's name was put forward at a BENHS council meeting as a successor trustee, to which post he was duly elected. While not carrying any additional work load, a trustee's rôle has an important obligation in the event of a society becoming insolvent.

Brad always had a particular bent for new gadgetry. The writer of this note recalls a delightful piece of Ashby 'Heath-Robinson' equipment, consisting of a veterinarian's hypodermic syringe taped to the end of a walking stick with a pull-string attached to the head of the plunger! This simple, though effective, piece of apparatus allowed samples of pond water to be taken at various depths. He retained this same inventive frame of mind to the end, for on 14 December 1993 he exhibited a 'home-made' but highly professional slide-viewer, constructed only a few weeks

before he died. With his death the Society has lost a respected member who did much on the side-lines of the BENHS—a difficult rôle to refill. The writer of this obituary notice misses a valued friend and a worthy field companion.

ERIC W. GROVES

EDITORIAL

MORE ABOUT LOGOS

Since the appearance of the last issue of the journal, and in particular my pontifications on the possible origins of the Society's logo, I have received various communications pointing out alternative identities for this mysterious creature. It was a postcard from Tony Irwin, which first alerted me to the possibility that the insect was a long-tailed zygaenid moth, possibly *Himantopterus fuscineris* Westw. This species is depicted (plate 46b) in *The dictionary of butterflies and moths in colour* by Allan Watson and Paul Whalley (1975, Michael Joseph Ltd; reprinted 1983, Peerage books) and it certainly looks very like the logo illustration. *Himantopterus* is a small genus of Indian and South-East Asian moths, all with very long hind wings; *H. fuscineris* is recorded from Java and Sumatra. The larvae are reputed to live with termites, but otherwise very little is known of this or others in the group.

A few days later, Mark Parsons thrust a small glass-topped box under my nose. It was another long-tailed zygaenid, a *Doratopteryx* species, this time from Africa. The close resemblance of this moth to the Society logo was noted by Martin Honey and, like many great entomological advances, was the result of a conversation during a staff coffee break at the Natural History Museum.

However, further evidence has emerged that the device is indeed *Nemoptera*. In the Council's report for 1967 (*Proc. Trans. Br. Ent. Nat. Hist. Soc.* 1968; 1: 16), when its availability was first announced, the tie is described as having "a simple motif, a neuropteron".

No matter what the insect is, the question still remains—why should Arthur Smith have chosen such an obscure insect to decorate the Society's tie? Perhaps someone out there has an idea.

It might be worth reporting here that the Society's council spent some time and energy in debating the exact form of the logo. At the time, everyone on council was firmly of the opinion that the insect on the tie was a species of *Nemoptera*, a mainly Mediterranean group related to lace-wings. In particular, it was thought to be *Nemoptera bipennis*, the species shown (page 107) in Michael Chinery's *Insects of Britain and western Europe* (1986, Collins). In asking Rob Dyke to redraw, it was suggested that the logo should be more life-like, so Rob carefully penned a more detailed figure accordingly.

However, it was only then noticed that *Nemoptera* had much broader and blunter wings than Smith's tie logo—a completely different design had resulted. What should the Society do? There were two alternatives: use Rob's new 'more accurate' depiction of *Nemoptera* or return to a version based on Smith's ties. The debate was finally resolved at the 1995 annual exhibition where a vote to use Smith's slim-winged insect was narrowly passed by the assembled council members. Given the mystery surrounding its origins, and argument on the animal's identity, it is perhaps just as well that we have retained Smith's design more or less unaltered.

RICHARD A. JONES

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Meetings of the Society are held regularly in London, at the rooms of the Royal Entomological Society, 41 Queen's Gate, London SW7 and the well-known ANNUAL EXHIBITION is planned for Saturday 2 November 1996 at Imperial College, London SW7. 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, R. F. McCormick, at the address given below.

The Society maintains a library, and collections at its headquarters in Dinton Pastures, which are open to members on various advertised days each month, telephone 01734-321402 for the latest meeting news.

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Cover illustration: Purple emperor, *Apatura iris* (L.) feeding. Canon A1 camera, 100mm macro lens. Photo: R. Revels.

NOTE: The Editor invites submission of photographs for black and white reproduction on the front covers of the journal. The subject matter is open, with an emphasis on aesthetic value rather than scientific novelty. Submissions can be in the form of colour or black and white prints or colour transparencies.

A. E. WRIGHT'S RECORDS OF HYMENOPTERA ACULEATA FOR GRANGE AND NEIGHBOURHOOD, INCLUDING A NOTE ABOUT HIS FRIEND J. D. WARD

NEIL A. ROBINSON

3 Abbey Drive, Natland, Kendal, Cumbria LA9 7QN

Albert Edward Wright was a dedicated entomologist who lived at Brunleigh, Kents Bank Road, Grange-over-Sands after his retirement in the early 1920s until his death at the age of 76 in 1950. During this time he collected, studied and recorded in detail the butterflies, moths, hoverflies, bees, wasps, ants and other Hymenoptera of the Grange area. He was an active member of the Lancashire and Cheshire Entomological Society and Manchester Entomological Society, and was a fellow of the Royal Entomological Society of London. His large collection, which was almost complete for British moths, has been divided and is lodged in various museums. Of his aculeates, 2200 are in the Natural History Museum, London (accession register entry: B.M. 1950-558. 2200 British Aculeata. Purchased from Watkins and Doncaster. 2.xi. 1950 Coll. by A. E. Wright), and some are at Liverpool Museum. His ledger of records and entomological diaries are in the possession of Dr Neville L. Birkett, who first visited Wright on 19.viii.1940, but was not living in Grange at that time. He kindly made the ledger and diaries available for me to extract the records of Hymenoptera. The object was to obtain a picture of the range of species in the only intensive collection of aculeates which has been made in South Lakeland, and in particular to identify the locations and habitats in which they were collected. It was also to provide information for Tullie House Museum, Carlisle, where Steven Hewitt, Keeper of Natural History, is compiling records for Cumbria, and for the interest of other entomologists because, although the A. E. Wright Collection is famous, as far as I am aware there is no published list of his Hymenoptera. His obituary in the *Annual Report and Proceedings of the Lancashire and Cheshire Entomological Society* (Mansbridge, 1949/50) states that he contributed a list of the Syrphidae and aculeate Hymenoptera to the *North Western Naturalist* in 1940, but in fact this paper only lists Syrphidae (Wright, 1940). As it turned out, the list which I compiled, although of interest to the people for whom it was intended, proved to be too problematical to be suitable for publication due to subsequent changes in nomenclature, revisions of taxa and uncertainties or errors of identification. However in the course of this work I discovered a great deal which is of interest about Wright himself. Although he was well known as a lepidopterist and dipterist, much less seems to have been known about his interest in Hymenoptera.

WRIGHT'S RECORDS

The ledger contains his records of butterflies, moths, hoverflies and ants, wasps and bees of Grange-over-Sands and surrounding district. To this Neville Birkett has added a list of Chironomidae of Kendal District (including parts of Lakeland) but these are not his complete records. I have only examined the section on Hymenoptera Aculeata. The ledger is oblong in horizontal format with the pages ruled into three columns. The first contains a complete list of British aculeates, the second contains records from other sources and the third contains his own records. In the second column L and C followed by a year simply indicate records for Lancashire and Cheshire in the Fauna Committee Report and bear no specific

relation to Grange (which was in Lancashire at that time) but it also contains records from the 1920s by his friend and close neighbour J. D. Ward. The ledger entries usually contain only minimal information about locations, e.g. "Grange-over-Sands" or "Witherslack". Although there are some earlier dates in the ledger, the majority of the records are for the period 1940 to 1943. The fact that there are no entries after 1943, and the discovery of additional species in later diaries, led to the slightly disappointing realization that the ledger is not a complete list of Wright's collection. This seems to have been the original purpose of the ledger for all the groups which he studied, but evidently he did not keep it up after 1943. Therefore it was necessary to search through the post-1943 diaries for additional species.

The diaries are a single hard-backed exercise book covering 1939 to 1946 and then a series of annual large-format 'Boots scribbling diaries' for 1947-1950. They contain detailed day-to-day accounts of his insect collecting, visitors and correspondence. It is evident that he took advantage of every fine day to collect insects in his garden, on walks around Grange, or on short excursions further afield. When it rained he resorted to picking flies off the windows of his house and even the shelters on the Promenade ("Went twice to the Bandstand—a splendid flytrap"), but he must have spent a great deal of time mounting and identifying his specimens—and writing up his diaries. He also collected flower heads, buds and blotched or mined leaves to breed out the larvae or pupae which they contained. He did not use a light trap, but opened his curtains to see what came to his window.

Moths are recorded by their specific epithets only. Bees and wasps are recorded by genera, frequently with bracketed spaces left for the specific names to be added later. These however were rarely filled in. In 1941 he was sending aculeates to H. (Harry) Britten at Manchester Museum for identification. By 1942 more of the bees were identified directly and by 1943 more of the wasps, but there continued to be a great many gaps. If these specimens were identified their names are presumably only to be found on the data labels. Some of the later entries are corrections by Britten of earlier identifications by Wright, which do not seem always to have been altered in the ledger, raising further problems about this as a list. In 1946 he was sending specimens for identification to, and exchanging specimens with, Dr O. W. Richards at the Imperial College of Science, London. He also exchanged specimens and species lists with W. D. Cowin at Douglas Museum, Isle of Man.

The diary entries always record the weather, but there are few observations on what the aculeates were doing. There are some exceptions: on 25.v.1945 he records watching a *Chrysis ignita* (L.) enter a hole in a post in his garden provisioned by *Osmia caerulescens* (L.), and on 18.vi.1945 an attempted mating between an *O. caerulescens* and another which might have been the other sex or another species, but such instances are few. Generally he only reports what he saw or collected and where. Apart from his visitors and occasional excursions with his family, there is in fact very little anecdotal information. The outbreak of war against Germany is noted at 11.00 a.m. on Sunday 3.ix.1939, and later that he could not use a light because of the blackout. The all-night air-raid of 4.v.1941 (when according to Lord Haw-Haw the "Grange harbour works" were bombed—Neville Birkett, pers. comm.), which did great damage all over the district including blowing in his front windows, is reported in between what he had taken in the garden in the morning and what he bred out later, and is not mentioned again. On a lighter note, on 26.vii.1940 he records falling into a dyke at Witherslack and losing his kite net. He maintained his diaries until the day before he died suddenly on 26 April 1950. His obituary in *The Entomologist* was written by Neville Birkett (Birkett, 1950). Obituaries were also published by the Lancashire and Cheshire Entomological Society (Mansbridge, 1949/50), the Raven

Entomological and Natural History Society (Anon., 1950) and the Royal Entomological Society (Wigglesworth, 1951).

LOCATIONS AND HABITATS

Grange is situated on the carboniferous limestone on the north side of Morecambe Bay and its sheltered south-facing situation gives it a very mild climate. Wright was a keen gardener. He frequently recorded spending the whole day in the garden, which evidently attracted a great number of insects. It had a south-facing limestone rockery where he took many bees, and a vegetable garden where he had drilled holes of a variety of sizes into the raspberry posts (Neville Birkett, pers. comm.) at which he collected twelve species of solitary wasps and six of solitary bees. The overall range of bees and wasps (and other insects) which he recorded is quite astounding, particularly as this was no 'country garden'. It was simply the garden of a large stone-built house, one of a row in a street in the centre of Grange-over-Sands. However Dr R. C. Lowther who also lived nearby in the centre of Grange recorded nearly 400 species of Macrolepidoptera in his garden, and Wright caught about two-thirds of the then known species of syrphids in or near Grange (Wright, 1940), which demonstrates how rich the Grange area is (or was).

Around Grange his favourite walk was by way of "the Lane and Bee path" to Eggerslack, an area of lanes, paths, limestone walls, small fields and woods, and then to the open limestone grassland of Hampsfell. He also often walked along the road between the golf course and the railway to the embankment of Holme Island (SD423784), from which he worked the seaward side of the railway embankment and the saltmarsh. The embankment seems to have been a very good location where he took many sphecids, *Andrena* and *Halictus/Lasioglossum*, especially on *Daucus carota* L. It was here that he took *Melitta haemorrhoidalis* (F.) in July 1945 and 1947, new to the north of England. Sometimes he went to Eggerslack in the morning and the embankment in the afternoon. Unfortunately the embankment and saltmarsh are much more heavily grazed now and the rich flora of Wright's day is no longer present (Neville Birkett, pers. comm.). Another place on the outskirts of Grange which he sometimes visited, particularly to look for ants, was Yewbarrow (SD404783), a wooded knoll directly above Grange. These places are usually referred to in the ledger as "Grange". It was in fields near Yewbarrow that J. D. Ward collected *Osmia xanthomelana* (Kirby) in 1920 and 1924 (Robinson, 1996). Wright did not collect this species, but his collection in the Natural History Museum, London, was found to contain three males of another nationally rare mason bee: *O. parietina* Curtis, though he had not identified them as such (George Else, pers. comm.).

His most regular short excursion was by bus to Witherslack, where his favourite haunt was "Black Tom's Lane". This is the track between Nichols Moss (SD430825) and the adjacent limestone ridge to the east, giving a nice juxtaposition of mossland and limestone habitats. Nichols Moss is an SSSI which at that time would be largely devoid of trees; in 1947 he reports thirty or forty men cutting peat (but fortunately this only affected a small area). Like most small Cumbrian mosslands it has become invaded by pine and birch since the Second World War, but English Nature is negotiating with the owners for the removal of the trees and has begun clearing the south end. The lane is now much over-shadowed by trees and not the open habitat which Wright knew.

He also went to the SPNR reserve at Meathop Moss, for which he was chairman of the management committee. Fifty years later the Cumbria Wildlife Trust is still succeeding in keeping the central area free of pine and birch, by constant effort.

More often it seems that he went to what he refers to as Witherslack or Whitbarrow Moss. The latter seems most likely to be what is marked on Ordnance Survey maps as Bellart How Moss (SD 455835), which is continuous with the much more extensive Foulshaw Moss (SD 460825), both of which have since been planted with conifers by the Forestry Commission. Witherslack Moss may have been the same area, approached from the Witherslack end. These coastal raised bogs, which provided heather and other mossland habitats within easy reach of Grange, are collectively referred to as "Witherslack" in the ledger.

Further afield he occasionally went west to Cark or east to Arnside which, although on the other side of the Kent estuary, is the next stop on the train from Grange, but most of his collecting was done at Grange or Witherslack. It seems that he collected his insects from flowers, in flight, or by sweeping; he did not seek out breeding colonies of aculeates. His only references to nesting sites are the posts in his garden and the "bee path" which evidently had good populations of fossorial bees and wasps.

NATIONAL GRID SQUARES, COUNTY AND VICE-COUNTY

Grange is in SD47 (and so is Arnside). The summit of Hampsfell is actually in SD37, but as Wright's notes seem to refer to the lower slopes which are in SD47, it can be assumed that all the records for Grange are in SD47. Witherslack is in SD48. Cark and Holker are in SD37. In Wright's day Grange was in the detached unit of North Lancashire, separated from the rest of Lancashire by the southern extremity of Westmorland. In 1974 with local government reorganization it was absorbed with Westmorland and Cumberland into Cumbria. The position about vice-counties is simpler: Grange and all the other locations mentioned are, and always have been, in vice-county 69, Westmorland with North Lancashire, which demonstrates the benefits of the Watsonian system.

J. D. WARD

Although not the main subject of this memoir, James Davis Ward deserves mention as the only person, as far as I am aware, who studied Hymenoptera in Grange before Wright. Of particular interest are his records of *Osmia xanthomelana* (Kirby), the first and last in north-west England since 1835. Two of his specimens dated 5.vi.1920 and 14.vi.1924 are in his collection of 680 Hymenoptera which is in the Natural History Museum, London (Accession: B.M. 1935-530. 680 British Hymenoptera (all named). Britain: Lancashire. Pres. by F. Mette Esq. 24.xi.35 J. D. Ward Collection). This species is now apparently confined to a single coastal location on the Isle of Wight (see distribution maps and species account in Falk, 1991) where its habitat is an unstable clay cliff, which bears no resemblance to the situation in which Ward found it (Robinson, 1996). In 1922 he published a list of records of Diptera and Hymenoptera from North Lancashire (Ward, 1922) which however only includes 17 Hymenoptera and does not mention *O. xanthomelana*—evidently it was identified later. This list is clearly very incomplete—unfortunately he never updated it. He was a patient observer with a Fabre-like affection for his subjects and recorded his observations in great detail in his diaries, which also are held by Neville Birkett. Typical examples are: on 24.v.1924 a bite-by-bite account of a *Crossocerus* species (which he named as *Crabro leucostomus*) emerging from its cocoon, accompanied by a charming illustration, and on 2.vii.1928 a lengthy account of a territorial male *Anthidium manicatum* (L.) attacking and disabling honey bees. He examined eight of

its victims and found that in each case the costal nervule of one forewing was broken through. Ward lived in Grange all his life and died at the age of 59 on 13 February 1935. From his obituary by Wright in the *Lancashire and Cheshire Naturalist* (Wright, 1935), it is clear that he was remembered with great affection.

ACKNOWLEDGEMENTS

I am indebted to Neville Birkett of Grange-over-Sands for allowing me to study the diaries of Wright and Ward and for providing much additional information. I am also grateful to George Else, Department of Entomology, Natural History Museum, London, for commenting on the original draft and providing helpful suggestions and information.

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ANNOUNCEMENT

BENHS Honorary Secretary sought.—After several years in the post, Roy McCormick wishes to resign as BENHS Honorary Secretary at the 1997 AGM. A volunteer is therefore sought to take on this important position. To give an idea of the duties involved, Roy has drawn up the following 'job description'. Anyone interested in becoming Honorary Secretary should contact the President, Colin Hart, or another member of Council.

HONORARY SECRETARY—JOB DESCRIPTION

Attend Council Meetings (the first Thursdays of February, March, May, July, September, October and December). Take minutes, circulate minutes to Council members (3 weeks after the meeting if possible). Read out the names of prospective members for approval by Council. Keep the minute book, draw up agenda for

Council Meetings. Book room for Council Meetings; present accommodation is at Baden Powell House, Queen's Gate, SW7.

Attend Indoor Meetings and read out the names of new members (these being approved at Council Meetings). Announce the names of those signing the obligations book. (This is a job that I found difficult/impossible to do so the job was carried out by the President or another designated person.)

Prepare Council's report for the Annual Meeting. This involves looking through the year's minutes, picking out the important events that have happened and writing a short report about each subject.

Attend the Annual Meeting, take minutes of the Annual Meeting (somebody else takes the minutes for the Ordinary Meeting). Read out the Council's report that you have prepared.

Draw-up, print, and deliver to the Distribution Secretary, notices for circulation to Members. Annual Meeting notice to be produced 6 weeks before the meeting; around early January (Annual Meeting held around the end of February). Annual Exhibition and Dinner notice to be produced 6 weeks before the event; around mid-September (Annual Exhibition held around the end of October). Try to get these notices to the Distribution Secretary in time for a distribution of the journal. The programme card and field meetings notices are produced by the members of Council responsible for these, i.e. Field Meetings Secretary and Indoor Meetings Secretary; the Hon. Secretary has to make sure these are on time.

Deal with the Society correspondence; mail sent to Dinton Pastures will be given to you at Council meetings by a member of Council who visits the Pelham-Clinton Building on a regular basis; usually Peter Chandler the Hon. Curator. Bring to the attention of Council any items that need a decision/ruling.

'Supervise' the activities of the Assistant Secretaries; most of this section will be self-supervisory and will need little effort from the Hon. Secretary. Check each year if the co-opted members of Council wish to carry on. These are: Distribution Secretary, Membership Secretary, Exhibition Secretary, Sales Secretary (at the moment a full member of Council), Conservation representative, Dipterists' Forum representative and Assistant Treasurer (at the moment a full member of Council).

Arrange Special Meetings as directed by Council or requested by the membership.

Bring to the attention of the Council, at the December meeting, those members who will be eligible for election to special life membership on 1st January of the following year.

Maintain stocks of the Society's stationery. The President of the year has his own headed notepaper with his address printed on the standard A4 paper (200). The Indoor Meetings Secretary has his own address printed on Standard A4 (as and when required). The Assistant Treasurer and Hon. Editor get their own stocks; envelopes are supplied by the Hon. Secretary. Letters to our printer are in the file.

Advise the Assistant Treasurer about deaths or resignations of members that have come to your attention.

Notices are copied commercially from copy supplied and posted or given to the Distribution Secretary; around 700 copies will be needed. If a word processor is used notices need only minimal alteration each year.

At a rough estimate it will take 3-4 evenings a month (I did most of my work during the day) to compile and produce the minutes, the most time-intensive part of the job. The unquantifiable element is dealing with correspondence; a lot of this can be passed on to other officers of Council to deal with but some will have to be dealt with by the Hon. Secretary. A word processor is a valuable asset for this job.

ROY McCORMICK 9th May 1996

***LASIUS BRUNNEUS* (LATREILLE) (HYMENOPTERA:
FORMICIDAE) NEW TO KENT?**

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On 27.vii.1995, whilst carrying out a biological survey of Beckenham Place Park in south-east London between Lewisham and Bromley, I collected a few ants from wood mould in a rotten hollow at the base of a large oak tree (TQ382707). They proved to be *Lasius brunneus* (Lat.). The Park is in vice-county 16 "West Kent", and it was not until several months later that I discovered this to be a supposed new county record.

In fact *Lasius brunneus* has been found in the vice-county before. Mr A. A. Allen informs me that he found several specimens of this ant at the base of a mature, externally sound willow tree in Maryon-Wilson Park, Charlton (TQ4178), some ten years ago, but did not publish the record.

Lasius brunneus is described as having a "curious distribution" (Brian, 1977) in the south Midlands. Its stronghold is in the Thames Valley, at the concurrence of vice-counties Surrey, North Hampshire, Berkshire, Oxfordshire, Buckinghamshire and Middlesex (Fig. 1), and its absence from suitable habitat in the New Forest and certain southern counties is often commented upon (Falk, 1991). Its occurrence in Kent may seem to extend the known distribution of this species greatly, but Beckenham Place Park is only a few miles inside the West Kent border and about 15 miles from the ant's closest Surrey locality in Esher (Gardner, 1972). Charlton is about 4 miles further north-east.

Beckenham Place Park is now a mixture of woodlands, some moderately ancient and some more modern plantations, together with playing fields and a public golf course. The golf course is studded with large trees and pollards and, apart from the

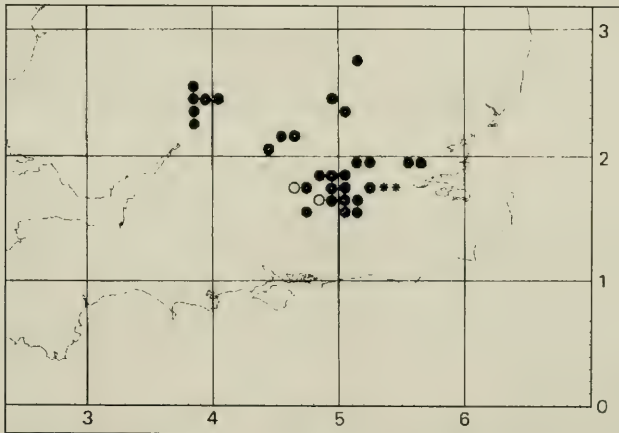


Fig. 1. Provisional distribution of *Lasius brunneus* to July 1979, reproduced from Barrett (1979) with permission. ○ pre-1961 records, ● records 1961 to 1979, * present Kent records from Beckenham (left) and Charlton (right).

closely mown fairways and greens, still retains some of its previous parkland character. It was in one of these large oaks that *Lasius brunneus* was found by reaching into a small hollow at the base of the tree, between the roots, and scooping out handfuls of wood mould and grass. The ants were very plentiful, but none of the many recorded myrmecophilous beetles or other insects were found among them.

Interestingly, there is an old record of *Lasius brunneus* from Kent, by Smith (1858) who reported a single specimen from amongst a number of ants collected at Deal. Donisthorpe (1927, p. 249) dismisses this record as almost certainly a misidentification, but then alludes (p. 251) to the possible occurrence of the ant in a small remnant of forest at West Wickham, Kent, about 3 miles due south of Beckenham Place Park. His reason for this was the discovery there of the false scorpion *Allochernes wideri* (Koch, C.L.), which in Donisthorpe's experience was unlike other tree species in that it always occurred between bark and wood in a space choked with characteristic red powdery debris. In Donisthorpe's opinion this debris suggested the work of ants, and in particular *Lasius brunneus* since he had found the false scorpion associated with this ant in its Berkshire sites.

In fact, the distribution of *Allochernes wideri* extends beyond that of *Lasius brunneus* (Legg & Jones, 1988), with scattered localities as far north as Wakefield in Yorkshire and south and west into the New Forest where *Lasius brunneus* is, as reported above, curiously absent. This suggests that the false scorpion is not such an obligate myrmecophile as Donisthorpe supposed. Nevertheless, there is one especially tantalizing aspect of the false scorpion's distribution in that there is a record for the same Deal area where *Lasius brunneus* is reputed to have occurred.

NOTE ON *LASIUS BRUNNEUS* RECORDS

Lasius brunneus is one of the species being targetted by the Bees, Wasps and Ants Recording Scheme for mapping in an atlas to be published in 1997/8. Records of this species should be sent to: Simon Hoy (PSD), c/o Pest Identification Service, MAFF Harpenden Laboratories, Hatching Green, Harpenden, Hertfordshire AL5 2BD.

ACKNOWLEDGEMENTS

The map showing the distribution of *Lasius brunneus* is reproduced from Barrett (1979), with the permission of the Biological Records Centre, Institute of Terrestrial Ecology.

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NOTES ON THE NATURAL HISTORY, DISTRIBUTION AND IDENTIFICATION OF BRITISH REED BEETLES

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The twenty-one British species contained in the sub-family Donaciinae of the Chrysomelidae, often referred to as the 'reed-beetles', are distributed within three genera: *Donacia* (15 species), *Plateumaris* (four species) and *Macrolea* (two species). Most are conspicuous, medium-sized beetles that are to be found resting, often in large numbers, on the foliage of water plants at the margins of lakes and rivers during the summer months. They attract attention on account of their brilliant metallic colours.

Unfortunately the similarity between some of the species has created problems with identification that discourage and confuse. Existing keys frequently use characters that are variable and therefore unreliable. Fowler (1890; iv: 266-279) gave keys to all species of British Donaciinae, but the characters were not illustrated: *Plateumaris* and *Donacia* species were dealt with collectively under *Donacia*, and many specific names then employed are not now in current usage. Joy (1932) provided a key to all British Donaciinae in the correct genera and with currently accepted nomenclature, but his key is very poorly illustrated.

An account of the habits and distribution of donaciine beetles is presented, derived from observations and material collected over many years and deposited with the Department of Entomology at the Natural History Museum, South Kensington (by a large number of field workers). This is combined with a new key supported by colour prints and line drawings, intended to reduce the problems of identification. It is regretted that insufficient space was available to detail the large number of individual records obtained, but a list of the contributors has been included.

DESCRIPTION OF INDIVIDUAL SPECIES, THEIR HABITS AND DISTRIBUTION

Genus *DONACIA*

1. *Donacia cinerea* Herbst
2. *Donacia dentata* Hoppe
3. *Donacia versicolorea* (Brahm)
4. *Donacia crassipes* Fabricius
5. *Donacia clavipes* Fabricius
6. *Donacia vulgaris* Zschach
7. *Donacia aquatica* (Linnaeus)
8. *Donacia marginata* Hoppe
9. *Donacia bicolora* Zschach
10. *Donacia obscura* Gyllenhal
11. *Donacia semicuprea* Panzer
12. *Donacia impressa* Paykull

13. *Donacia thalassina* Germar
14. *Donacia simplex* Fabricius
15. *Donacia sparganii* Ahrens

Genus *PLATEUMARIS*

16. *Plateumaris affinis* (Kunze)
17. *Plateumaris braccata* (Scopoli)
18. *Plateumaris discolor* (Panzer)
19. *Plateumaris sericea* (Linnaeus)

Genus *MACROPLEA*

20. *Macrolea appendiculata* (Panzer)
21. *Macrolea mutica* (Fabricius)

Vice-county maps, with pre- and post-1970 record distributions are given for each species. Vice-county numbers (after Watson) and regions (NCC 1985) are interpreted on maps given in the appendix. Underlined numbers indicate those vice-counties in which a species has been recorded both before and after 1970.

Status categories assigned are as given in Hyman & Parsons (1992).

GENUS *DONACIA* (Greek: *Donax*, a reed: referring to affinity for aquatic vegetation)

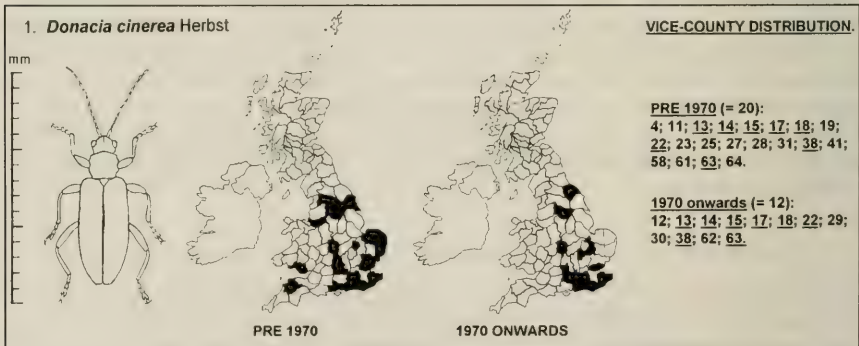
1. *Donacia cinerea* Herbst, 1784 (= *hydrochaeridis* Fabricius, 1801)

Status: **Notable B**

(Latin: *cinerarius*, a slave who heated in hot ashes the irons for the hairdresser, referring to the ashy-grey dorsal surface pubescence). L = 7.5–11.0 mm; Plate I, Figure 1.

This species is unique among the group in having a uniform covering of short white pubescence which tones the underlying bronze surfaces to an attractively glistening silver-grey or pale fawn colour. It has a localized distribution, though usually quite plentiful where it occurs. The adults are to be found mainly in May, June and early July, usually sitting on the leaves of reedmace (both *Typha latifolia* L. and *angustifolia* L.) growing in still water at the margin of lakes, ponds and canals rather than the running water of rivers and streams. *D. cinerea* feeds on the leaves of *Typha*, excoriating the upper epidermis, and may be found in company with *D. vulgaris*, as at Bolder Mere, Wisley, Surrey, where the two species share the same foodplant.

Formerly more widespread with pre-1970 records from 20 vice-counties. Post-1970 records are confined to North East, North West, South, South East England and East Midlands, the species appears to have retracted from South Wales, South West England and East Anglia.



2. *Donacia dentata* Hoppe, 1795

Status: **Notable A**

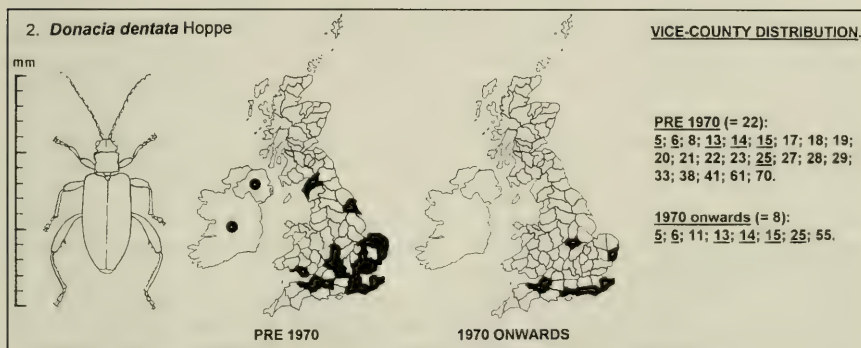
(Latin: *dentatus* toothed; probably referring to the large metafemoral teeth). L = 7.0–10.0 mm; Plate I, Figure 2.

Known now from relatively few localities, this donaciine is usually associated with arrowhead (*Sagittaria sagittifolia* L.). Like *D. crassipes* and *D. versicolorea*, it has disproportionately long bandy hind legs sporting conspicuous femoral teeth but, unlike them, the thorax and elytra in this species are of a brilliant metallic copper-rose or copper-green colour with, especially when viewed in sunlight, a sparkling frost-like quality due to reflection of light from the stria punctures. Further points of

distinction from *D. versicolorea* are the pale red apical halves of the femora (entirely dark in *versicolorea*), and the hind femoral teeth. In *D. dentata*, one of the two teeth on the ventral surface of the hind femora is smaller and situated slightly anterior to the other whereas the male *D. versicolorea* has two teeth of almost equal length set side by side. The female of *D. versicolorea* has only one very small obtuse femoral tooth that is sometimes missing.

The adults of *D. dentata*, like those of *D. versicolorea* and *D. sparganii*, become active during the latter part of the summer, appearing at the end of June and becoming most numerous during late July and August. Binoculars are convenient for observing the beetles which sun themselves on the leaves of their foodplant, often out of reach in the middle of the dykes they inhabit: they are very alert, flying readily to avoid capture. The species can be locally plentiful, and characteristic 'snailtrack' excoriations produced when feeding on the upper surface of arrowhead leaves offer a clue to their presence.

A rare donaciine with recent distribution confined to England. Post-1970 records are from East Midlands, East Anglia, and all regions of Southern England.

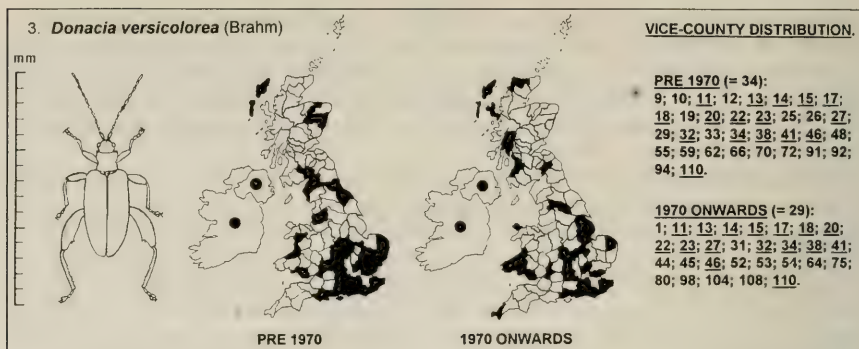


3. *Donacia versicolorea* (Brahm, 1791) (= *bidens* Olivier, 1791)

(Latin: *versicolor*, changing in colour, of various colours). L = 5.5–9.0 mm; Plate I, Figure 3.

Often a plentiful species inhabiting dykes, ponds, canals, fens, heathland pools and moorland rivers colonized by various species of *Potamogeton*. In common with *D. crassipes* and *D. sparganii* this species is often found at rest on the floating leaves of its foodplant. Like *D. crassipes*, with which it may be confused, it has rather flattened dark-coloured elytra, pin-point reflections of light marking the position of the stria punctures; however, it is a smaller species and appears later in the season (July/August) than *crassipes* (May/June/July). The more local *D. dentata* may also be found during July and August in similar localities but has more elongate less flattened elytra, and a brilliant metallic coloration. As with other Donaciinae, *D. versicolorea* is often found on leaves other than those of its true larval foodplant, *Potamogeton*, for example *Glyceria*, *Sagittaria*, *Sparganium* and *Nymphaea*.

A local but widespread species with recent records for N.W., S.W. and S.E. Scotland, North East England, West and East Midlands and all regions of Southern England and Wales.



4. *Donacia crassipes* Fabricius, 1775

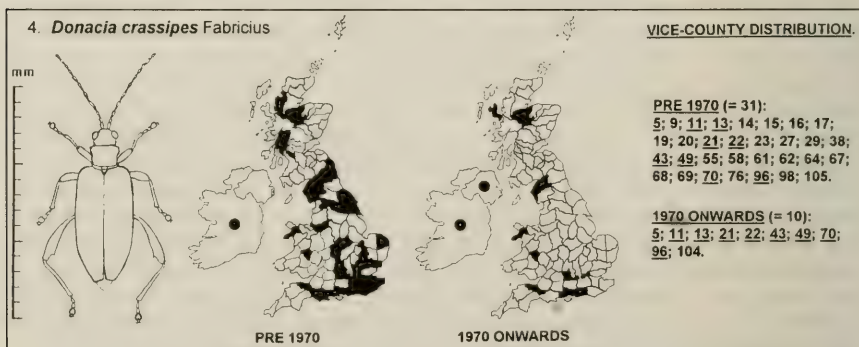
Status: **Notable B**

(Latin: *crassus*, thick, gross; *pes*, a foot, probably referring to the enlarged hind legs). L = 9.0–11.0 mm; Plate I, Figure 4.

One of the larger British Donaciinae, this local species is associated with waterlilies (both *Nymphaea alba* L. and *Nuphar lutea* (L.) Sm.) growing in lakes, ponds, rivers and canals. The adults, which appear at the end of May, are found mainly during June and July basking in the sun on the upper surface of floating lily leaves upon which they feed. They are best located with the aid of binoculars since they often choose sites well out on the water, and are difficult, at that distance, to distinguish from flies, bees and other insects that frequent the same sites. They are very alert and not easily approached. The beetle has exceptionally long curved hind legs and, like *D. versicolorea*, the elytra have a dark shiny surface with a slight purple or copper reflection. Close examination shows the surface of the elytra to be covered with pin-points of light reflected from the striae punctures, giving a 'starry night' effect, a feature also shared with *D. versicolorea*.

D. crassipes may be distinguished from *D. dentata* and *D. versicolorea*, which also have disproportionately large hind legs, in not having the pronotum strongly rugose but microsculptured throughout with fine grooves and reticulations with only sparse shallow punctures on the disc. In addition, the hind femora have one obtuse tooth or, if two, these are separated by at least twice the length of the anterior tooth.

A moderately widespread but local species recorded from Scotland, Wales and England. Most post-1970 records are from N.W., S.E., S., and S.W. England, Dyfed-Powys and North Wales, and N.W. Scotland.



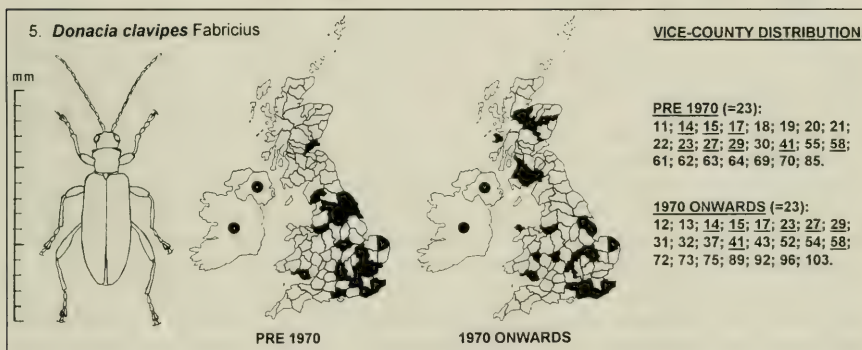
5. *Donacia clavipes* Fabricius, 1792 (= *menyanthis* Fabricius, 1801; & *menyanthis* Gyllenhal, 1813)
 Status: **Notable B**

(Latin: *clava*, a club, or possibly *clave*, cloven; *pes*, a foot; in reference to the conspicuously bilobed third tarsal joint). L = 7.5–12.0 mm; Plate I, Figure 5.

A large donaciine associated with reed-beds (*Phragmites australis* (Car.)) growing in the water of lakes, ponds, canals and fens. The rather elongated parallel-sided elytra of this species are brilliant shining metallic brassy-green or copper, while the legs and antennae are of a distinctive orange-red colour. It has a wide distribution, often abundant where it is found.

D. clavipes should be sought in the reed-beds during May, June and July and can be detected by knocking the reeds over a beating tray or by searching. The beetles are particularly fond of hiding in the basal part of a leaf where it folds around the reed stem. As many as eight individuals have been found in a single leaf-fold (Burton Mill-pond, W. Sussex, 22.v.95, I.M.). When feeding, the insect penetrates the young leaf shoots which later unfold to reveal a transverse series of somewhat irregularly elongated holes. *Plateumaris braccata*, also associated with *Phragmites*, eats into the young shoots in a similar fashion but, in this case, the series of holes produced are usually round, not elongated.

A very widespread locally common species, with post-1970 records for N.W., N.E. and S.W. Scotland, N.E. England, East and West Midlands, East Anglia, S.E. and S. England, Dyfed-Powys, N. and S. Wales.



6. *Donacia vulgaris* Zschach, 1788 (= *typhae* Ahrens, 1810)

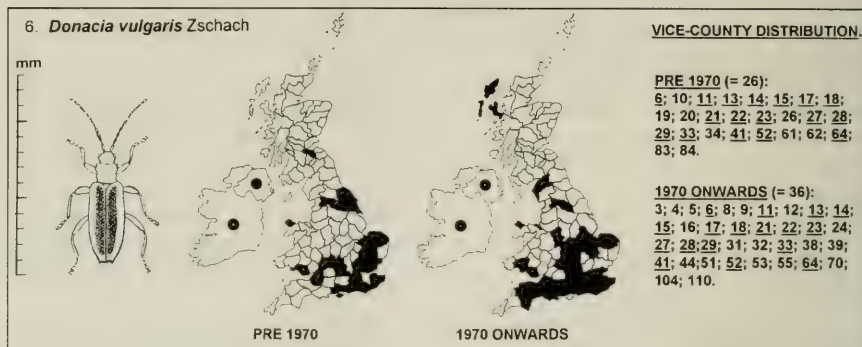
(Latin: *vulgaris*, common, ordinary—being one of the most widespread and commonly occurring species). L = 5.5–10.0 mm; Plate I, Figure 6.

One of the smaller Donaciinae, this species has a wide distribution and is often locally abundant. It is associated with bur-reed (*Sparganium*) and reed-mace (*Typha*) growing in rivers, ponds, dykes, canals and fens. The adult beetle is active during May, June, July and August, most records being for June.

D. vulgaris is very similar in shape and size to *D. thalassina* and *simplex* but, unlike them, has multicoloured elytra, usually with a longitudinal band of metallic blue and/or reddish coloration between stria 1 and 5, which contrasts with the pale copper background. Occasionally this band is missing, in which case the absence of a femoral tooth and the partly reddish antennae and legs will distinguish it from *D. thalassina*. Separation of unicolorous *D. vulgaris* from *D. simplex* is more difficult.

The posterior extremities of the elytra are truncated in both species, usually being square and simple in *simplex* but concave and emarginate in *vulgaris*. Examination of genital morphology may sometimes be necessary (see Fig. K41).

A common, widespread species with post-1970 records for N.W. Scotland, and all regions of Wales and England except the North East.

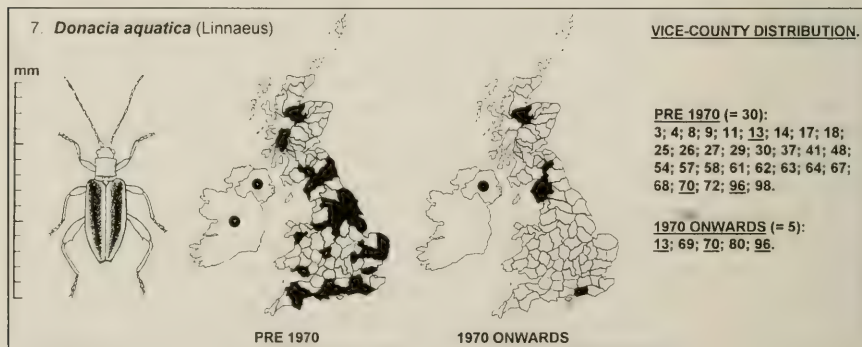


7. *Donacia aquatica* (Linnaeus, 1758) (= *dentipes* Fabricius, 1792) Status: RDB 3
(Latin: *aquatica*, of water). L = 6.8–9.6 mm; Plate I, Figure 7.

Uncommon in the UK, this species is found, usually in small numbers, by sweeping areas of aquatic vegetation dominated by sedges such as *Carex acutiformis* Ehrh. at the margins of open water (lakes and fens) during May and June. Unlike *D. thalassina* and *D. impressa*, it does not appear to be attracted to the flowers of sedge.

Now one of our rarest, this small donaciine is also one of our most beautiful species. The undersurface, legs and thorax are of shining gold, while the elytra are adorned with a broad reddish-purple longitudinal band of rainbow brilliance, commencing light blue between the sutural borders and first stria, then green (interstice 2), purple (interstices 3–5), red (interstices 6–7), pale gold (interstice 8), green (interstice 9) and finally a pale green-blue up to the lateral elytral borders.

A widespread but local species with records for N.W., N.E., and S.W. Scotland, N. and S. Wales, and most regions of England. Post-1970 records show a considerable decline and are from N.W., N.E. and S.E. Scotland, N.W. and S.E. England.



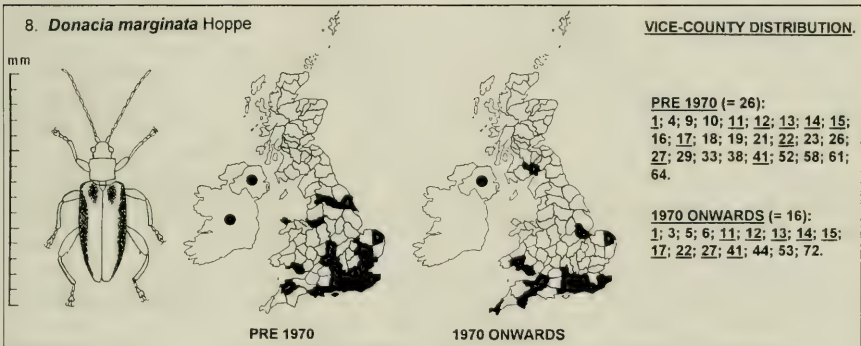
8. *Donacia marginata* Hoppe, 1795 (= *limbata* Panzer, 1796; *lemnae* Fabricius, 1801).

(Latin: *marginata*, provided with a border, probably referring to the elytra which usually have a reddish-purple lateral border). L = 7.5–11.0 mm; Plate I, Figure 8.

This handsome beetle is of a golden-bronze colour with reddish-purple discharges and lateral borders to the elytra. It is often found in large numbers, resting on and eating the upper epidermis from the leaves of the branched bur-reed (*Sparganium erectum* L.) growing at the margins of lakes, ponds, canals and dykes, generally with a preference for still water. The adults of this species enjoy a long season, first appearing about the middle of May but recorded most frequently in June, July and August.

Although of very similar size and shape to *D. bicolora* and *D. obscura*, *D. marginata* can in most cases be differentiated on the basis of coloration. *D. bicolora* is usually of a uniform brilliant golden-green colour; like *D. marginata* it is associated with *Sparganium erectum*, but prefers plants growing along the margin of running water (rivers). *D. obscura* is of a uniform dull bronze colour, and is associated with *Carex* rather than *Sparganium*. The coloured dorsal elytral markings of *D. marginata* may occasionally be entirely missing, in which case the strong dorso-lateral and lateral pronotal rugosities can be used to separate it from other species such as *D. bicolora* and *D. obscura*.

A widespread, locally common species with post-1970 records for S.W. Scotland, Dyfed-Powys and S. Wales, E. Midlands and all regions of Southern England.



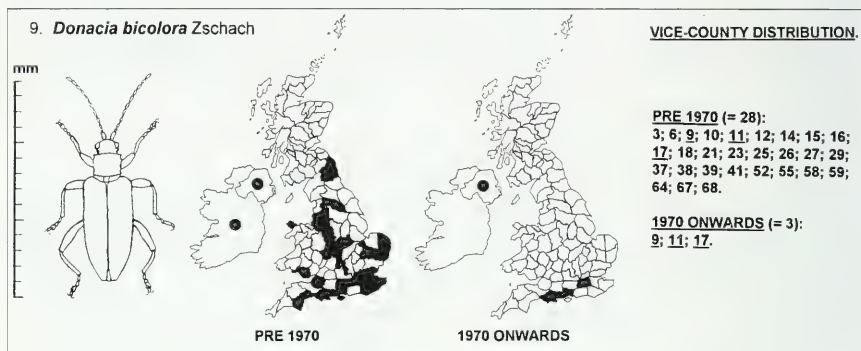
9. *Donacia bicolora* Zschach, 1788. (= *sagittariae* Fabricius, 1792) Status: RDB 2

(Latin: *bicolor*, of two colours, possibly referring to the brassy-green upper body surface and silvery lower surface [but see also J. Denton's observations below]). L = 8.0–11.6 mm; Plate II, Figure 9.

This beetle is noted for its magnificent sparkling greenish-gold coloration (unfortunately not fully conveyed by Figure 9). It is a local species with restricted distribution but may be quite plentiful in favoured localities, for instance the River Wey in Surrey and Stour in Hampshire, where it may be found, in company with *D. simplex*, on the leaves of bur-reed (*Sparganium erectum*) during May, June and July. Sometimes the margins of ponds, lakes and canals are chosen though proximity to flowing water seems to be preferred. Dr J. Denton, studying this species at Elstead, Surrey (May–August 1995), observed that a proportion of the beetles, which are of a constant bright gold or greenish-gold colour during May and June, become

greenish-blue or even a deep purplish-blue colour at the end of their adult season in late July and early August.

Formerly found in N. and S. Wales, East and West Midlands, N.E., N.W., S., S.E. S.W. England and East Anglia, this species is now restricted to three vice-counties, one in each of S., S.E. and S.W. England.



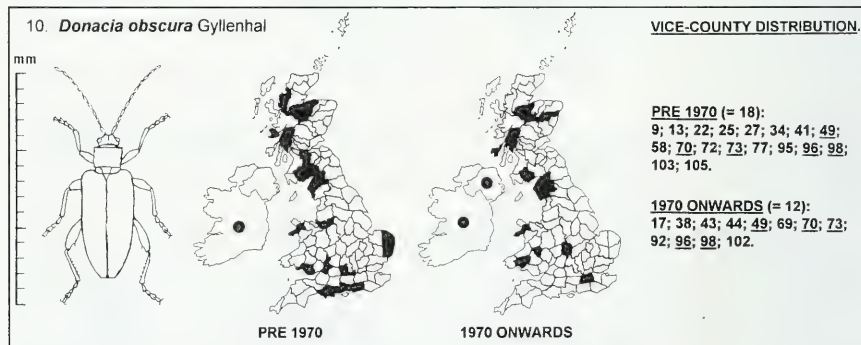
10. *Donacia obscura* Gyllenhal, 1813

Status: **Notable A**

(Latin: *obscura*, dark, obscure; referring to the deep bronze dorsal colour of this species). L = 8.0–10.5 mm; Plate II, Figure 10.

A uniformly dull chocolate-bronze coloured donaciine with well-marked hind-femoral teeth. The elytral impressions are less emphasized than those of *D. marginata* and *D. bicolora* to which *D. obscura* is morphologically similar. The adult beetles may be found by searching or sweeping vegetation dominated by club-rushes and sedges, especially *Carex rostrata* Stokes, growing in boggy areas alongside lochs, lakes and streams from April to July, most records being for June.

Distributed mainly in the north and west of the British Isles, in recent years this species has largely disappeared from the southern counties and East Anglia, remaining widespread although local in Wales and Scotland.

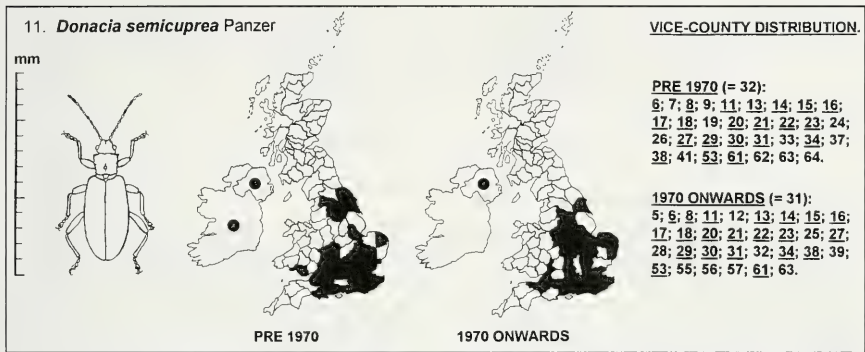


11. *Donacia semicuprea* Panzer, 1796

(Latin: *semicupreus*, half coppery, pertaining to the elytra which are coppery with greenish lateral margins). L = 5.5–8.2 mm; Plate II, Figure 11.

A small, rather convex, donaciine which has an elytral shape approaching that of the genus *Plateumaris*. It is found, often in large numbers, feeding on the leaves of its foodplant, the reed meadow-grass *Glyceria maxima* (Hartm.), during May, June, July and early August. Lakes, ponds, canals and dykes supporting an abundant growth of *Glyceria* are favoured. The dorsal surface is of a shiny copper colour, often with a greenish reflection on the lateral aspects of the elytra, while the head, legs, antennae and underparts, being covered with short white pubescence, appear light grey in colour. The presence of a deep midline pit or sulcus on the dorsal surface of the posterior pronotum is an important point in identification, unique to this donaciine.

A locally common species with post-1970 records for N.E. and N.W. England, E. and W. Midlands, East Anglia and all parts of Southern England, but it is apparently unknown in Scotland.



12. *Donacia impressa* Paykull, 1799

Status: **Notable A**

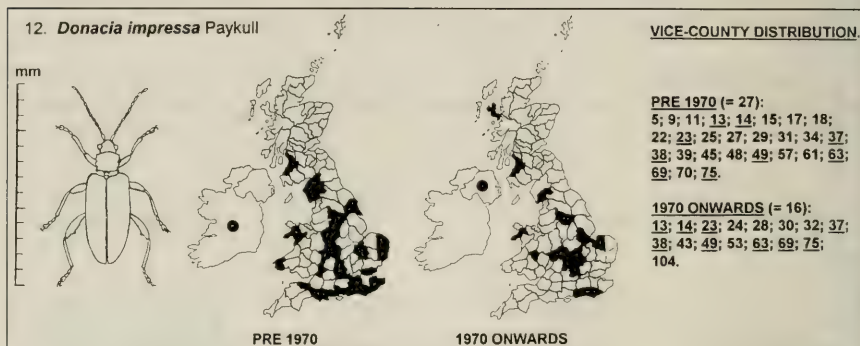
(Latin: *impressio*, distinct impression; probably referring to two deep elytral impressions). L = 6.5–9.0 mm; Plate II, Figure 12.

One of the smaller donaciines, this species is very local but may be seen in large numbers, especially when feeding on the flowers of the tussock sedge *Carex paniculata* L. and lesser pond sedge *Carex acutiformis* Ehrh. during May and June, and also the flowers of bulrush *Scirpus lacustris* L. in August and September. The adult beetles have been recorded from April until November.

D. impressa shows many similarities to *D. simplex* and *D. thalassina* with which some confusion is liable to arise. The impressions on the elytra are usually more distinct, and the metallic copper colour more constant in *D. impressa* than the other two species. *D. simplex* is easily distinguished by having parts of the antennae and legs reddish and hind femora without a tooth, and is usually associated with *Sparganium* rather than *Carex*. Distinction of *D. thalassina* from *D. impressa*, which have similar ecological requirements, is more difficult. Both have dark antennae and legs devoid of reddish coloration, and teeth on the hind femora, though these are usually better developed in *thalassina*, being reduced to a small tooth or knob in *impressa*. The elytra of *D. impressa* are broader and more rounded posteriorly than *D. thalassina* (and *D. simplex*) in which the elytra are quite sharply truncated with well-defined posterolateral angles. Also, unlike most examples of *thalassina*, the sutural borders of the elytra in *impressa* are usually raised to form a keel at their

posterior extremities. The elytral surface is more shining in *D. impressa*, being dull or 'frosted' in *D. thalassina* and *simplex* due to greater emphasis of striae punctation and reticulation.

A widespread locally common species with post-1970 records for N.W. and S.W. Scotland, N.W. England, North Wales and Dyfed-Powys, East and West Midlands, East Anglia, and South East England.



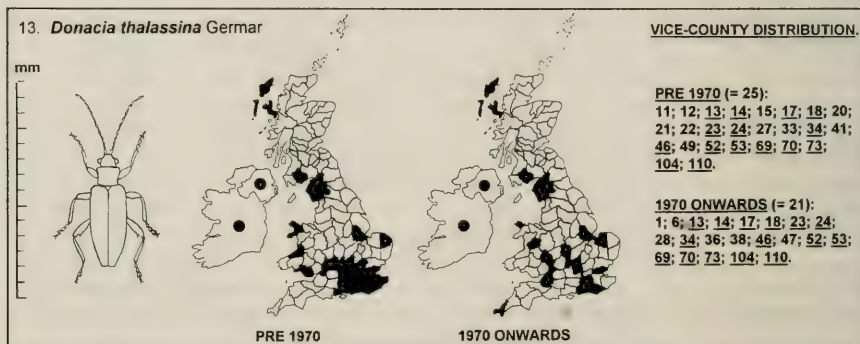
13. *Donacia thalassina* Germar, 1811

Status: **Notable B**

(Latin: *thalassina*, sea green, probably referring to the dorsal coloration of the species which may be greenish or brassy-bronze). L = 6.5–9.0 mm; Plate II, Figure 13.

Like *D. impressa* this is a very local species, also found mainly during May, June and early July. During May it is attracted in numbers to the flowers of the lesser pond and bottle sedges, *Carex acutiformis* and *rostrata* respectively, probably in order to feed upon the pollen. After the sedge flowering period is over (for instance 1.vi.95) the beetles have been observed to eat the leaves of *Carex*, and later (8.vii.95) may vacate *Carex* for other water plants such as *Typha* (observations at Bolder Mere, Wisley, Surrey; IM).

Superficially this species is very similar to the ubiquitous *D. simplex* and, like it, is uniformly shining bronze, usually with a distinctly copper tint, but sometimes grey or greenish, on the elytral and pronotal surfaces. Absence of red coloration on the antennae and legs and the usual presence of a metafemoral tooth serves to



distinguish this species from *D. simplex*, but separation from *D. impressa* (to which refer for details) is more difficult.

In view of the ecological similarity of their habitats, it is surprising that *D. thalassina* and *D. impressa* are so seldom found together: possibly a degree of mutual exclusion may exist.

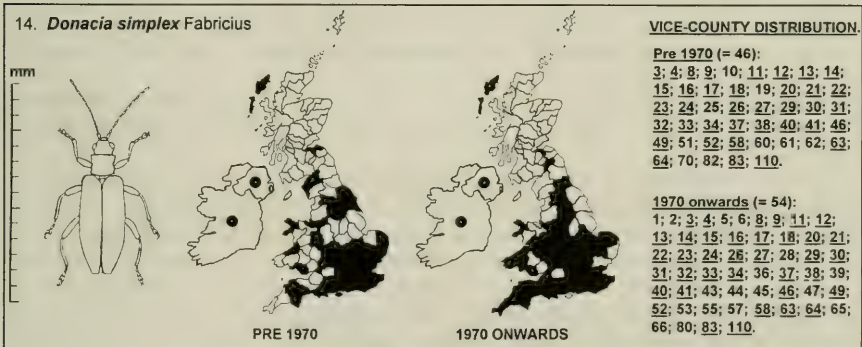
A local, but widespread species with post-1970 records for N.W. and S.W. Scotland, N.W. England, E. and W. Midlands, East Anglia, S.E. and S.W. England, Dyfed-Powys and N. Wales.

14. *Donacia simplex* Fabricius, 1775; (= *linearis* Hoppe, 1795).

(Latin: *simplex*, probably referring to the simple, untoothed hind femora of this species). L = 7.0–11.0 mm; Plate II, Figure 14.

Usually considered to be the most prevalent British donaciine, it is widely distributed and found, usually in large numbers, on the leaves of various species of bur-reed (*Sparganium*) growing in a wide variety of habitats, especially at the margins of ponds, canals and rivers, from about the middle of May to the beginning of August. The adult is usually a frosted metallic copper colour dorsally with a silvery undersurface, but the elytra and pronotum may have a uniform reddish, greyish or even a greenish tint. The legs and antennae are in part reddish-orange, and the hind femora untoothed.

A common widespread species with post-1970 records for North West and South East Scotland, and all regions of Wales and England.



15. *Donacia sparganii* Ahrens, 1810

Status: Notable A

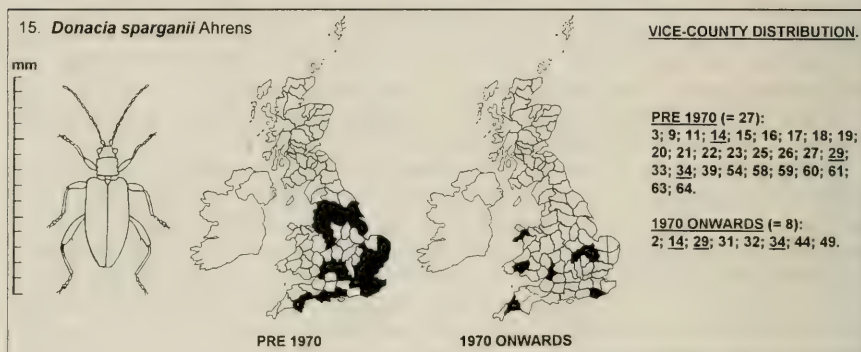
(Latin: *sparganium*, relating to an affinity for the bur-reed plant). L = 6.3–9.1 mm; Plate II, Figure 15.

A medium-sized species of a uniform metallic copper colour with two teeth, one of which is very small, on each hind femora. The elytra have a characteristic 'oily' shining appearance, with a pinkish or greenish reflection in the sunlight. Absence of punctures on the dorsum of the pronotum, which is transversely strigose, is an important point of identification.

This donaciine is known from few sites only, generally in association with species of bur-reed (*Sparganium*). *D. sparganii* is regarded as one of the rarer British species though it may be quite frequent where it is established. Though occasionally found on bank vegetation it is much more likely to be seen (with the aid of binoculars) resting, out of reach, on the floating leaves of *Sparganium* trailing in the current of

streams and rivers. The adult beetles appear during July and August after the *Sparganium* leaves have grown sufficiently to reach the surface of the deeper water.

Formerly recorded from many counties in the north, south and east of England, *D. sparganii* has now become a rare species restricted to only a few localities in Wales, the Midlands and Southern England.



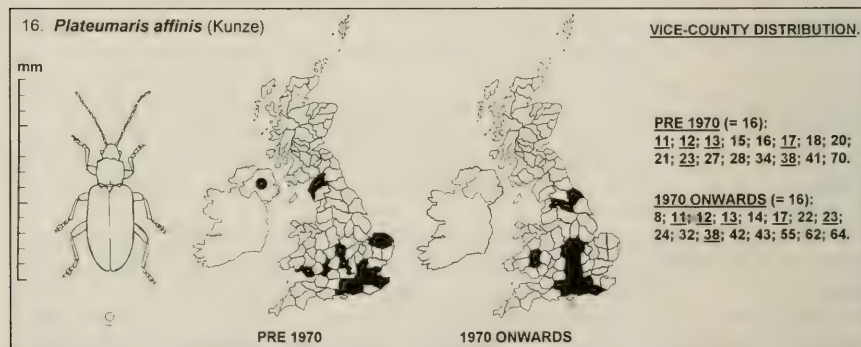
GENUS PLATEUMARIS. Very similar to *Donacia*, but legs stouter and elytra more rounded, 'vaulted' dorsally, and mandibles protruding. (Greek: *platys*, broad or flat; *eumaris*, a thick-soled Asiatic slipper. Askevold (1991) considered this to refer to the ovipositor of females in this genus. Alternatively Schenkling (1922) interprets *eumares* to mean easily moveable, but is uncertain to what this refers).

16. *Plateumaris affinis* (Kunze, 1818)

Status: **Notable B**

(Latin: *affinis*; neighbouring). L = 5.0–8.0 (male), 7.7–9.0 (female); Plate II, Figure 16.

P. affinis is associated with various species of *Carex* growing at lake margins, sharing the same ecological requirements as *P. discolor*, *Donacia impressa*, *thalassina* and *aquatica*, all of which may be found together during May and June as, for instance, in vegetation dominated by various species of *Carex* bordering Burton Mill Pond, near Fittleworth, West Sussex. *P. affinis*, like *D. aquatica*, is not attracted to the flowers of *Carex* as are *D. impressa* and *thalassina*, and is usually detected by sweeping or searching the leaves and stems of the sedges.



In *P. affinis* the two sexes are distinct in both colour and size, the pronotum and elytra of the male being black with a faint purple or violet reflection, but of a pale copper colour in the somewhat larger female. The legs are reddish yellow in both sexes, with the teeth on the hind femora considerably larger in the male.

A widespread, locally common species with recent records for Dyfed-Powys, North East England, East and West Midlands, South and South Eastern England.

17. *Plateumaris braccata* (Scopoli, 1772) (= *nigra* Fabricius, 1792)

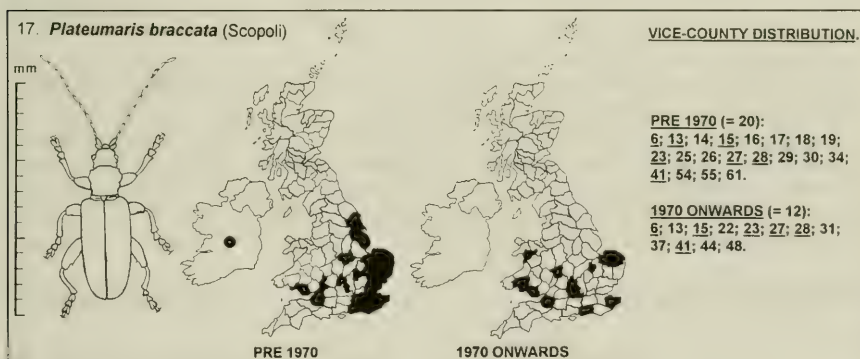
Status: **Notable A**

(Latin: *braccata*; wearing breeches, possibly referring to the conspicuously orange-red legs and ventral abdomen which contrasts with the dark thoracic and elytral surfaces). L = 8.5–12.0 mm.

Both sexes of this large donaciine have black pronotum and elytra with a green or violet reflection, and reddish-orange abdomen, antennae and legs. Though this species is similar in these respects to the male *P. affinis*, direct comparison leaves little doubt about the identification of *P. braccata* which is considerably larger and has a more obvious blue or greenish metallic reflection.

The adult beetles are usually found, during May and June, in beds of the reed *Phragmites australis* growing in water at the margins of lakes, canals and in fens. It is a local species, well established in the fenlands of East Anglia but also found sparingly in Sussex, Kent, and some other southern counties. Like *D. clavipes* it can be found concealed in the *Phragmites* leaf-folds. When feeding, the beetle penetrates the young leaf shoots which later unfold to present a characteristic transverse series of round holes.

A very local species restricted in distribution to Wales (all regions), East and West Midlands, East Anglia, and a few scattered sites in Southern England.



18. *Plateumaris discolor* (Panzer, 1795)

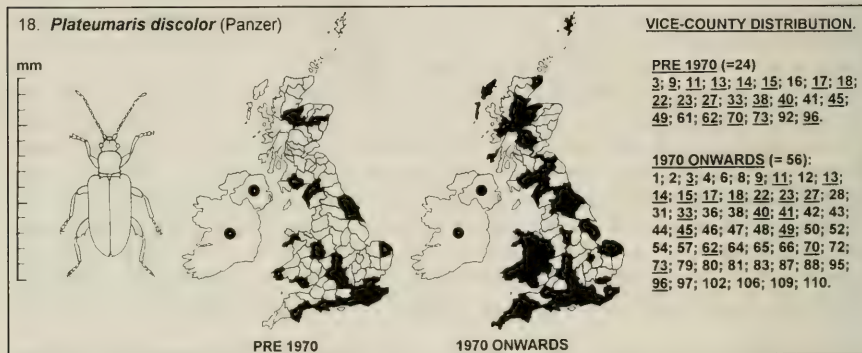
(Latin: *discolor*; of different colours, probably referring to the many different colour forms of this species). L = 6.5–9.0 mm.

P. discolor and *P. sericea* are closely similar in appearance and manifest an astonishing variety of spectacular jewel-like colour forms which include shades of gold, copper, green, blue, violet, purple, magenta, and sometimes black. The elytra, head and thorax are uniformly coloured and the hind femora strongly toothed. *P. discolor* is on average smaller than *sericea* and, in contrast to *P. sericea*, the thoracic disk is strongly punctured centrally and surrounded by marked strigosity. Though *P.*

discolor usually has shorter antennae than *P. sericea*, reliance cannot be placed on differences in the relative lengths of antennal segments 2, 3 and 4 often quoted (but length/width ratios of antennal segment 4 may be more reliable, see Key). The proximal portion of the antennal segments, tarsi and tibiae are usually reddish in *P. discolor* but generally dark in *sericea*.

P. discolor is widely distributed and, though adults have been recorded from March to November, are seen most frequently during June, often in large numbers, on vegetation in boggy moorland areas and around ponds, rivers and canals. This species is usually associated with *Carex*. It may sometimes be found on the flowers of various plants including *Sparganium* and *Caltha palustris* and favours a more acidic environment than *P. sericea*.

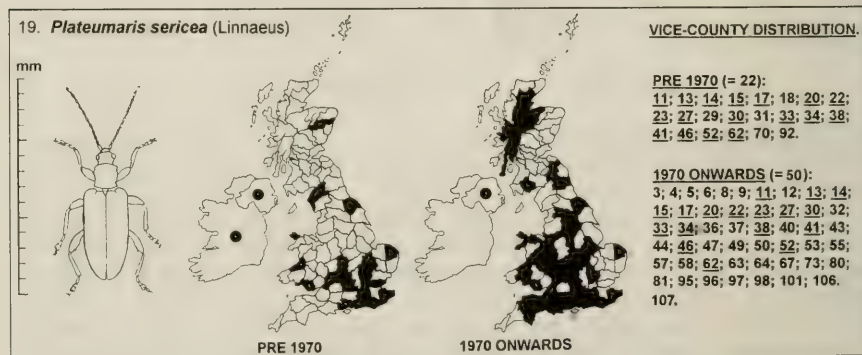
A very widespread, common species with numerous post-1970 records for all regions of Scotland, Wales, and England.



19. *Plateumaris sericea* (Linnaeus, 1758)

(Latin: *sericatus*; clothed in silken garments, probably referring to the silky-like appearance of the pronotum). L = 6.5–10.0 mm.

In most respects similar in appearance and habits to *P. discolor*. The main points of distinction from the latter concern the antennae, which are usually longer and narrower, especially in males; although differences in length between antennal segments are claimed, 4 being more than twice the length of 2 in *P. sericea*, this distinction may not be reliable (but see Key for length/width ratios of antennal



segment 4). The thoracic disk in *P. sericea* is more finely punctured than *P. discolor*, without surrounding strigosity. The adult beetles have been recorded for every month of the year but are most frequently seen during June, usually at rest on aquatic vegetation growing in neutral or basic habitats. This species is usually found in association with *Sparganium* species, especially *S. erectum*, but has also been recorded from the flowerheads of *Iris*, yellow flag.

A very widespread, common species with numerous post-1970 records from all regions of Scotland, Wales and England.

Note. Askevold (1991) synonymized *P. discolor* (Panzer) with *P. sericea* (Linnaeus). He considered that the ratio of the antennal segments 2 and 3, and the coarseness of pronotal rugosity, variable among donaciines and 'in many series of specimens a complete range of pronotal structure from uniformly alutaceous to coarsely rugose on the disc, can be found'. In addition he found no appreciable genitalic differences between specimens from geographically divergent areas such as Poland, Italy and Japan. However it can be contended that it is not the difference in the relative lengths of antennal segments 2 and 3 which is important, but that between 3 and 4 in comparison with 2. There is a significant difference in pronotal rugosity between the two species with little intraspecific variation, and differences between the endophallus of the two species are apparent in his photographs. Ecologically the two species occupy different niches, *P. discolor* in acidic conditions and *P. sericea* in neutral or basic water.

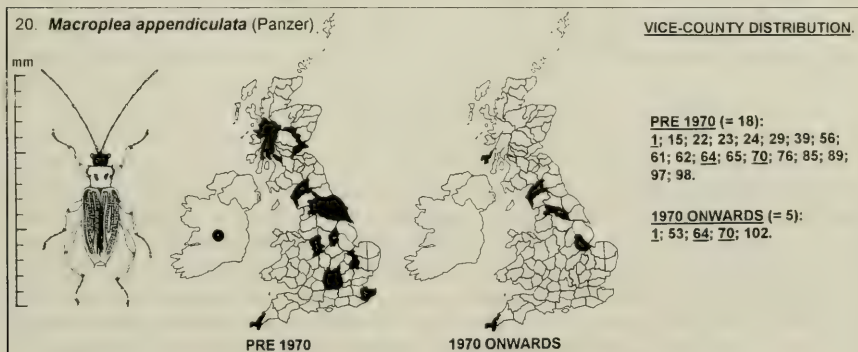
GENUS *MACROPLEA*. (Greek; *macro*, large, and *pleon*, 'swimming').

20. *Macrolea appendiculata* (Panzer, 1794)

Status: **RDB 3**

(Latin: *appendicula*, a little addition, probably referring to the elytral spine).
L = 6.0–7.5 mm.

The two British *Macrolea* differ from *Donacia* and *Plateumaris* in being smaller and of a dull yellowish coloration with head and elytral striae black. Though fully winged, the adult beetles are usually found submerged on the foliage of their foodplant in the water of canals, rivers, lakes and dykes from June to September. *M. appendiculata* was found, for instance, on submerged plants of the alternate-flowered water milfoil *Myriophyllum alterniflorum* DC. growing near the margin of Talkin Tarn, Brampton, Cumb. on 6.vi.92, hidden amongst the comb-like leaves. The beetles, although quite numerous, were very inconspicuous; whereas about 8 were



initially found with difficulty, 16 more eventually emerged from the vegetation as the stems and leaves dried out. Prof. J. A. Owen has found larvae and cocoons of *M. appendiculata* at the roots of *Myriophyllum alterniflorum* growing in Talkin Tarn during the autumn; one adult beetle, observed in captivity, shed its pupal case in the autumn and could be seen overwintering within the translucent cocoon, from which it eventually emerged in February. Adults have also been found in numbers on *Potamogeton pectinatus* L. at Kidlington, in a tributary of the River Cherwell, during June and August.

A widely distributed though local species. Post-1970 records are from South West Scotland, N.E. and N.W. England, E. Midlands and S.W. England.

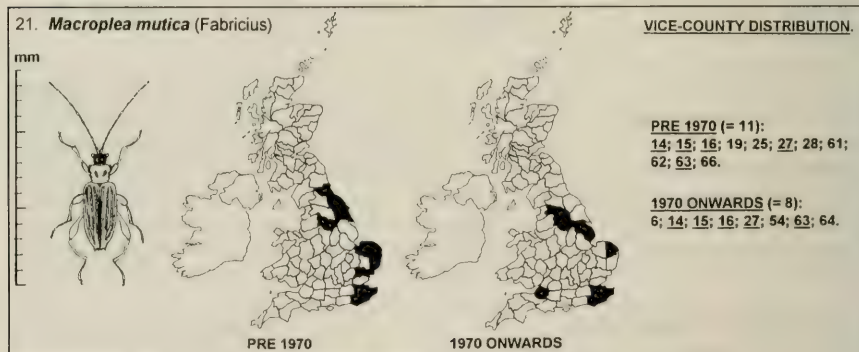
21. *Macrolepta mutica* (Fabricius, 1792) [= *curtisi* (Lacordaire, 1845)]

Status: **Notable A**

(Latin: *muticus*, spineless, referring to the shorter elytral spines). L = 5.0–7.0 mm.

Very similar to the preceding species, this beetle is also found on the leaves of submerged water plants, especially *Potamogeton pectinatus* and *Zostera marina*, usually in brackish clay pits and dykes near the coast. The main points of difference from *M. appendiculata* are the shorter posterolateral elytral spine, and absence of pigmented apices to the femora and tibiae and tarsal joints, though the latter is considered an unreliable character. There are some morphological differences in the male aedeagus.

Apparently not so widespread as *M. appendiculata*. Recent records are from North West England, E. and W. Midlands, East Anglia, S.W. and S.E. England, but have been chiefly in the east.



GENERAL COMMENTS

Alterations in distribution

Examination of the pre- and post-1970 distribution reveals that some interesting changes have taken place. Percentage changes given below are calculated from the number of vice-counties in which a species has been recorded before and after 1970. Although such records are as much determined by the availability of entomological expertise as they are by the incidence of species, the observed *increase* in distribution of *D. simplex*, *D. vulgaris*, *P. discolor* and *P. sericea* suggests that the marked decrease in recorded distribution of at least half of our British donaciine species is a

genuine problem which calls for an explanation, and not just the result of a reduction in entomological fieldwork.

A. Post-1970 increase.		B. No change ($\mp 10\%$)		C. Decrease in post-1970 distribution			
Species	% Diff.	Name	% Diff.	Name	% Diff.	Name	% Diff.
<i>P. discolor</i>	+57%	<i>D. clavipes</i>	+4.4%	<i>D. versicolora</i>	-15%	<i>D. impressa</i>	-41%
<i>P. sericea</i>	+55%	<i>P. affinis</i>	0.0%	<i>D. thalassina</i>	-16%	<i>D. dentata</i>	-64%
<i>D. vulgaris</i>	+28%	<i>D. semicuprea</i>	-3.1%	<i>M. mutica</i>	-27%	<i>D. crassipes</i>	-68%
<i>D. simplex</i>	+15%			<i>D. obscura</i>	-33%	<i>D. sparganii</i>	-70%
				<i>D. marginata</i>	-39%	<i>M. appendiculata</i>	-81%
				<i>D. cinerea</i>	-40%	<i>D. aquatica</i>	-83%
				<i>P. braccata</i>	-40%	<i>D. bicolora</i>	-89%

Host plants

The British Donaciinae are associated with the Nymphaeaceae and Haloragaceae of the Dicotyledones and with seven families of the Monocotyledones: Alismataceae, Typhaceae, Sparganiaceae, Potamogetonaceae, Zosteraceae, Cyperaceae and Gramineae. To a large extent the host plant on which the adult feeds is the same as that on which cocoons have been taken and upon which the larvae feed. Donaciine species can be grouped according to their host plant associations. *Donacia crassipes* and *Macrolea appendiculata* are the only species associated with Dicotyledones, the former with yellow and white water lilies (*Nuphar* and *Nymphaea* of the Nymphaeaceae), and the latter with water milfoil (*Myriophyllum* of the Haloragaceae). Of the Monocotyledones *Sagittaria sagittifolia* (Alismataceae) is host to *Donacia dentata* and *Potamogeton* (Potamogetonaceae) to *D. versicolora*. *Sparganium* of the Typhaceae is the host of *D. bicolora*, *D. simplex*, *D. sparganii*, *Plateumaris sericea* and possibly *D. vulgaris*, and *Typha* is host to *D. cinerea* and also *D. vulgaris*, the first three sometimes occurring in the same locality on *Sparganium erectum*. Of the Cyperaceae *Scirpus* is a host to *D. impressa* whilst various species of *Carex* support *D. aquatica*, *D. obscura*, *D. impressa*, *D. thalassina*, *Plateumaris affinis* and *P. discolor*, while of the Gramineae *Glyceria* species are eaten by *D. semicuprea* and *Phragmites communis* is host to *D. clavipes* and *P. braccata*.

Early stages

Oviposition differs in the British genera, the eggs of *Plateumaris* being laid on foliage above water while those of *Donacia* are laid, usually in clusters or rows, in gelatinous envelopes on the undersides of floating leaves or submerged foliage and stems. The life cycle of donaciines appears to be related to the growth habit of their host plants and they can be divided on the basis of observed dates of occurrence.

The first group includes *D. thalassina*, *obscura*, *clavipes*, *vulgaris* and *cinerea*, active as adults during the spring and early summer, in which the larvae reach maturity and pupate by the autumn of the year in which oviposition took place. These soon emerge but remain as adults and overwinter within cocoons which apparently maintain a connection with intracellular air spaces within the host plant, attached to roots and stems in the mud of lakes and streams.

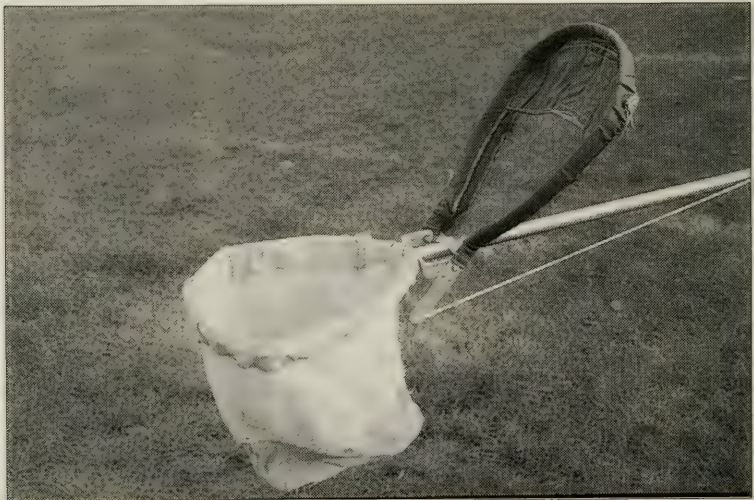
The second group includes *D. dentata*, *sparganii* and *versicolora*, which are active as adults during the second part of summer and in the autumn. These overwinter as larvae which complete their growth and pupate during the first half of the year following oviposition, finally emerging around midsummer. Adults of the latter

group do not, therefore, overwinter but may sometimes be found around midsummer, awaiting emergence fully developed within their cocoons.

In contrast to foodplants of the first group (*Carex*, *Phragmites*, *Typha* and *Sparganium erectum*), the foliage of plants upon which adult beetles of the second group feed (*Sagittaria*, *Potamogeton* spp. and *Sparganium emersum*) does not reach full development until after midsummer.

Collecting techniques

The simplest and most informative method of detecting and collecting the adult beetles is by direct searching of the leaves and flowers of their host plants, especially in warm sunshine, during their months of occurrence. Under certain circumstances alternative methods may be useful. The use of a sweep-net is useful when the beetles are infrequent and hidden in dense foliage such as stands of reeds and sedges; this method is especially effective for species such as *Donacia aquatica*, *impressa*, *thalassina*, *Plateumaris sericea* and *affinis* (pers. observ.). Alternatively plants growing together in a dense stand can be tapped with a stick over a beating tray. Stainforth (1944) collected *D. impressa* and *clavipes* by tapping bulrush (*Scirpus lacustris*) and reeds (*Phragmites australis*), respectively, watching for the fallen insects on the surface of the water. Species like *D. crassipes*, *dentata*, *versicolorea* and *sparganii* that rest on the floating leaves of their foodplants (*Nuphar*, *Sagittaria*, *Potamogeton* and *Sparganium*) may be caught by quickly submerging the leaf with the beetle on it. They cannot then take flight, but float to the surface and can then be picked off. The use of an extendable 'clap net' (see figure) can also be very effective, and may be necessary when negotiating an inaccessible environment with deep water and mud. Collection of *Macrolea* species which inhabit submerged water plants calls for the use of a water net or rake.



Extendable clap net.

According to Stainforth (1944) a further useful method is to search for cocoons from late August until the following May or June. September is probably the best month since the weather is still warm, the water in ponds and canals at a low level, and sufficient time will have elapsed to allow the adults to emerge from the pupae and become fully hardened. Apparently some species may remain in such a condition within the cocoons for as long as 8 months! Unfortunately this method leads to habitat destruction since the foodplants must be pulled up with their roots and rhizomes intact, washed free of mud and then carefully searched. It is often difficult to pull up aquatic plants by the roots especially if they are matted together as is the case with *Carex* and *Scirpus*. Stainforth found the cocoons of *D. versicolorea* difficult to collect because the host plant *Potamogeton natans* grows in deep water and does not come up by the roots very readily, and he found that the cocoons of *D. clavipes* were usually buried at a depth of six to eight inches amongst the roots of *Phragmites* growing in water.

KEYS FOR THE IDENTIFICATION OF DONACIINE BEETLES BY M. L. COX

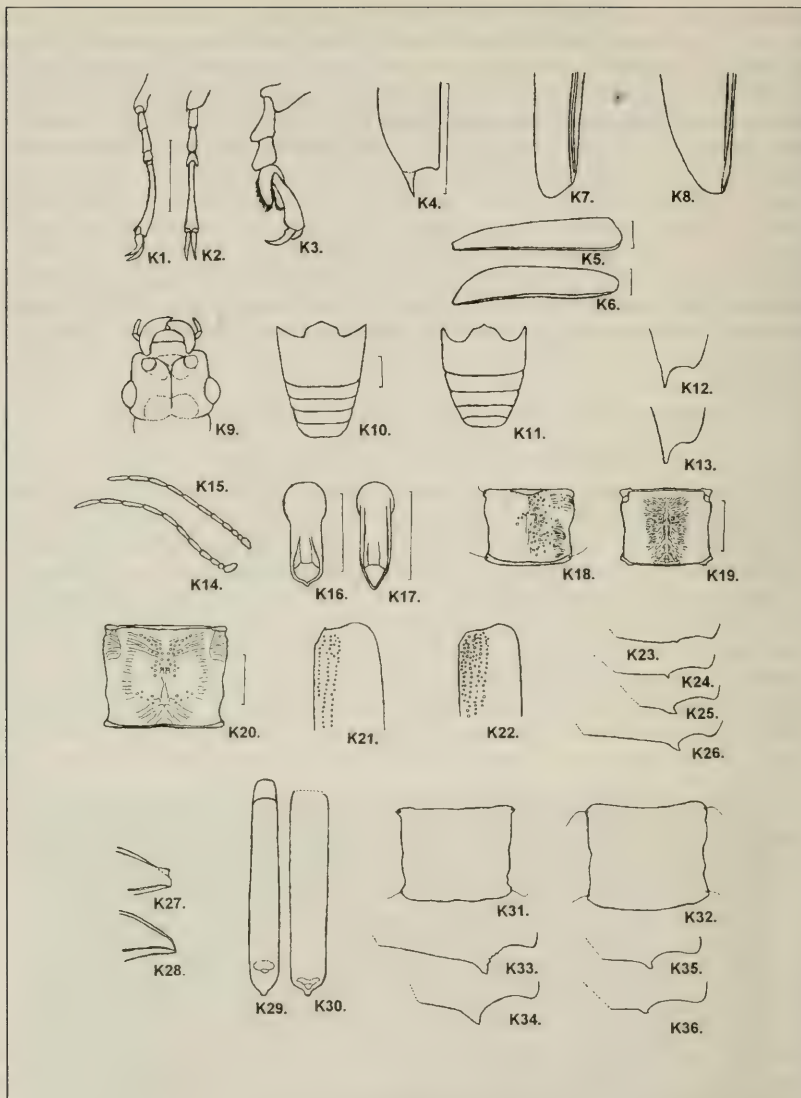
Subfamily DONACIINAE: key to genera

- 1 Dorsally not metallic, usually yellowish with dark brown or black. Tarsi slender, subcylindrical, almost glabrous ventrally, segment 3 small, unlobed, segment 5 longer than 1 to 4* combined (Figs K1,2). Elytra with double rows of punctures and with black or dark brown stripes; truncate, unidentate apically (Fig. K4). Usually under water on hostplants..... *Macrolea*
- Dorsally metallic. Tarsi broad, flattened with dense pilosity ventrally, segment 3 bilobed, segment 5* at most twice as long as 3 (Fig. K3). Elytra metallic, apices without tooth (Figs K7,8). Usually on water plants..... 2
- 2 Elytra somewhat flat dorsally (Fig. K5), suture normal, not inverted apically (Fig. K7). Mandibles short, not protruding (Figs K37,38). Males sometimes with small tooth interoapically on metatibiae. Abdominal ventrite 1 longer than following 4* combined (Fig. K10)..... *Donacia*
- Elytra vaulted dorsally (Fig. K6), suture inverted at apex, so that internal margin becomes the external one (Fig. K8). Mandibles protruding (Fig. K9). Males with small tooth interoapically on meso- and meta-tibiae. Abdominal ventrite 1 at most as long as following 4* combined (Fig. K11)..... *Plateumaris*

Genus Macrolea Samouelle: key to species

- 1 Terminal spine of elytra usually more slender, more sharply pointed (Fig. K12). Elytra apically with more transverse emargination (Fig. K12). Males with median lobe of aedeagus broader, abruptly narrowed apically, with small median lip (Fig. K16); antennae relatively longer, especially apical segment with length/width ratio about 6.6 (Fig. K14). Body usually longer, 6.0–7.5 mm. *appendiculata* (Panzer)
- Terminal spine of elytra usually less slender, less sharply pointed (Fig. K13). Elytra apically with less transverse emargination (Fig. K13). Males with median lobe of aedeagus narrower, more gradually narrowing to a rounded apex which lacks a median lip (Fig. K17); antennae relatively shorter, especially apical segment with length/width ratio about 5.7 (Fig. K15). Body usually shorter, 5.0–7.0 mm. *mutica* (Fabricius)

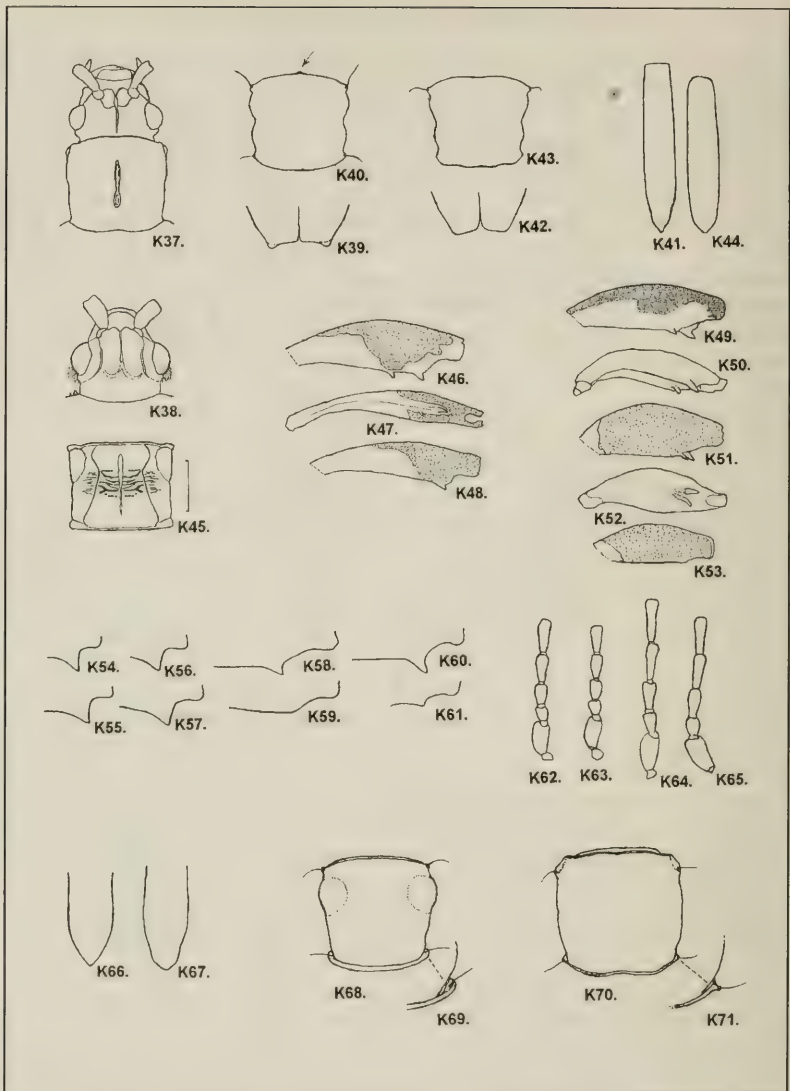
*Note. Tarsal segment 4 is vestigial and, as in most chrysomelids, is inconspicuous.



Figs. K1, 2, 4, 12, 14 & 16 *Macroplea appendiculata*; K13, 15, & 17 *Macroplea mutica*; K3 & 7 *Donacia crassipes*; K5, 10 & 18 *Donacia aquatica*; K6 *Plateumaris affinis*; K8 & 11 *Plateumaris sericea*; K9 *Plateumaris* sp. head dorsal; K19 *Donacia sparganii*; K20 *Donacia marginata*; K21, 23, 24, 27, 29 *Donacia impressa*; K25, 26, 28, 30 *Donacia thalassina*; K31, 33, 34 *Donacia obscura*; K22, 32, 35, 36 *Donacia bicolora*; K1 3 right metatarsus (K1 & 3 lateral, K2 dorsal); K4 left elytron dorsal; K5, 6 right elytron lateral; K7, 8, 12, 13 apex left elytron dorsal; K10, 11 venter; K14, 15 right antenna; K16, 17, 29, 30 median aedeagal lobe dorsal; K18, 19, 20, 31, 32 pronotum dorsal; K21, 22 base right elytron; K23-26, 33-36 posterior half right metafemora; K27, 28 apex left elytron lateral. Scale line = 1 mm.

Genus Donacia Fabricius: key to species

- 1 Pronotum and elytra pubescent (Plate I, Figure 1). Usually bronze dorsally, rarely elytra metallic dark green..... *cinerea* Herbst
- Pronotum and elytra not pubescent (Plates I & II, Figures 2–15). Various colours..... 2
- 2 Antennae and legs, including tarsi, entirely reddish brown (Plate I, Figure 5)..... *clavipes* Fabricius
- Antennae and legs at the most only partly reddish brown (Plate I, Figure 2)..... 3
- 3 Antennae and legs, except claws, entirely black with indistinct metallic reflection, or sometimes legs brightly metallic (Plate I, Figure 7)..... 4
- Antennae and legs usually partly reddish brown (at least one quarter or third of femora) (Plate I, Figure 2), sometimes the antennae are entirely dark..... 10
- 4 Pronotal disc distinctly and coarsely punctured (Fig. K18). Hind femora in both sexes usually with one spine..... 5
- Pronotal disc impunctate or at most with few small indistinct punctures, finely transversely rugose (Fig. K19). Hind femora of both sexes usually with two spines (one very small); sometimes, in addition, with several very small spines posteriorly..... *sparganii* Ahrens
- 5 Elytra green, bluish-green along suture; interstices 2–6 or 7 reddish (golden, coppery, blue or purple in part) (Plate I, Figure 7)..... *aquatica* (Linnaeus)
- Elytra unicolorous or with interstices 3–5 red, blue or purple in basal fourth..... 6
- 6 Pronotum dorso-laterally and laterally strongly rugose, with a few coarse punctures; rugosities are irregular and transversely or obliquely orientated, smooth and shiny (Fig. K20). Elytra bronze brown, lateral margin greenish, usually with interstices 7–9 and 2–5 in basal fifth red, blue or purple (Plate I, Figure 8); sometimes all of these markings absent..... *marginata* Hoppe
- Pronotum dorso-laterally and laterally not distinctly rugose, sometimes with a few fine rugosities, usually very coarsely and densely punctured, punctures sometimes confluent. Elytra without red markings..... 7
- 7 Anterior margin of pronotum almost straight or slightly convex between anterior angles in dorsal view (Fig. K19). Abbreviated scutellar stria usually distinct (Fig. K21)..... 8
- Anterior margin of pronotum slightly concave between anterior angles (Fig. K32). Abbreviated scutellar stria usually indistinct (Fig. K22)..... 9
- 8 Hind femora with small usually obtuse tooth, sometimes acute or missing (Figs K23,24). Elytra with suture distinctly raised at apex (Fig. K27). Males with median lobe of aedeagus narrower, gradually broadening to apex which narrows more gradually and with less distinct median lip (Fig. K29). Usually either deep brassy or bronze dorsally (Plate II, Figure 12)..... *impressa* Paykull
- Hind femora with tooth long and acute, sometimes greatly reduced (Figs K25,26). Elytra usually without suture distinctly raised at apex (Fig. K28). Males with median lobe of aedeagus broader, subparallel-sided over much of length, gradually narrowed at apex with distinct median lip (Fig. K30). Dorsal colour more variable, brassy, bronze, sometimes greenish..... *thalassina* Germar
- 9 Dorsal surface and legs dull deep bronze, without green reflection (Plate II, Figure 10). Pronotum usually with anterior angles distinct, especially laterally



Figs. K37 *Donacia semicuprea*, head and pronotum dorsal; K38 *Donacia vulgaris* head, dorsal; K39-41 *Donacia vulgaris*; K42-44 *Donacia simplex*; K45, 49, 50 *Donacia dentata*; K46-48 *Donacia crassipes*; K51-53 *Donacia versicolora*; K54, 55, 62, 63, 66 *Plateumaris discolor*; K56, 57, 64, 65, 67 *Plateumaris sericea*; K58, 59, 68, 69 *Plateumaris braccata*; K60, 61, 70, 71 *Plateumaris affinis*; K39, 42 elytral apex dorsal; K40, 43, 45 pronotum dorsal; K41, 44, 66, 67 median aedeagal lobe dorsal; K46, 48, 49, 51, 53 right metafemora lateral; K47, 50, 52 left metafemora ventral; K54-61 posterior half right metafemora lateral; K62-65 left antennal segments 1-5; K68, 70 pronotum dorsal; K69, 71 enlargement of right basal part of pronotum. Scale line = 1 mm.

- (Fig. K31). Femoral teeth large in both sexes (Figs K33,34)
 *obscura* Gyllenhal
- Dorsal surface and legs bright golden green or darker greenish bronze (Plate II, Figure 9); rarely entirely blue. Pronotum usually with anterior angles indistinct, especially laterally (Fig. K32). Femoral teeth in both sexes smaller, about half the size (Figs K35,36)..... *bicolora* Zschach
- 10 Hind tibiae not usually finely toothed along ventral ridge. Hind femora usually without tooth..... 11
- Hind tibiae finely toothed (teeth may be acute or obtuse) along ventral ridge. Hind femora usually dentate..... 13
- 11 Disc of pronotum in mid-line with a small shallow anterior and larger, deeper posterior fovea, these connected by a narrow longitudinal groove (Plate II, Figure 11 and Fig. K37); majority of discal punctures not confluent, interspaces smooth and shining. Head without a distinct occipital groove along inner margin of eyes, without a longitudinal convexity on each side of median longitudinal fronto-vertical groove (Fig. K37). Elytra gently rounded in basal half, slightly broadened to middle (Plate II, Figure 11)..... *semicuprea* Panzer
- Disc of pronotum in mid-line without foveae but sometimes with indistinct fine median longitudinal groove; disc with interspaces narrow, usually dull, finely microsculptured, punctures often confluent. Head with a distinct occipital groove along inner margin of eyes, and with a distinct longitudinal convexity on each side of median longitudinal fronto-vertical groove (Fig. K38). Elytra sub-parallel in basal half, not broadening to middle (Plate II, Figure 14)..... 12
- 12 Apices of elytra usually distinctly emarginate, rarely straight (Fig. K39). Elytra usually red, blue, purple, golden, brassy or a combination of these colours between interstices 1–4 or 5, rarely unicolorous dark green (Plate I, Figure 6). Dorsal part of fore-tibiae usually darkened, only partly reddish. Anterior margin of pronotum in mid-line usually with a small protuberance (Fig. K40). Males with median lobe of aedeagus gradually, sinuately narrowed towards apex, with a sharper point (Fig. K41)..... *vulgaris* Zschach
- Apices of elytra truncate, usually straight or sometimes very indistinctly emarginate (Fig. K42). Elytra unicolorous, margin and interstices 1–5 or 5 without contrasting coloration (Plate II, Figure 14). Dorsal part of fore-tibiae usually entirely reddish. Anterior margin of pronotum in mid-line usually without a small protuberance (Fig. K43). Males with median lobe of aedeagus more evenly, abruptly narrowed towards apex, with more rounded, blunt point (Fig. K44)..... *simplex* Fabricius
- 13 Pronotum strongly rugose throughout, usually coarsely and densely punctured on disc (Fig. K45). Hind femora without or with one or two teeth; when two these are situated close together and not more than the length of the anterior tooth apart (Figs K49–53)..... 14
- Pronotum not strongly rugose, strongly microsculptured throughout with fine grooves and reticulations, disc with indistinct sparse, shallow punctures. Hind femora with one obtuse tooth or with two teeth which are more widely separated, at least two times the length of the anterior tooth apart (Figs K46–48).
 *crassipes* Fabricius
- 14 Elytra with interstices dull, very finely, usually densely and evenly punctured. Hind femora in both sexes usually with two teeth, one smaller situated slightly anterior to the larger posterior tooth on the ventral surface (Figs K49,50). Ventral half of femora usually pale reddish in contrast to dark metallic dorsal half (Fig. K49)..... *dentata* Hoppe

- Elytra with interstices shining, very finely and sparsely punctured (almost impunctate). Hind femora in males with two teeth set almost side by side and subequal in length (Figs K51,52); in females with very small obtuse tooth (Fig. K53), sometimes missing. Ventral half of femora usually almost entirely dark (apical two-thirds of femora almost entirely black) (Fig. K51)
 *versicolorea* (Brahm)

Genus Plateumaris Thomson: key to species

- 1 Elytra with 2 impressions on each near suture, one about one-third length from base, the other one-third length from apex, the latter sometimes indistinct. Pronotum glabrous except for a few setae posteriorly. Abdomen concolorous with rest of body. Metafemora with strong triangular tooth in both sexes (Figs K54-57)..... 2
 Elytra without impressions. Pronotum very finely pubescent. Abdomen brown or reddish, not concolorous with rest of body. Males with strong metafemoral tooth (Figs K58,60), females without a tooth (Fig. K59) or with blunt angulation (Fig. K61)..... 3
- 2 Pronotal disc with punctuation distinctly stronger in mid-line, obliquely wrinkled throughout. Antennal segments 3 and 4 less elongate (Figs K62,63), males with length/width ratio of segment 4 about 2.0. Males with median lobe of aedeagus evenly narrowed apically to pointed tip (Fig. K66). Colour variable, metallic green, blue violet or gold, sometimes black..... *discolor* (Panzer)
- Pronotal disc with punctuation equal and fine, smoother, without oblique wrinkles. Antennal segments 3 and 4 more elongate (Figs K64,65), males with length/width ratio of segment 4 about 2.6. Males with median lobe of aedeagus not evenly narrowed apically and with apical median lip (Fig. K67). Colour variable, as *discolor*..... *sericea* (Linnaeus)
- 3 Pronotum distinctly narrowed posteriorly, with a tuberosity at each side just behind the indistinct anterior angle; anterior setiferous pore close to anterior margin; posterior setiferous pore not on conical process (Figs K68,69). Elytral interstices strongly cross strigose. Black with a green or violet reflection, pronotum often greenish or bluish. Antennae and legs reddish brown. Body length usually longer, 8.5-11.5 mm. On *Phragmites australis*
 *braccata* (Scopoli)
- Pronotum subrectangular, with sides subparallel and without a tuberosity at each side behind the anterior angle which is prominent, and anterior setiferous pore distant to anterior margin with posterior setiferous pore on conical process (Figs K70,71). Antennae and legs orange brown. Males black with a purple or violet reflection, sometimes basally reddish brown. Females coppery (Plate II, Figure 16). Body length usually shorter, 5.0-9.0 mm. Usually on *Carex*
 *affinis* (Kunze)

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Plate I. BRITISH DONACIIDS



1. *Donacia cinerea* Herbst



2. *Donacia dentata* Hoppe



3. *Donacia versicolore* (Brahm)



4. *Donacia crassipes* Fabricius



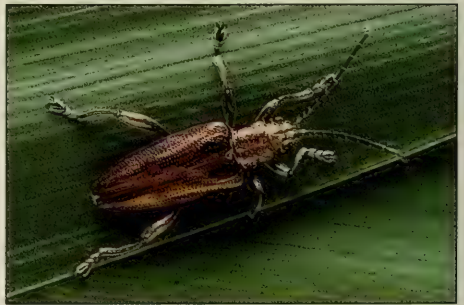
5. *Donacia clavipes* Fabricius



6. *Donacia vulgaris* Zschach



7. *Donacia aquatica* (Linnaeus)



8. *Donacia marginata* Hoppe

Plate II. BRITISH DONACIIDS



9. *Donacia bicolor* Zschach



10. *Donacia obscura* Gyllenhal



11. *Donacia semicuprea* Panzer



12. *Donacia impressa* Paykull



13. *Donacia thalassina* Germar



14. *Donacia simplex* Fabricius



15. *Donacia sparganil* Ahrens



16. *Plateumaris affinis* (Kunze)



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APPENDIX. INTERPRETATION OF VICE-COUNTY NUMBERS

- | | | | |
|-----------------------------------|--------------------------------------|---|---|
| 1. West Cornwall
(with Scilly) | 30. Bedfordshire | 59. South Lancashire | 86. Stirlingshire |
| 2. East Cornwall | 31. Huntingdonshire | 60. West Lancashire | 87. West Perthshire
(with Clackmannan) |
| 3. South Devon | 32. Northamptonshire | 61. South-east Yorkshire | 88. Mid Perthshire |
| 4. North Devon | 33. East Gloucestershire | 62. North-east Yorkshire | 89. East Perthshire |
| 5. South Somerset | 34. West Gloucestershire | 63. South-west Yorkshire | 90. Angus (Forfar) |
| 6. North Somerset | 35. Monmouthshire | 64. Mid-west Yorkshire | 91. Kincardineshire |
| 7. North Wiltshire | 36. Herefordshire | 65. North-west Yorkshire | 92. S. Aberdeenshire |
| 8. South Wiltshire | 37. Worcestershire | 66. Durham | 93. N. Aberdeenshire |
| 9. Dorset | 38. Warwickshire | 67. S. Northumberland | 94. Banffshire |
| 10. Isle of Wight | 39. Staffordshire | 68. North Northumberland
(Cheviot) | 95. Moray (Elgin) |
| 11. South Hampshire | 40. Shropshire (Salop) | 69. Westmorland
(with N. Lancashire) | 96. East. Inverness
(with Nairn) |
| 12. North Hampshire | 41. Glamorgan | 70. Cumberland | 97. West Inverness |
| 13. West Sussex | 42. Breconshire | 71. Isle of Man | 98. Argyll Main |
| 14. East Sussex | 43. Radnorshire | 72. Dumfriesshire | 99. Dunbartonshire |
| 15. East Kent | 44. Carmarthenshire | 73. Kirkcudbrightshire | 100. Clyde Islands |
| 16. West Kent | 45. Pembrokeshire | 74. Wigtownshire | 101. Kintyre |
| 17. Surrey | 46. Cardiganshire | 75. Ayrshire | 102. South Ebuades |
| 18. South Essex | 47. Montgomeryshire | 76. Renfrewshire | 103. Mid Ebuades |
| 19. North Essex | 48. Merionethshire | 77. Lanarkshire | 104. North Ebuades |
| 20. Hertfordshire | 49. Caernarvonshire | 78. Peeblesshire | 105. West Ross |
| 21. Middlesex | 50. Denbighshire | 79. Selkirkshire | 106. East Ross |
| 22. Berkshire | 51. Flintshire | 80. Roxburghshire | 107. East Sutherland |
| 23. Oxfordshire | 52. Anglesey | 81. Berwickshire | 108. West Sutherland |
| 24. Buckinghamshire | 53. South Lincolnshire | 82. East Lothian
(Haddington) | 109. Caithness |
| 25. East Suffolk | 54. North Lincolnshire | 83. Midlothian (Edinburgh) | 110. Outer Hebrides |
| 26. West Suffolk | 55. Leicestershire
(with Rutland) | 84. West Lothian (Linlithgow) | 111. Orkney Islands |
| 27. East Norfolk | 56. Nottinghamshire | 85. Fifeshire | 112. Shetland Islands
(Zetland) |
| 28. West Norfolk | 57. Derbyshire | | 113. Channel Islands |
| 29. Cambridgeshire | 58. Cheshire | | |



LETTER TO THE EDITOR

Scottish populations of *Pararge aegeria*.—We were most interested to read of Leonard Winokur's work on the speckled wood butterfly *Pararge aegeria* but did not recognize his discussion concerning the Scottish populations. He states that "*P. a. tircis* appears to be extending its range down the Great Glen from deciduous forest in the north-east to cooler pine forests more south-west". This seems to be more or less the reverse of the true situation.

P. a. tircis was present in south-east Scotland (and perhaps the south-west) in the mid 1800s, extending up to Perth and Angus. (The Aberdeen record is of two specimens found on the edge of the city but there is real doubt about the validity of these.) A decline began to affect the species about 1850, although it may have hung on in the Perth area until 1921 (Thomson, 1980, *The butterflies of Scotland*, Croom Helm). Meanwhile *P. a. oblita* was found in the western coastal area, centred around Oban but ranging well north and south of there. In the 1950s this subspecies spread north-eastwards to the Inverness area, colonizing the Black Isle in the 1960s and subsequently spreading both northwards to East Sutherland and eastwards along the Moray Coast (Barbour, 1986, *Entomologist's Rec. J. Var.* 98: 98–105). In 1991 Roy Leverton confirmed that it had reached north-east Aberdeenshire. Specimens from all of these areas have the morphological characteristics of *P. a. oblita*.

Although there are some gaps in the linking area between Loch Ness-side and the west coast populations, it seems most likely that the north-eastern populations were derived from those on the west coast. The nearest *P. a. tircis* are well south in England. We know of no other authors who suggest that the 'Inverness' populations are *P. a. tircis*, for example Shreeve and Emmet (1989, *Moths and butterflies of Great Britain and Ireland*, Vol 7, pt 1, Harley Books) specifically include the Moray Coast populations within *P. a. oblita*, and so we believe that Winokur's analysis of the Scottish situation needs re-consideration.—DAVID BARBOUR, 125a High St, Aberlour, Banffshire; CLIFFORD EDWARDS, Swiss Cottage, Benvoulin Rd, Oban, Argyll; MARK YOUNG, Culterty Field Station, Aberdeen University, Newburgh, Aberdeenshire.

Reply by the author.—My study of the speckled wood butterfly primarily compared N. Wales and S. England subspecies *tircis* with a sample population of subspecies *oblita* from the Appin area. The more extensive consideration of *P. a. oblita* in my 1995 paper (*Br. J. Ent. Nat. Hist.* 8: 102–112) was based on previous literature. My misinterpretation of the speckled wood's history in Scotland may have arisen from the concomitant treatment of the two subspecies by Thomson (1980) and my unfamiliarity with the detailed political geography referred to by Barbour (1986). At this point I should add that the S. England site described in my paper should read 'east' of Salisbury Plain—it is in west *Hampshire*.

If I understand correctly, subspecies *tircis* died out from north-east Scotland in the early 1920s, whereas subspecies *oblita* has been extending its range since the 1950s north-eastwards along the Great Glen as far as the Moray Firth, where it occupies cooler pine forests than it does further south-west. Hence examination of responses along this cline to particular climatic regimes can still help us understand whether there is rapid adaptation in subspecies *oblita* alone to minor climatic shifts.

A high incidence of pattern abnormalities thereby disclosing nuclear/cytoplasmic incompatibilities, could nevertheless help predict the outcomes in other species where a mixing of locally adapted races might occur. For instance, when Purefoy released English brimstone butterflies, *Gonepteryx rhamni*, at Tipperary, Ireland, they became

fully established and integrated with local populations of subspecies *gravesi* (Dennis, R. L. H. 1977. *The British butterflies*. E. W. Classey). Similarly, more general arguments concerning the processes by which evolutionary shifts might be effected, e.g. gene amplification, remain valid.—LEN WINOKUR, School of Animal and Microbial Sciences, Reading University, PO Box 228, Reading RG6 2AJ.

BOOK REVIEW

Butterflies of Surrey by Graham A. Collins, 87 pp, 16 colour plates, published by the Surrey Wildlife Trust, School Lane, Pirbright, Woking, Surrey, GU24 0JN, £12.—Surrey has been the target of a number of local lists in the past forty years or so. The previous lists have covered several different parts of Surrey, but this is the first to deal with the whole of the county since the Victoria County History in 1902. The introduction has an interesting, though rather short, account of the geology showing how both soil type and aspect affect species like the silver-spotted skipper, while others such as the speckled wood and peacock are present in almost all habitats. The change from traditional to modern agricultural methods, myxomatosis, coniferization and Dutch elm disease have all had a profound effect in the last half-century and are mentioned briefly.

The species accounts are highly informative but concise. The comments offered clearly show that the author has a thorough knowledge of the literature which he combines with a sensible and well-balanced view of more dubious records. At the start of each species account there is a list showing the status, preferred habitats, voltinism and period of flight. The foodplants listed are only those on which the species has been recorded in Surrey and are further broken down into confirmed, likely (e.g. a pupa dug up from the base of the plant) and old (not recorded on the plant for many years). A rare insight is shown into the habits of both the adults and early stages which has enabled the author to extend the known range of a number of species, and also greatly enhanced the value of the book. Clear, tetrad-based distribution maps and a dated list of records are given for most species.

The sixteen pages of colour illustrations are by a variety of photographers and are for the most part excellent. The picture of the dingy skipper is particularly clear, whilst one of the two pictures of the silver-studded blue is of little use, as two of the wings are in shadow and angled sharply towards the photographer. Each colour plate contains four pictures laid out in a unique zig-zag pattern which, although not unattractive, leaves about one-third of the plate as white space. Colour printing is expensive and I would have preferred to see this space used to show more pictures of the early stages, eggs of the black and purple hairstreaks, and a small larva of the white admiral, for example, would show new recorders exactly what the early stages of these insects look like.

The proof-reading and checking are excellent. One curio is the use of 'broodedness' on page 15, when the phrase 'number of broods' would have done a better job. On a more serious note I am disappointed to see that the Amateur Entomologists' Society has been omitted from the list of societies in Appendix 3. Overall, this is a well-balanced, informative book at a good price. I look forward eagerly to the next volume.

SHORT COMMUNICATIONS

***Morophaga choragella* (D. & S.) (Lepidoptera: Tineidae) in Windsor Forest and Great Park and other records from southern England**—In my note reporting the presence of this moth on Snelsmore Common, Berkshire (Alexander, 1995) I commented on the surprising absence of records from Windsor. Mark Shaw has subsequently informed me that he has reared it from a piece of the bracket fungus *Inonotus cuticularis* (Bull. ex Fr.) P. Karsten given to him by John Owen. The fungus was collected from beech logs in the deer enclosure of Windsor Great Park in 1992. I have also now reared it myself during 1995 from some *I. cuticularis* bracket growing high up on the trunk of an over-mature beech in the High Standing Hill (SU930740) area of Windsor Forest. Baker (1994) lists just five scattered records from Berkshire, suggesting that the species is not common in the county. One of these is from Silwood Park, 1971, which is close to the south-west of Windsor Great Park.

Pelham-Clinton (1985) states that the larvae feed in galleries in various bracket fungi (*Laetiporus*, *Phellinus*, *Piptoporus* etc.), or perhaps in rotten wood. He gives no indication of the relative frequency with which the moth has been reared from these fungal fruiting bodies. My experience suggests that *Inonotus* brackets are a favoured breeding medium for this moth—I have also successfully reared it from *I. dryadeus* (Pers. ex Fr.) Murrill in Hailey Wood, Gloucestershire (Alexander, 1990) and Staverton Park, Suffolk (TM353513) (unpublished). At the latter site the bracket was found very typically at the base of an old parkland oak, 15.ix.1994. In each case the host tree was alive and healthy—*Inonotus dryadeus* only hollows oaks, its presence does not imply the tree is dying. I have never found the moth in either *Laetiporus sulphureus* (Bull. ex Fr.) Murr. or *Piptoporus betulinus* (Bull. ex Fr.) Karst. despite regularly rearing Coleoptera from brackets of these fungi.

In contrast, Andy Foster (pers. comm.) knows it from beech stumps: (i) six freshly emerged adults on a beech stump on Hampstead Heath (TQ262866), 14.vii.1984—he had noted exuviae on fungi there previously, 7.vii.1984—large clumps of a small bracket fungus were noted, possibly *Coriolus versicolor* (L. ex Fr.) Quel.; (ii) freshly emerged adults on large beech stump at Rainbow Wood Farm, Claverton Down, Bath (ST772628), N. Somerset, 3.vii.1995; apparently a new county record.

Although *M. choragella* is not currently regarded as 'nationally scarce', i.e. believed to be confined to fewer than 100 of the 10-km squares of the OS National Grid, Mark Parsons informs me that the species is borderline in this respect and such status is under consideration. Whatever the final decision, as a characteristic species of ancient pasture woodlands it is certainly of special conservation interest and concern.

My thanks to A. P. Foster, E. E. Green, J. A. Owen, M. S. Parsons and M. R. Shaw for their help with this note.—K. N. A. ALEXANDER, 14 Partridge Way, Cirencester, Glos. GL7 1BQ.

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Xiphydria longicollis (Geoffroy in Fourcroy) (Hymenoptera: Xiphydriidae) in Maidenhead, Berkshire.—On 8.vii.1995 on grass beneath a lavender bush I noticed a large female hymenopteran about an inch long which I had never previously encountered. I strongly dislike killing things and this looked so distinctive I thought it would be extremely easy to name and contented myself in making fairly detailed notes. The woodwasp genus *Xiphydria* came to mind although it is over half a century since I recorded *X. camelus* (L.) and *X. prolongata* (Geoff. in Fourc.) from Bedfordshire (*Entomologist's Mon. Mag.* 1944; **80**: 87). When it was clear from Benson's 1951 key (*Handb. Ident. Br. Insects VI 2a*: 17) that there was no other species recorded at that time I turned to Schmiedeknecht (1930; *Hym. Nord- und Mitteleuropas* ed. 2) only to find that he does not key out the European species. I wondered, perhaps, if it were an ichneumon but could find nothing like it in the collection at Dinton Pastures. Its identity continued to puzzle me and I sent my description 'six lateral white spots on black abdomen the final posterior spot the largest, relatively short wings and antennae, white spots and stripes on black head, white bands on otherwise dark legs and total length about 2.5 cm' to Mark Shaw at the Royal Scottish Museum. He suggested that my immediate identification as a *Xiphydria* was almost certainly correct and drew my attention to his paper concerning *X. longicollis* being new to Great Britain and recorded by J. A. Owen from nearby Windsor Great Park (*Entomologist's Gaz.* 1985; **36**: 233–235). I checked the very sparse and ancient material in the Natural History Museum and there is no doubt that the insect I saw was this species. Dr Shaw mentioned the possibility of it being associated with diseased sycamores and there are some quite close to where the woodwasp was found. I am delighted to have seen all three British species, despite the 52 years it has taken.—BERNARD VERDCOURT, Spring Cottage, Kimbers Lane, Maidenhead, Berkshire SL6 2QP.

Editorial note on *Xiphydria longicollis*.—The association with sycamore is reported by Malumphy (1993; *Entomologist's Gaz.* **44**: 10) when numerous specimens emerged from cut sycamore logs in a Hertfordshire house. A specimen found on a moribund oak at the RHS Garden, Wisley, Surrey, by Halstead (1992; *Br. J. Ent. Nat. Hist.* **5**: 23) is figured in the 1991 BENHS Annual Exhibition report (1992; *Br. J. Ent. Nat. Hist.* **5**: 79, plate II, figure 10).—RICHARD A. JONES.

BOOK REVIEW

Dragonflies, by Peter L. Miller, Naturalists' Handbooks 7, second edition, revised, Richmond Publishing, Slough, 1995, 118 pages, hardback £16, paperback £8.95.—This is not just an updated reprint of a popular handbook; with half as many pages again, it is a completely revised work. Since the first edition in 1987, much new information has come to light on all aspects of dragonfly ecology, behaviour, biology and distribution, and this has been incorporated in the new book. Although the keys to adults and larvae are more or less the same (*Coenagrion lunulatum* is now included), the coloured plates are completely different, showing 23 species painted by R. R. Askew and previously published in *The dragonflies of Europe*, by Harley Books in 1988. Every section of the text is greatly enlarged and there are some additional line illustrations.

RICHARD A. JONES

BENHS INDOOR MEETINGS

12 December 1995

The President Dr M. SCOBLE announced the death of Dr P. J. L. Roche, a special life member, who joined the Society in 1942.

Mr R. I. VANE-WRIGHT showed a specimen of David's tiger butterfly, *Parantica davidii* Schröder. This example of a milkweed butterfly is confined to a single volcano in the central Philippines where it is threatened by deforestation.

Mr R. HAWKINS showed three female sawflies: *Phymatocera aterrima* (Klug), which is normally a garden insect associated with Solomon's seal, taken 2.vi.95 on West Wickham Common, Kent; *Athalia rosae* (L.), an uncommon species which occasionally comes to Britain as a migrant and is sometimes a pest of turnips and other cruciferous plants, found 9.viii.95 at Riddlesdown, Surrey; *Birka cinereipes* (Klug), which was taken with the preceding species.

Mr R. W. J. UFFEN showed two conopid flies collected by Charles Watson to show similarities in the field and separation characters of male and female *Conops quadrifasciatus* Deg. and *Leopoldius brevirostris* (Germar). Attention was drawn to the failure of keys to mention that males, as well as females, have a theca on the fifth abdominal sternite, and that there is no simple way of separating males in order to use the keys. The specimens shown were: *L. brevirostris*, male taken in a garden, viii.1995 at Bishop's Stortford, Herts.; a female taken 29.vii.1995 at Sawbridgeworth Marsh, Herts.; a male *C. quadrifasciatus*, taken vii.1995 at Rushy Mead, Bishop's Stortford, Essex; a female taken by the exhibitor on 15.viii.93 at Bricket Wood Common, Herts.

Mr D. HACKETT showed two beetles found under sycamore bark at Strand on the Green, Kew, Surrey on 5.xii.95. These were larvae of *Ctesias serra* (F.) (Dermestidae) found with spiders' egg masses under a loose flake of bark. This is a notable B species in Hyman and Parsons and a grade 3 ancient pasture woodland indicator species in Harding and Rose. The exhibitor had found larvae in several places around London in 1995, some way from its supposed habitat type. The other beetle, *Aplocnemus pini* Redt. (Melyridae), has a similar status and was found with the preceding species. The exhibitor had previously found this beetle under oak bark and in an old beefsteak fungus on the ground under old oak trees.

Mr M. BARCLAY said that he had found larvae of *Ctesias serra* under the bark of sycamores and London plane trees in Chelsea and Fulham. Its status as an uncommon beetle indicative of ancient trees needs reviewing.

Mr M. BARCLAY showed a live example of the cellar beetle *Blaps mucronata* Latr. (Coleoptera: Tenebrionidae) found under the floorboards of his house at Fulham. He also showed a pinned specimen of a longhorn beetle, *Morimus funereus* Muls. (Coleoptera: Cerambycidae) found crawling around on an aeroplane travelling between Budapest, Hungary and Heathrow on 20.v.94. It had been mistaken by other passengers for a spider. It is associated with beech stumps and the adult fed on beech shoots for a while before it died.

Dr D. LONSDALE noted that the late Eric Bradford had reared a *Blaps* beetle that had lived for ten years. Dr Lonsdale had himself kept a carabid beetle, *Laemostenus terricola* (Herbst), for 18 months before it escaped.

Mr A. J. HALSTEAD showed a clump of coral fungus, *Ramaria* sp. possibly *R. botrytis*. It was one of several dozen clumps of this basidiomycete fungus found at

RHS Garden, Wisley, Surrey. It was growing on the ground under some beech and holly trees in a flower bed which had been mulched with horse dung and wood shavings compost. This was the second successive year that the fungus had appeared in that place. It develops in September and persists into the winter, surviving several degrees of frost.

Mr K. MERRIFIELD referred to the fossilized worm holes he had exhibited at the previous meeting. He said that it had been suggested to him afterwards that they might be modern worm holes which had become lined with ferric salts.

The following persons have been approved by Council as ordinary members: Geoffrey Howard Trevis, Matthew Smith, Jon Nicholls, A. G. J. Butcher, David Richard Nellist, Martin Roy Honey, A. M. Davies, David Anthony Newman, Lee Brady and Harry Wooltorton. The Suffolk branch of Butterfly Conservation has become a corporate member.

Miss R. DAY announced the publication of a new book by the London Natural History Society. *Birdwatching in London* is a paperback by E. M. Nicholson and costs £8.95.

Mr A. J. HALSTEAD reported seeing a worker bumblebee of either *Bombus terrestris* or *lucorum* visiting the flowers of white dead-nettle at Royston, Herts., on 25.xi.95. Its pollen baskets were full, possibly indicating that brood was still being raised in the nest—a very late date for either of these species.

DICK VANE-WRIGHT spoke on 'Opportunity or design which is best for conserving biodiversity?' He outlined the reasons for conserving the world's biodiversity and described some of the steps that can be taken to try and ensure that the limited funds available for this purpose are used to preserve the maximum biodiversity *in situ* in the short to medium term. The biodiversity of animal and plant life is spread unevenly over land and sea. It is necessary to select sites or areas which, taken together, will give the widest representation of the fauna and flora. The speaker illustrated this with a metaphor: the names of eminent entomologists that had been selected to ensure that they covered all 26 letters in the alphabet. To conserve all 26 letters (or species) some names (or sites) must be protected as they include one or more unique letters not found in other names. When these names have been set aside, other names can be selected to give the best complementary selection of letters. The longest name may contain the widest range of letters but the next best choice may not be the second longest name, as it may simply duplicate many of the letters in the first choice. Computer programs have been developed to analyse the various choices and make the best selection.

Further examples of this process were given to illustrate site selection for conserving the biodiversity of butterflies and breeding birds in Britain. Other programmes have been devised for owls, hawkmoths and milkweed butterflies in other parts of the world. The development of such programmes is continuing and they will become increasingly sophisticated tools for guiding conservation planning. Britain is fortunate in having a great deal of information available on the distribution of plants and animals. This information needs to be brought together and analysed to identify and prioritize conservation needs. At present conservation aid is not necessarily dealing with the threat to wildlife. Much of the money goes to wilderness areas which are of little economic value and are not under immediate threat. There may also be much duplication in the habitats of nature reserves and they will not be the right mixture of sites to maximize biodiversity. The lecture was followed by a demonstration of the capabilities of the world map computer system.

15 January 1996

The President Dr M. SCOBLE announced the death of a former member, Howard G. Phelps.

Mr R. SOFTLY showed two live specimens of the chestnut moth, *Conistra vaccinii* (L.) (Lepidoptera: Noctuidae). They were taken in an actinic trap near a railway embankment in Hampstead. The daytime temperature had been 12 °C but fell to 5 °C by the following morning. *Conistra vaccinii* is the most active of the winter hibernator moths and the exhibitor wondered why they bothered to fly at a time of year when nourishment is unlikely to be available to them.

Dr B. EVERS HAM showed some examples of seed-feeding carabid beetles of the genera *Harpalus* and *Amara* found in Breckland grassland, together with some other species of scarce carabids found in that area.

Mr R. HAWKINS announced that he was handing over the sale of the Society's publications to Gavin Boyd. Sales of the recently published '*New British Beetles*' were going well with more than 150 copies sold. He noted that the printers had dispatched the books in boxes labelled 'Beatles'.

Mr A. J. HALSTEAD, noting that January was a quiet time for insects, gave a communication dating from February 1907. He read from a gardening magazine, *The Garden*, p. 84, 16.ii.1907, in which it was reported that gardeners at Wargrave Manor had on 6.ii.1907 found 265 queen wasps hibernating in rolled-up lath blinds on greenhouses at the Manor. The owner of the property had shown the wasps alive at a meeting of the Wargrave Gardeners' Association, whose members thanked him for 'ridding the district of so many of the noxious insects'!

Dr B. EVERS HAM spoke on the ecology of ground beetles. The Carabidae is a very successful family with around 50 000 species in the world and it is the third largest beetle family in Britain. Carabids can be found from the tropics to arctic regions, and from sea shores to mountain tops. Carabids vary in size from around 2 mm to 35 mm long but show little variation in their body shape. The main variations concern the length and stoutness of the legs, and the shape of the head and mandibles which are related to the feeding habits of the beetles. Some have flattened bodies which enable them to crawl under bark, while other species have shortened wing-cases. Carabid beetles are easily sampled by using pit-fall traps and so much has been learnt about their distribution and habitat preferences.

Dr Eversham showed examples of some of the more interesting species associated with the sandy heathland of the Breck, the peat bogs of Thorne Moors NNR, the clay cliffs at Spurn Point, and the grazing marshes at Rainham Marsh. The richest areas of the Breck are often the field margins, particularly for the seed-feeding species. The fenland areas of the Breck also have some scarce species but coniferized areas have a carabid fauna similar to arable fields.

The part of Thorne Moors that has survived commercial peat cutting has an exceptionally rich carabid fauna with 260 species recorded. One reason for the abundance is the diversity of habitats within the national nature reserve. This includes an area of salt-marsh 45 miles inland due to saline water which is pumped out of mine workings. A key feature of sites with high carabid biodiversity seems to be the occurrence of all the successional stages from disturbed ground to mature habitat. Not all of man's activities are harmful to ground beetles—some man-made features such as quarries, sand pits, reservoirs, hedges and colliery spoil heaps can provide analogues of natural habitats and may be colonized by species needing these conditions.

27 February 1996

The President Dr M. SCOBLE announced the deaths of Mr H. R. Last, who had been a special life member since 1991, and Mr L. F. Ferguson, who had been a member for nearly 50 years.

Mr R. A. JONES showed some specimens of the ant *Lasius brunneus* (Latr.) found at Beckenham Place Park in south-east London, some three miles inside the West Kent boundary. The ants were found in wood mould in a small hollow between roots at the base of a large oak tree. *Lasius brunneus* is found mainly in Surrey, Berks. and Bucks. Beckenham Place Park is about 15 miles from the ant's nearest Surrey locality.

Mr C. W. PLANT showed two rare parasitic tachinid flies. *Gynnosoma nitens* Meig. is an RDB1 species previously known only from Box Hill, Surrey in July 1956. The specimen exhibited was taken on 3.viii.95 at Mill Wood Pit, Grays, S. Essex, which is a site of national significance for its aculeate Hymenoptera. A second specimen was taken at the same site by Peter Harvey, while another was taken by the exhibitor on 2.vii.95 at Richborough Power Station, near Sandwich, Kent. Elsewhere in Europe this fly is known to parasitize the pentatomid bugs *Sciocoris cursitans* (F.) and *S. helferi*—the latter does not occur in Britain. An RDB3 species, *Subclytia rotundiventris* (Fallén) was taken 18.vi.94 at the Essex Wildlife Trust's reserve at Rushy Mead, near Bishop's Stortford, and is a new record for the county. Its larvae are parasitoids of the shield bugs *Elasmostethus interstinctus* (L.) and *Elasmucha grisea* (L.).

Mr Plant also showed some pieces of apple branches showing extensive tunnelling by caterpillars of the clearwing moth, *Synanthedon myopaeformis* Borkh. They came from a group of four or five apple trees at Bishop's Stortford, Herts. which are a relic of a former orchard now largely replaced by housing. The exhibitor had been aware of the presence of the moth on these trees for several years. When he learned that the local council considered the trees dangerous and intended to fell them he notified the council of the entomological interest. As a result the council agreed to retain the trees and limit the work to pruning out dangerous branches. Mr Plant was permitted to supervise the work and remove the tunnelled branches to his garden from where they will be dispersed to other suitable sites in the locality. Mr Plant emphasized the importance of communicating with local authorities and other land owners when vulnerable wildlife habitats are identified. Land owners cannot be blamed for destroying scarce insects if they are unaware of their existence.

Mr I. Sims showed male and female examples of the psychid moth, *Luffia lapidella* (Goeze), and females of *L. ferchaultella* (Steph.), together with their larval bags in which pupation occurs. There is some uncertainty as to whether they are separate species or forms of a single species. *Luffia lapidella* reproduces sexually and the females are 3–4 times larger than those of *ferchaultella*; it also has 4 tarsal and 14 antennal segments, with *ferchaultella* there are usually 3 tarsal and 12 antennal segments although there can be some variation. *Luffia lapidella* occurs in Cornwall and its larvae feed on algae on rocks. *Luffia ferchaultella* is a parthenogenic species found throughout southern England and is associated with lichen on trees and fences. The exhibitor has successfully reared *lapidella* larvae on tree lichen and *ferchaultella* on rock lichen without any adverse effects on the moths.

Mr R. W. J. UFFEN showed a live specimen of the diamond back moth, *Plutella xylostella* (L.). This had been reared from larvae found on imported broccoli heads. The exhibitor noted that although this world-wide brassica pest was a frequent migrant to Britain it was unusual to find larvae on cabbages being grown in gardens.

Mr A. J. HALSTEAD showed a Gary Larson 'Far Side' cartoon that illustrated the perils of exhibiting specimens at entomological meetings.

Dr P. WARING showed some colour transparencies taken during the Society's recent three-man expedition to Belize. They had been recording moths and butterflies using mainly actinic lights and bait traps. A full report on the expedition will be published in the journal.

The following persons have been approved by Council as ordinary members: Dr Andrew W. Ewing, Mr Alan Deacon, Mr David J. Fee, Dr K. M. Veronica Bennett, Mr Stephen P. Bolchover, Dr Malcolm J. Smart, Mr Jeremy R. Board, Mr Paul A. Winstanley, Dr Brian H. Orr, Mr Ashley P. Leftwich, Mr James Newton, C. M. Raper, Mr John Radford, Mr Nigel St John Cuming, Mr Dawson, Ms Jennifer M. Spence, Mr Darren J. Mann and Mr John Tennant.

The ordinary meeting then closed and was followed by the Annual General Meeting and Presidential Address.

Minutes of the Annual General Meeting of the Society held at the Royal Entomological Society of London's rooms at 6.30 pm on 27 February 1996

Chairman: The President, Dr M. SCOBLE. Present: 31 members.

Minutes of the last Annual General Meeting were read and signed.

The Secretary read the Council's report, followed by the Treasurer who read his report. The Treasurer then invited questions on his report. Mr Stubbs asked questions about the accounts and Mr Pickles answered to Mr Stubbs satisfaction. The Editor, Librarian and Curator then read their reports and Dr Scoble read the report of the Hering Memorial Fund. The President proposed the adoption of the reports, this was seconded by Dr I. F. G. McLean and passed unopposed.

The President then read the names of the Officers and Members of Council recommended by the Council for 1996/97 and, as no other names had been submitted, he declared the following duly elected: President C. Hart, Vice-presidents M. J. Scoble and D. J. L. Agassiz, Treasurer A. J. Pickles, Secretary R. F. McCormick, Editor R. A. Jones, Curator P. J. Chandler, Librarian I. R. Simms, Lanternist I. McLean, Building Manager P. J. Baker, Ordinary Members of the Council D. Lonsdale, M. Parsons, A. Jenkins, C. Firmin, M. Barclay, N. Hall, G. Boyd, P. M. Waring, R. Hawkins and S. Pittis.

The Secretary then read bye-law 26(d) and invited motions or questions. There was none.

The President then read his report and gave his address.

The President then installed the new President, Mr C. Hart.

The President proposed a vote of thanks to the retiring President, and this was seconded by Dr Waring. The President asked for permission to publish the Presidential address, and this was given.

Mr C. W. PLANT gave a vote of thanks to the retiring Officers and Council.

The President proposed the election of Mr R. A. Bell and Mr D. O'Keeffe as auditors for the coming year with Council being empowered to appoint registered auditors under the Charities Act if necessary. This was seconded by Mr I. Sims and Mr Plant and passed unopposed.

BENHS FIELD MEETINGS

Snelsmore Common, Berkshire, 5 August 1995

Leaders: **Martin Harvey** and **Brian Baker**. Snelsmore Common forms one of the largest remaining areas of open heathland in Berkshire, and also contains some interesting valley mire habitats and some old woodland around its edges. The Common has been much in the news over the last few years because it is one of the sites on the route of the Newbury bypass; although the bypass route misses the heathland, it has resulted in the removal of some old trees at the site's south-east corner, and what effect the road construction will have on the hydrology of the mires remains to be seen.

Fourteen members and friends joined us for this field meeting, from as far afield as Somerset and Yorkshire. A variety of insect groups (over 230 species in all) was recorded during a very hot day, but one focus turned out to be leaf-mining insects. With the expert help of John Robbins, we compiled an impressive list of some 30 lepidopterous, coleopterous and hymenopterous leaf-mines. By this time in August, the hot dry weather seemed to have been too much for day-flying insects, but noteworthy Diptera included the hoverflies *Helophilus hybridus* Loew and *Eumerus ornatus* Meig., the snail-killing fly *Elgiva cucularia* (L.), the parasitic conopid flies *Sicus ferrugineus* (L.) and *Conops ceriaeformis* Meig. The aquatic life in some of Snelsmore's ponds was sampled by John Bratton, who recorded several water beetles including the nationally scarce species *Hydroporus longulus* Muls. and *Helochares lividus* (Forst.).

Returning to the search for larvae and feeding damage, Andrew Halstead found evidence of the sawfly *Pristiphora geniculata* (Hartig), with characteristic feeding damage on rowan *Sorbus aucuparia* (L.). This local sawfly is considered to be of provisional Red Data Book 3 (rare) status. The few other Hymenoptera species seen included the delightfully named mournful wasp *Pemphredon lugubris* (F.), a black wasp which nests in rotten wood. Diversion was provided by Malcolm Storey's discovery of a lobster moth *Stauropus fagi* (L.) larva, sitting on a rose stem next to the path (presumably having fallen from the trees above).

Eight MV lamps were in operation for the evening session, producing a good moth list with several characteristic heathland species including the gelechiid micro-moth *Aristotelia ericinella* Zell., the birch mocha *Cyclophora albipunctata* (Hufn.), the ling pug *Eupithecia goossensiata* Mab. and the true-lover's knot *Lycophotia porphyria* (D. & S.). As well as the moths, some other interesting species turned up. Martin Albertini spotted a dusky cockroach *Ectobius lapponicus* (L.) close to his m.v. trap, a species probably near the north-west edge of its range here at Snelsmore. The longhorn beetle *Arhopalus rusticus* (L.) was once confined to Scottish pine forests, but has spread or been introduced into the south of England. One adult came to light. The mayfly *Ephemera lineata* Eaton is currently classified provisionally as a Red Data Book 2 (vulnerable) species, but as Brian Baker has reported in this journal (*Br. J. Ent. Nat. Hist.* 1995; 8: 75-76) it seems to have increased in numbers in recent years, and has been seen quite frequently along the Thames in Berkshire and Oxfordshire at least. A specimen turned up at Snelsmore on this occasion, some ten miles from the Thames, so was perhaps a refugee from the nearby Kennet Valley. Similarly some distance from its usual reedbed habitat was the twin-spotted wainscot *Archanara geminipunctata* (Haw.) found by Tony Dobson. Perhaps the hot summer weather had encouraged these species to emigrate and look for fresh breeding territory.

Decoy Heath and Silchester Common, Berkshire, 19 August 1995

Leaders: **Martin Harvey** and **Stephen Miles** for the BENHS Conservation Working Group. Eight members of BENHS and Butterfly Conservation were present to visit these two very different heathland sites. Decoy Heath is regenerated heathland on a small former landfill site, with *Calluna* and *Erica* plants re-established on infertile gravelly soil. A number of ponds and boggy areas are present, and 25 species of Odonata have been recorded. The site is now a nature reserve for BBONT, the local Wildlife Trust. Silchester Common is a larger, longer-established and drier sandy heathland, managed by the local parish council and commoners. It is adjacent to Pamber Forest (Hampshire), and a number of rare and characteristic heathland invertebrates have been recorded over the years.

Despite Decoy Heath's chequered past (the landfill pits were filled in about 25 years ago), during our morning visit Stephen Miles and Raymond Uffen were pleased to find that some heathland species of Hymenoptera had survived on the site (or perhaps had recolonized from nearby). These included the bees *Colletes succinctus* (L.), *Andrena fuscipes* (Kirby), *Lasioglossum malachura* (Kirby), *Melitta tricineta* (Kirby) and *Megachile versicolor* Smith. In addition, the median wasp *Dolichovespula media* (Retz.), which has colonized the UK since 1980, was recorded. Among the Orthoptera, it was pleasing to see both short-winged and long-winged coneheads *Conocephalus dorsalis* (Latr.) and *C. discolor* (Thunb.); the former has been found in Berkshire for some time now, but the latter is a recent arrival since 1994. We were able to view the 25th dragonfly species to be added to the reserve's list: at least four of the migratory yellow-winged darter *Sympetrum flaveolum* (L.), which arrived in the UK in large numbers in 1995, were seen during the morning. Brian Baker demonstrated how to go about looking for clearwing moth larvae in birch stumps, and had soon found a larva of the large red-belted clearwing *Synanthedon culiciformis* L.

At Silchester Common in the afternoon we saw evidence of recent fires on the heathland. Luckily these seemed to have been contained in quite small areas, and may even be beneficial in allowing some heathland regeneration. Certainly the burnt areas had attracted the pyralid moth *Pyla fusca* (Haw.), a heather-feeding species which is frequently associated with burnt heathland. Insect activity seemed low during the hot afternoon, and some areas that are normally quite wet even in summer were very dry, with a lack of their usual flowering plants. However, heathland Hymenoptera were still in evidence, including the potter wasp *Eumenes coarctatus* (L.), a local species typical of heathlands but not present on all. Other characteristic species included the predatory bug *Alydus calcaratus* (L.), the gelechiid micro-moth *Aristotelia ericinella* Zell. (a *Calluna* feeder) and the ladybird *Coccinella hieroglyphica* L. Birch stumps again yielded evidence of *Synanthedon culiciformis* (L.) and also white-barred clearwing *S. spheciformis* (D. & S.) Diptera of note were *Chorisops nagatomii* Rozk. and *Micropeza lateralis* Meig., the latter found in its characteristic boggy habitat.

Three of us stayed on to run an m.v. lamp at Decoy Heath in the evening. Again, flight activity seemed low after the huge numbers of moths that had swarmed round m.v. lights in July. A reasonable number of mostly common species were recorded, including bulrush wainscot *Nonagria typhae* (Thunb.) and the hemlock-feeding oecophorid micro-moth *Agonopterix alstroemeriana* Clerck. However, as well as the moths perhaps the highlight of the m.v. session was a lesser earwig *Labia minor* (L.), spotted among the moths by Malcolm Storey.

In all, over 100 species were recorded throughout the day, including several classified on the "recorder" database as nationally scarce. The BENHS Conservation Working Group is compiling a report for the managers of these sites, giving full details of species recorded and suggested habitat requirements.

Stowe Landscape Gardens NT, Buckinghamshire, 18 May 1996

Leaders: **Frances and George Higgs**. The meeting took place on an overcast evening with a very strong east wind and temperature of 42°F (6°C). My wife and I were joined by eight stalwart friends from BENHS and Milton Keynes Natural History Society. Those attending were Martin Albertini, David Manning, Peter and Diane Sharpe, Mike Killeby, Jean Varley, Christine and David Roberts.

Sites were chosen with difficulty owing to the weather conditions. Five m.v. lights plus one actinic were run for just over an hour in which time no moths were recorded. Our only records came from a search made before lighting up when D. Manning went looking for leaf-mining species. He noted workings and case of *Coleophora laricella* (Hübner), vacant mines of *Stigmella aurella* (F.) on bramble. Also a larva of *Operophtera brumata* (L.) on hornbeam. M. Albertini boxed a micro moth which D. Manning identified as *Elachista rufocinerea* (Haw.).

With conditions as they were and the participants very cold we abandoned our attempts to record and managed to retrieve all equipment just before the arrival of heavy rain.

Our grateful thanks to the National Trust and to the Estate Manager Mr Frank Thomson for his most valuable help.

Stowe is a large and interesting site from which there are few records. A great pity we were unable to sample its potential. Warm thanks to the hardy people who supported the event.

OFFICERS' REPORTS FOR 1995

COUNCIL'S REPORT

The Society's membership stood at 741 at the end of the year, a small increase on the numbers for the previous year; 42 new members were elected during the year, 22 were struck off for non-payment and 4 members resigned. There are 4 members who have served 50 years in the Society and are now special life members. Eleven deaths were reported to the Society during 1995.

The Council met 7 times during 1995 and, on average, 15 members attended each meeting. Less of the Council's time was taken up discussing Dinton Pastures (the Pelham-Clinton Building) but there are still ongoing problems with the air conditioning and alarm systems although a new alarm system has recently been fitted which is working at the moment. The Council members who have taken the brunt of attending for engineers' visits have been our Curator, Mr Peter Chandler; our Building Manager, Mr Peter Baker; our Distribution Secretary, Mr Young and Dr Muggleton. Our thanks go to these hard-working members of Council, and to any other members who have helped with this work. Other things that have taken up the Council's time were producing a revised membership application form; finalizing the affiliation of the Dipterist's Forum and paving the way for the affiliation of the

Bees Wasps and Ants Recording scheme; discussions on whether the BENHS could help produce new Royal Entomological Society handbooks and deliberations about the number of trees that had been felled in Windsor Great Park. Letters were written to the Estates Office by your President and I am pleased to say that the felling has stopped and extensive re-planting has taken place. Further environmental issues have included the production of a conservation questionnaire which was distributed to the membership; this attracted 135 replies with over 100 giving a positive response. An additional item is the possible inclusion of several species of invertebrates including three new species of macromoth to the fully protected list; your Council has argued the case for these species to go onto a less restrictive listing.

There were 11 indoor meetings held at the rooms of the Royal Entomological Society and a joint meeting with the London Natural History Society at the Linnean Society's rooms in Piccadilly. In general, attendances at indoor meetings were improved with around 25 or more people coming to each meeting; this was probably because of the hard work put in by our Indoor Meetings Secretary, Dr McLean, in arranging speakers for these events. Six workshops were arranged at the Pelham-Clinton Building and one at the Natural History Museum; they proved to be very popular. Along with these, three moth-trapping evenings at Dinton Pastures were carried out in order to enlarge our knowledge of the Lepidoptera of the area. The Pelham-Clinton Building was opened on a weekend, either Saturday or Sunday, 16 times during 1994/95. It was decided to try opening on both days of the weekend in order to encourage better attendances and, in the main, this strategy worked well with more people attending. The interest of the membership in the organized events makes it rewarding for the hard-working Council Members involved and our premises at Dinton Pastures a success. A full programme of meetings and events is being prepared for 1996/97.

The Society continued to represent members' interests in the field of conservation and Mr S. R. Miles has taken an active part as the Society's representative on the Joint Committee for Conservation of British Invertebrates. Because of the death of Mrs Frances Murphy before September of this year, Mr Miles is the lone representative until a replacement can be found.

Twenty-nine Field Meetings were held at wide-ranging areas of the countryside, including the moth-trapping events at Dinton Pastures Country Park. Attendance at these varied widely. We would like to thank our new Field Meetings Secretary, Dr Paul Waring, for all his hard work in arranging these meetings; a full programme of Field Meetings is already in hand for 1996, with a central theme 'National Trust sites'; this was sent out with Vol. 9, Part 1. A special field expedition to Belize was agreed and partly funded by the Society; this is hoped to be the first of many and a full report about this will be in the journal. One of the field meetings to the New Forest was the subject of a television programme shown on national television—a first for the BENHS.

A successful Annual Exhibition was organized by Mr Michael Simmons and was attended by 250 members and 100 visitors, an increase in the numbers who attended the previous year. There were around 190 exhibits with the usual slant on the Lepidoptera but with a slight decrease in the other orders. The Council reinforced its guidelines to stop controversial exhibits from being shown at our Exhibition. The aim is to stop long series of any species from one locality, unless for a special reason, from being shown. Mr Michael Simmons organized the Annual Dinner for the second time and made a great success of a job that was thrust upon him in 1994; a similar number to last year, of members and companions sat down to a meal that was enjoyed by all.

ROY MCCORMICK

TREASURER'S REPORT

The strong recovery in the stock exchange in the final period of 1995 has meant that we have finished the year with a net worth, including investments at market value that has risen from some £380 000 to nearly £405 000. Since the balance sheet date that upwards trend has continued.

It is of course comforting to know that this financial strength underpins the stability of the society, but it was our intention that the costs of running the society and providing the journal free to members should be met from current income, and in this we have not succeeded. There is a deficit on membership of £3000 compared to £1800 in 1994.

In getting to these figures the significant items are curation costs of £5000; grant of £1500 on the Society's expedition to Belize; purchase of a printer for £700 and a grant of £600 towards the publishing costs of *The butterflies of Surrey*. Curation costs were largely offset in the year by receipts from the sale of old cabinets. It is hoped that by assisting the Surrey Trust with their publishing costs we will effectively be supporting a planned series of books on the insects of Surrey which will be financed in turn from the proceeds of the earlier publications.

Costs of providing services to the Pelham-Clinton Building remain high, although steps have been taken this year to change the security and air conditioning arrangements which should lead to reductions, but this remains an area of concern to Council.

The special publications fund has shown an increase this year from £31 000 to just under £43 000 which requires comment. For many years this fund was only credited with surpluses on sales of the society's publications. This surplus is not immediately reinvested in publications, but remains for some time in liquid assets and it is therefore felt that the fund should be credited with its share of investment income. This has been done this year, and an additional sum of £2000 has been credited in some compensation for previous years. Some stocks of books and plates which escaped inclusion last year are valued in these accounts.

Roger Hawkins leaves the Sales Secretary's position with this fund in good heart and well able to finance an ambitious programme of publications.

Transfers out of the Bequest Fund this year are £1000 to help with the cost of the coloured plates in the journal, and just under £16000 to maintain the value of the General Fund.

At market value the Hering fund stands at over £13000, and is well able to maintain the present level of grants.

It was announced in the last edition of the journal that we had obtained third party insurance cover of £2 000 000 for all members when engaged in entomological pursuits and this is offered as an additional benefit of membership as an increasing number of agencies issuing permits require this cover. We were able to obtain this at nominal cost. My thanks to Dennis O'Keeffe and our long serving joint auditor Reg Bell who have audited our books once again and have also audited the books of *The Dipterists' Forum*.

My thanks also to Mark Telfer who took on the onerous task of Assistant Treasurer at the beginning of 1994 and has done splendid work in re-organizing the computer system on to a modern PC. Unfortunately pressure of studies has meant his giving up this post after two years. It was particularly encouraging to have one of our younger members volunteering for a position like this and it is to be hoped that he will reappear on Council at an appropriate time, and that other younger members will follow his example. I look forward to working with Roger Hawkins who has taken over this role.

*Income and expenditure account
year to 31 December 1995*

	1995	1994
<i>General account</i>		
Subscriptions	8,641	10,249
Interest and dividends	11,374	10,181
Redemption surplus	123	
Donations and bequests	234	1,339
Surplus on Christmas cards	102	130
Surplus on cabinets and collections	4,027	<u>23</u>
<i>Total income</i>	(24,501)	(21,922)
Headquarters services	4,540	4,811
Insurance	941	935
Headquarters security and maintenance	2,111	1,807
Council rooms and expenses	2,100	1,981
Equipment	700	2,328
Members meetings and exhibitions	1,722	2,345
Administration	1,626	2,534
Library	258	960
Curation costs	5,038	
Subscriptions and donations to other societies	130	173
Grant to <i>The butterflies of Surrey</i>	600	-
Cost of dinner	69	181
Belize expedition	<u>1,500</u>	<u>-</u>
<i>Cost of running society</i>	<u>21,335</u>	<u>18,055</u>
	(3,166)	(3,867)
<i>Publications account (free to members)</i>		
Sales	(1,935)	(1,267)
Bequest fund grant for plates	(1,000)	(1,000)
Production of journal	7,681	6,402
Distribution costs	1,507	1,572
Net cost of journal	<u>6,253</u>	<u>5,707</u>
Deficit (surplus) on membership	3,087	1,840
<i>Special publications (for sale)</i>		
Sales	(6,840)	(6,128)
Opening stock	5,021	9,088
Publication costs	3,762	128
Distribution and general costs	676	871
Closing stock	<u>(11,660)</u>	<u>(5,021)</u>
Surplus on sale of special publications	<u>(9,041)</u>	<u>(1,062)</u>
	(5,954)	778
Transferred to Hering fund	699	643
Transferred to bequest fund	9,285	8,170
Transferred to general fund	(15,806)	(11,242)
Transferred to special publications fund	<u>11,776</u>	<u>1,651</u>
	<u>5,954</u>	<u>(778)</u>

Balance sheet as at 31st December 1995

	1995	1994
<i>Employment of capital</i>		
Leasehold property	154,736	154,736
Opening amortization	(4,420)	(2,210)
Amortization	<u>(2,210)</u>	<u>(2,210)</u>
	148,106	150,316
<i>Quoted investments</i>		
General fund	24,276	28,036
Hering fund	3,540	3,540
Investment bonds	139,000	139,000
<i>Current assets</i>		
Special publications	11,660	5,021
Christmas cards	332	50
Sundry debtors and payments in advance	4,678	3,149
Bank capital reserve account	20,002	14,200
Eurocheque account	320	-
Bank societies reserve account	4,643	4,468
Bank current account	1,377	2,424
	<u>43,012</u>	<u>29,312</u>
<i>Current liabilities</i>		
Sundry creditors and accrued expenses	7,635	2,049
	<u>(7,635)</u>	<u>(2,049)</u>
<i>New current assets</i>		
	35,377	27,263
	<u>350,299</u>	<u>348,155</u>
<i>Capital employed</i>		
<i>General fund</i>		
Opening balance	39,587	39,589
Transfer from bequest fund	15,804	11,242
Transfer from income and expenditure account	<u>(15,804)</u>	<u>(11,242)</u>
	39,587	39,589
<i>Housing fund</i>		
Opening balance	150,316	152,526
Amortization	<u>(2,210)</u>	<u>(2,210)</u>
	148,106	150,316
<i>Special publications fund</i>		
Opening balance	31,146	29,495
Surplus from sales and investment income	<u>11,776</u>	<u>1,651</u>
	42,922	31,146
<i>Bequest fund</i>		
Opening balance	122,119	126,191
Income	9,285	8,170
Grants & expenditure	<u>(16,804)</u>	<u>(12,242)</u>
	114,600	122,119

Balance sheet as at 31st December 1995

	1995	1994
<i>Hering memorial fund</i>		
Opening balance	4,985	4,942
Income	699	643
Expenditure	(600)	(600)
	<u>5,084</u>	<u>4,985</u>
	<u>350,299</u>	<u>348,155</u>

Accounting policies

- (a) The accounts are prepared under the historical cost convention.
- (b) The costs of building and equipping leasehold premises at Dinton Pastures Park have been capitalized. The total cost of these premises which were completed during the year to 31st December 1993 are being amortized over the term of the lease. The first amortization charge was made in 1993.
- (c) The value of the library, collections, ties, back numbers of proceedings and journals and the computer system is not included in these accounts. Current expenditure on such items is written off to the income and expenditure account.
- (d) Donations and legacies are brought into account when they are received by the society.
- (e) Surpluses (or deficits) arising on the special publications fund which accounts for publications primarily for sale are transferred to that fund to finance future publications.

<i>Investments</i>	<i>Book value at cost</i>		<i>Market value</i>
	<i>General & bequest</i>	<i>Hering memorial</i>	
1230 Shell T&T 25p Ord.	477.79	771.83	10356
750 Unilever 5p Ord.	248.45		10320
6272 M&G Charifund Units	19091.17	1147.24	62720
2450.90 Treas. 9 1/2% 1999	771.22	1621.21	2653
3863.71 Treas. 8 3/4% 1997	3687.94		4018
	<u>24276.57</u>	<u>3540.28</u>	<u>90067</u>
<i>Investment bonds</i>	<i>Total</i>		
Hendersons	58000.00		55320
Sun Life	56000.00		53748
Barings	25000.00		22948
	<u>139000.00</u>		<u>131016</u>

Fund movements

Amortization on the leasehold premises at Dinton Pastures has been charged to the housing fund. A grant has been made from the bequest fund towards the cost of coloured plates published in the journal and towards the general running expenses of the Society.

Make up of funds

The funds are represented by the following assets:

<i>Housing fund</i>		
Leasehold premises	148,106	148,106
	<u>At cost</u>	<u>At market value</u>
<i>Special publications</i>		
Stock	11,660	11,660
Cash deposits	17,262	17,262
Hendersons bond	10,000	9,538
Barings bond	4,000	3,672
	<u>42,922</u>	<u>42,132</u>
<i>Hering fund</i>		
Investments	3,540	11,705
Cash deposits	1,544	1,544
	<u>5,084</u>	<u>13,249</u>
<i>Bequest fund</i>		
Hendersons bond	48,000	45,782
Sun Life bond	56,000	52,748
Barings bond	10,600	9,730
Cash deposits	—	—
	<u>114,600</u>	<u>108,260</u>
<i>General fund</i>		
Barings bond	10,400	9,546
Investments	28,036	82,122
Current assets	1,151	1,151
	<u>39,587</u>	<u>92,819</u>
<i>Net worth</i>	<u>350,299</u>	<u>404,566</u>

Report of the auditors to the members

We have examined the financial statements attached which have been prepared in accordance with the recommendations of SORP2.

We have audited the financial statements annexed in accordance with approved auditing standards.

In our opinion the financial statements which have been prepared under the historical cost convention give a true and fair view of the state of the Society's affairs at 31st December 1995 and of its Income and Expenditure for the year then ended.

D. O'KEEFFE
R. A. BELL

PROFESSOR HERING MEMORIAL RESEARCH FUND

The Committee supported two of the five applications made to the Fund for 1996.

Dr Alan Gange, from Royal Holloway College, was granted £450 to extend his work on the effect of endophytic fungi on the performance of the thistle gall fly—*Urophora cardui* (Tephritidae). Earlier work demonstrated that reducing mycorrhizal infection of the foodplant, *Cirsium arvense*, had the effect of increasing gall weight and the number of live larvae per gall. The new work will concentrate on the effects of endophytic fungi on the fly.

Dr Rimantes Puplesis was awarded £200 towards the cost of consumables and travel for collecting lepidopteran leaf miners in the far east of Siberia.

A report has been received from Dr Sergej Sinev (Russian Academy of Sciences, St Petersburg), who received a Hering award last year, on the results of his visit to the Russian Far East. Dr Sinev collected some 5500 specimens of microlepidopterans from an area near Ussuzijsk and from a reserve in the most southern part of the Primorye area. Over 600 species are represented in this material (mainly of the families Cosmopterigidae, Chrysopeliidae, Stathmopodidae, Blastobasidae, Agonoxenidae, Scythrididae and Elachistidae), of which at least 15 are new. In addition, about 350 larvae were collected, representing around 35 species, of gelechioids mining herbaceous plants. Several papers based on this material are being written. The Committee is delighted to be able to help our colleagues in eastern Europe to collect from such interesting areas.

An award enabled Mr Roland Johansson, from Växjö, Sweden, well known for his colour paintings of microlepidopterans, to visit the Natural History Museum, London, to illustrate types of some Australian Nepticulidae. This work forms part of a collaborative study with colleagues from institutes in Canberra and Leiden. It was clear from the results of Mr Johansson's work by the time he left the Natural History Museum that the visit was a considerable success.

Although the sum of £600 is not large, I continue to be impressed by the value of the work it facilitates year after year.

As always, I am grateful to the other members of the Hering Fund Committee for their efforts.

MALCOLM J. SCOBLE

LIBRARIAN'S REPORT

1995 has been a year of transition in the stewardship of your library. Firstly, I must thank Mr Stephen Miles, your librarian for the past 12 years, for the invaluable support he has lent to "the new boy", especially where the computerized library database is concerned. This now holds a listing of all books on our shelves and an up to date record of book loans and returns.

With the agreement of council, two journal exchanges and a purchase have been arranged. Our journals have reached the point where another back-number binding exercise would be advantageous. Consequently, I have approached the firm of Riley, Dunn and Wilson regarding this and the restoration of several old books that are deteriorating. I hope to be in a position to authorize this work in the Spring of 1996.

On the subject of old books, I am pleased to communicate that Council has decided not to dispose of these. Both Stephen and myself thought that the loss of these items would have detracted from the cultural and historical interest not only of your library but of your Society as a whole.

Sadly, due to the circumstances leading to these events, the library has benefited from two large bequests of books this year. The first was received from the estate of Eric Bradford and the second from that of Humphrey Mackworth-Præd. These items will be made available to members in due course.

I must give special thanks to John Muggleton who has looked after receipt and arrangement of journals, an onerous task because of the numbers of items involved. Thanks are also due to Graham Collins, Peter Chandler and Alan Stubbs for donations of books to the library this year. Andrew Halstead has made progress in arranging the collection of slides, a welcome move that should greatly facilitate their access to members. Melvin Crow lent valuable assistance in co-ordinating access to Eric Bradford's books and Tony and Dorothy Harman assisted with their transportation to Dinton Pastures. I extend my thanks to them all for their help in these matters.

Finally, I wish to add that I have enjoyed my first year as your librarian and hope that those of you who have availed yourselves of the library have not found it wanting. I have learnt a lot concerning the ways that the library and Society function and I am looking to the future with interest.

I. SIMS

CURATOR'S REPORT

The principal event in the last year has been the arrival at Dinton Pastures of the collections of Eric Bradford, who was my predecessor as Curator and these have now become a most valuable addition to the Society's assets.

Eric was primarily a microlepidopterist and was responsible for the layout of our "micro" collection. His beautifully displayed collection of these insects has thus been a significant acquisition. However, he collected all orders of insects in his woodland reserve at Child's Forstal, Blean in Kent and also from his personally created habitat behind his garden at Pean Hill, Whitstable. We also received from him a large collection of leaf mines, a new area for our collections.

Eric's main collection of "micros", including his Kent material was arranged in four Hill units and laid out according to Bradley & Fletcher. There was also a 16-drawer cabinet, containing a previous arrangement and largely from Hertfordshire. The latter have now been incorporated into the Hill units and these named collections together contain 970 species, of which no less than 56 are additions to the Society's collection, bringing the number of British Lepidoptera that we lack below 200. Along with the "micros" came a large number of genitalia preparations on microscope slides, which are separate from the collection and yet to be collated with it. There are also about 50 small boxes containing unnamed "micros", most of them sorted to family—these await examination!

Another 40 boxes contained unnamed "macros" or other orders. I have sorted the latter into orders and major groups and progress is already being made on their identification. I am grateful to Raymond Uffen for naming the Aculeate Hymenoptera, Andrew Halstead the sawflies and Alan Stubbs the craneflies. Roger Hawkins and Bernard Nau have also assisted on the Heteroptera. Eventually it is hoped that a full record can be compiled of the insects that Eric collected in his wood. The other orders are being incorporated into the Society's existing collections but the Lepidoptera will remain separate.

The leaf mines include more than 1000 named ones which comprise about 100 species of "micros". There are also 1300 packets of unnamed mines, the plants also

requiring to be identified. Plastic boxes have been provided for the storage of the leaf mines and it is hoped that they can be identified and catalogued in due course.

I am indebted to Eric's family for the opportunity for Stephen Miles and myself to visit his home to assess his library and collections. Our thanks must also be extended to Melvin Crow for facilitating our visit and for making the necessary preparation for transport, and to Tony Harman for bringing the effects to Dinton Pastures.

Having just completed the reorganization necessary to accommodate Eric Bradford's collection, we were sad to hear that Humphrey Mackworth-Praed had also died; his father's collection of British "macros" came to us only four years ago after the death of his mother. Humphrey specialized in the European Lepidoptera and the opportunity was provided by his son Mark for again Stephen Miles and myself to visit his home. We agreed then to accept all the European collections, which included eight assorted cabinets of butterflies, 40 large store boxes of moths (comprising about 1000 species) and a few boxes of other insects, mainly Orthoptera but also a few Neuroptera, among them *Nemoptera bipennis* which was until recently thought to have been the model for the Society's emblem. A local Surrey collection and a collection of African butterflies were considered less appropriate for the Society to accept and alternative arrangements for these were suggested. The transport of the collections as well as some books is to be arranged shortly and Tony Harman has again offered to carry this out.

The acquisition of these European collections will provide the impetus to begin the rearrangement of the European Lepidoptera and this will happen as time allows.

As reported last year, a start has been made on the reorganization of the British "macro" moths and this is being carried out by David Moore. He is following the order of Bradley & Fletcher and is now progressing through the geometrids. As drawers are cleared, these are being repaired by Peter Baker to facilitate the process.

A 40-drawer and two 20-drawer cabinets have been sold and these have been replaced by the purchase of four 15-drawer cabinets from Stephenson Blake. These will be used to begin the layout of some of the smaller orders such as Neuroptera and Trichoptera, followed by the reorganization of the Diptera and Hymenoptera in due course.

As the new layout of moths proceeds, other cabinets will become available for sale and further new cabinets will be obtained to continue the arrangement of the other orders.

Andrew Halstead has donated some further sawflies and the strength of the Society's collections of these insects continues to grow with about 220 species now represented.

The reference to a collections policy in last year's report brought one response, which suggested that we ought to offer duplicates from new acquisitions to local museums in the collector's area. This will be considered, but will of course depend on the extent to which the museum concerned is thriving.

The collections have been well used at workshops and on open days during the year. With the new arrivals this year, space is at a premium and the type of rationalization that I have described will of necessity continue. This will be essential to facilitate access especially at the better attended workshops. We hope of course that there will be a respite from major bequests for a while, to enable another period of consolidation to develop.

EDITOR'S REPORT

Some years ago, a previous editor of this journal bemoaned the fact that he heard so little from the Society's members, regarding its content and style, that he doubted whether many of them valued the publication at all. I have to say that I have been more encouraged by readers and I sometimes wonder why this should be so.

Possibly it is because members are becoming more vociferous, airing their opinions more readily. Several articles, as well as "letters to the editor", have been in direct response to previously published notes, creating an atmosphere of earnest discussion. It also seems that members are now more readily prepared to report the results of their entomological work. Whereas at one time many members of the society were content to be simply readers, absorbing what was presented for their own personal and individual interest, today we are a much more interactive and communicative bunch and the journal benefits from this increased activity.

The car, telephone, fax, e-mail and the other adjuncts of modern living have made communication easier and speedier, but I believe there is also an underlying change in the collective psyche of the Society. It appears to me that the field entomologists who dominate the membership are becoming more involved in some of the practical aspects of invertebrate recording and as a result are more actively reporting what is going on in the British countryside. A quick look through the contents of the journal shows that during the year there were two articles on special interest groups, two local surveys, three papers on distributions of individual species and one on land management, together with the usual mix of articles on taxonomy, behaviour, genetics and specific notable finds. For too long, the field naturalist has remained quiet; I see this recent trend towards a greater voice as a welcome sea change that will benefit the Society, its journal and its readers.

I hope that the continuing enthusiasm for the journal also has something to do with the recent improvement in the quality of the paper and the two-colour cover. It may also have something to do with the fact that the journal is often able to offer rapid publication. I recently accepted a paper within days of its arrival on my doorstep; it fitted perfectly into the schedule, I needed a few more notes to complete an issue and I now hope it will be in print within 2 months of being written. Certain other entomological journals have a waiting time of 2 years!

On the other hand, I have recently received certain longer articles, and although I would have liked to publish them sooner, I have been constrained by the number of pages the journal can sensibly publish. To alleviate some of the pressure, the journal published 224 pages in 1995, 32 more than the year before, and I am pleased to announce that following discussion with the Society's treasurer, the journal will publish even more pages in 1996. Only two colour plates were published in 1995, but four were printed—the two remaining are to be held over until 1996 to illustrate a paper on the aquatic leaf beetles *Donacia*, *Plateumaris* and *Macrolea*, which is in preparation at the moment.

Although I have commented on my perceived changes in the reported interests of the society's members, the content of the journal is still a matter of some bemusement to myself and others. For the most part it is outside of my control and rests entirely with the desires and energies of the authors and contributors "out there" who submit their notes and papers on whatever they see fit. Although all papers are refereed by members of the editorial committee, refusal is uncommon and more often than not helpful notes on revision are offered to the authors with final publication being to everyone's general agreement and approval.

I cannot influence what is submitted to the journal, all I can do is try and achieve a certain balance of longer versus shorter articles, technical papers versus anecdotal

reports. Some very specialist articles may seem a bit indigestible to those without a detailed knowledge of the insects involved, but they remain, nevertheless, important papers which give authority and prestige to the journal. A glance at David Young's paper, published at the end of the year, shows just how many of the world's premier academic institutions consider the journal worthy of a subscription. I hope that combination of these important scientific articles with more general and lightweight papers gives each issue an interest for everyone.

As ever, I need to thank all those who have helped me with the journal in 1995, and in particular the members of the Editorial Committee. Sadly, this Committee is now two members short following the deaths of Frances Murphy and Eric Bradford. They will be sadly missed and obituaries will be published in the journal in 1996.

The journal has not been the only publication by the Society in 1995, a year which also saw the final appearance of the book by Peter Hodge and myself—*New British beetles: species not in Joy's practical handbook*. Five hundred copies of this book were printed and, to date, sales are approaching 150 copies, mainly of the hardback apparently. Initial enthusiasm has been encouraging and we await reviews in the entomological literature with interest.

Other of the Society's publications continue to sell well, in particular *British hoverflies* by Alan Stubbs and Steven Falk, which sold out yet again at the end of the year. To cope with the on-going demand for this excellent identification guide, a further 500 copies have been reprinted. This has given the book a final print run of 3000 copies, a far greater number than was first envisaged when the book was written in 1983.

No doubt the availability of such a useful publication has served to increase the interest in this group of attractive flies. Since its first publication 15 new species have been discovered in Britain and knowledge of hoverfly biology has increased dramatically. Although a small appendix was added to the book in 1986, so much new information has since come to light that a much larger "second" supplement has been prepared by Alan Stubbs. It is being typeset at the moment and should be available in a few weeks. The Society is further indebted to Alan for his continued support and also to Roger Hawkins who has been the mainstay of the Society's sales drive. Roger has now passed this duty over to Gavin Boyd and although I wish the Society's books to sell well, I hope he is not too swamped by all this recent publishing activity.

RICHARD A. JONES

BOOK REVIEW

Longhorn beetles: illustrated key to the Cerambycidae and Vesperidae of Europe by Ulrich Bense. Margraf Verlag, Weikersheim, Germany, 1995, 512 pp, softback DM 90, hardback DM 126.—This is a basic key to the identification of European longhorns; it is not a monograph. The book is intended to be used to identify to species level all of the longhorn beetles currently known from Europe, with the exception only of the Dorcadionini, and excluding the European parts of the former Soviet Union and Turkey. The keys are the major part of the book and follow some short introductory sections on classification, development, feeding, reproduction, defence mechanisms, economic importance and nature conservation.

All of the species on the British checklist are covered, including established non-natives, although *Grammoptera holomelina* is treated as part of *G. ruficornis*. The nomenclature is of course Continental, and not entirely consistent with Bily & Mehl's book in the *Fauna Entomologica Scandinavica series* (22, 1989), so some of the generic names used may not be familiar to British coleopterists. The specific names of all but one are however the same and so it shouldn't prove too much of a problem. The exception is *Grammoptera variegata* which is here named *G. abdominalis*.

The keys are in both German and English, with the equivalent text sections facing each other on each two-page spread and the illustrations in between. The layout is particularly good for English readers as the English is on the right-hand side. As a working key the paperback would have been better to have been comb or spiral-bound to enable it to be used open flat while examining specimens.

The illustrations used in the keys are line drawings. They mostly lie alongside the relevant couplets and are generally very clear. The absence of colour illustrations is a great pity, but has presumably kept the price down. A few colour photographs are included in the introductory text, but these are surprisingly not cross-referenced in the keys.

I tried out the keys using my British reference material as well as about 30 longhorns collected in either the French Pyrenees or in Crete, and invariably arrived at a conclusion. Confirmatory features are provided for each species, as well as basic information on habitat and season, and a distribution map. My British material was identified correctly and I was reasonably content with the identifications of the non-British. A few of the couplets are difficult when examining single specimens in isolation, but that is true of many keys. It is a general principle that anyone hoping to correctly identify specimens in isolation should always be very wary of accepting such identifications uncritically. Confirmation by subsequent comparison with a good reference collection is always to be recommended. One particular problem in the keys is the scutellar character used for separating *Pseudovadonia* (*Pseudoalosterna* in Bily & Mehl) from *Vadonia*. The relevant features can be very difficult to see and perhaps should not have been left to stand alone.

The couplet numbering system has a few problems. I noted two mistakes: 15 for 16 and 24 for 25 in the English version, although both are correct in the German version. Figures 653 and 654 are transposed.

The distribution maps are very interesting in their own right, although the source material is unbalanced according to the country involved. The sources are fully referenced and this is an excellent feature, a good primer for getting to know the literature of other European countries. The source for British Isles distribution is primarily Kaufmann's series of papers in the *Entomologist's Record* (1985–90), and so the author has missed published records which up-date those papers. Thus *Tetrops starkii* is not recognized as occurring in Britain (Harrison, *Entomologist's Mon. Mag.* 1992: 128: 181–183). Surprisingly neither is *Leiopus nebulosus*! The maps suggest that Britain is not an important area for European longhorns—we do not contribute significant proportions of the distribution of any species, and all of our species are widespread in Europe. Of course, this is only distribution, and information is really needed on relative abundance before we can properly assess the significance of our fauna.

Overall the keys seem reliable and this book provides an excellent basis for venturing into the European fauna. It is to be hoped that volumes covering further families will be forthcoming.

OBITUARY

ERIC BRADFORD 1921–1995

Eric Bradford was born in Holloway, north London, on 11 May 1921, the second of seven children. He was early recognized as a good artist when he went to school in Upper Hornsey Road. Although he left school aged 14 and went to work for Messrs Starky of Warren Street as a sign writer, he continued his education at the Hornsey School of Arts and Crafts in the evenings.

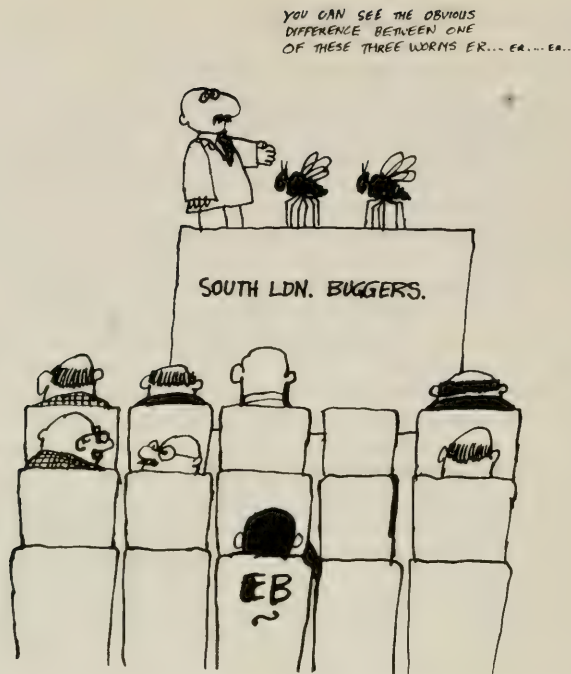
In 1940, aged 19, he joined the RAF and served at Brize Norton and Market Stainton before being sent to North Africa. On his return to England, he was based at Lydd, where he narrowly escaped bombing by a V-1 doodle-bug.

After the war he worked in Upper Street, Islington as a free-lance illustrator, and in about 1961 joined ATV as a graphic designer. He stayed with the company until his retirement, which he took early.

Eric joined the BENHS in 1960, but his interest in natural history had been with him from boyhood. He never forgot that when he was about 13 he took his first yellow shell, *Campptogramma bilineata* (L.), off the lime trees (now alas gone) in Upper Holloway Road. Having assisted the curator Eric Gardner for several years, particularly with the microlepidoptera, Eric succeeded him as curator on his death in 1976. He held the post for 10 years, a busy period with many important acquisitions to the collections. He led an active curatorial team, in which Bill Parker and the late Bob Weal had prominent roles. Eric stood down in 1986 when his increasing commitments in Kent made attendance at meetings more difficult. He also served the Society in many ways behind the scenes, helping out with the BENHS stand at the AES exhibition and at our own annual exhibition and he often used his graphics



Eric Bradford, 1921–1995, seen here making notes at the BENHS annual exhibition, 27 October 1990.



Eric's wry observation of the "South London" as it then was, one of several cartoons which he gathered together under the heading *Bradford's book for buggers!* For more recent members of the Society, the "worm" on the left is the late Baron de Worms.

skills to produce signs and displays. For many years he was recorder for the illustration exhibits at the annual exhibitions. In recognition of his work for the Society, he was elected an honorary member in 1985.

Eric moved to Kent in the 1970s and to his house, Brooklands of Pean Hill, in the early 1980s. He had previously bought 15 acres of Blean Woods at Child's Forstal, a reserve he always wanted for nature conservation, and later bought a 4½-acre plot at the back of his house as another reserve. Here he had a large pond dug out and it soon became home to a great deal of wildlife including great crested newts, water voles, sedge and reed warblers. He was a regular exhibitor at BENHS indoor meetings, producing a wide variety of rare and interesting creatures from his two personal reserves. Although primarily a microlepidopterist, he had very broad interests and was deeply involved in local natural history societies and nature conservation in general.

Eric was a very skilled artist and to many he will be most remembered for his exquisite water-colours. Under a magnifying glass it was often possible to guess at each individual scale of the moth he had painted so painstakingly. His latest pictures in this journal illustrated the British Gelechiidae, accompanying a series of papers in collaboration with Paul Sokoloff.

Eric's collections have been bequeathed to the Society, but his nature reserves are left to the Kent Trust for Nature Conservation. The Trust, however, decided that the

site adjoining his house was a bit small for them to administer properly so the Whitstable Natural History Society (of which Eric was an active member) are going to manage it. This has delighted Eric's family who know how he tried to manage it himself and what he intended doing in the future. The WNHS are also putting up an observation hide and a seat, by the pond, as a memorial.

Eric had an infectious enthusiasm and natural sense of humour and he was not above poking fun even at the then "South London" society he held dear, as the accompanying cartoon shows.

Eric died in a road accident on 12 August 1995 and perhaps the greatest sadness is the loss of the potential he still possessed. He was very recently working on further colour plates for the journal and it is hoped that they can be published as a posthumous memorial.

RICHARD A. JONES

BOOK REVIEW

Keys to the insects of the European part of the USSR, Volume 3, Hymenoptera, Part 4. Science Publishers, Lebanon, New Hampshire, USA, 1995, xvi+883 pages, hardback, US \$147.50.—This is an English language translation of a substantial compilation, covering all of the Braconidae except Opiinae, Alysiinae and Aphidiinae (which are all dealt with in Part 5) and including 1723 species in 165 genera, originally published in the Russian language in 1986. It has been produced without an added preface and, amazingly, the date of the original appears not to be given anywhere in this translated version (even in the footnote where explanation is given for the indicated pagination relationship to the Russian original), despite its overwhelming significance for the nomenclatural status of the 123 proposed new species (i.e. whose correct dates of publication are 1986 not 1995), and a number of lectotype designations that are also made. This is a serious omission that the publishers should seek to rectify in future projects of this kind.

The aim of the work in 1986 was to provide a 'useful' guide, based on keys, to the braconid fauna of the European part of the former USSR (somewhat vaguely defined, despite the included map). With this in mind, species from the surrounding areas of western Europe, the Caucasus, Kazakhstan and the former Soviet Central Asia are given generous, though by no means exhaustive, inclusion even if they had not yet been found in the area of focus. The synonymy given is also not exhaustive, and it pays attention mainly to names that have been used in the Soviet literature. One result is that some of the names that have been used (and indeed are still being used in a few cases) in western Europe do not appear, even though the taxon itself may do so. In an ideal world this would of course be a considerable disadvantage, but even for the relatively well-known western European fauna the world of braconid taxonomy is very far from ideal, and it is probably more appropriate to direct criticism towards the lack of expressed justification for the synonymy that *is* proposed, as it is very rarely clear whether this has been based on an examination of types. Indeed, the whole work is heavily derivative and most sections (subfamilies or genera) start with references to keys, often from western Europe, on which the treatment has been based, but unfortunately it is rarely evident which keys are basically lifted, which are cobbled together from a more scattered literature, and which have the added value of a more critical revisionary approach.

There is extensive re-use of figures (acknowledged to authors, rather than being exactly sourced but even then not always unambiguously): perhaps the Soviet Union's not being party to the copyright laws that operated in the West has legitimately laundered those of them that were originally published in Europe for unrestricted reissue, though that would seem an unlikely loophole given the extent of current copyright law, so maybe it is just a good risk taken as nobody is likely to object. A more practical difficulty stemming from re-using other people's figures is that some keys have ended up being illustrated in two or more styles, with considerable loss of clarity. Given an access to the pre-existing western literature, for western Europeans the most directly useful sections of this work may prove to be those covering groups on which V. I. Tobias, who is the sole author of most of the keys, had previously worked most, and some parts that have also been enriched by collaborators: S. A. Belokobilsij for Doryctinae *sensu lato* (but relatively early on in his strong involvement with that group), and A. G. Kotenko who assumed responsibility for the majority of 'Apanteles' (*sensu lato*). The first few pages of the addenda (pp. 869–883) inserted immediately before publication in 1986 should not be overlooked as they bring some important late updates to notice.

Inevitably some of the information given is unreliable or misleading—the host data, for example, are at least partly just reiterations of the usual unintelligible jumble of accumulated and unsourced truth, half-truth and fantasy, and it is high time (even in 1986) that taxonomic works on parasitoids try to do better than this. A possible source of confusion rather more exclusive to the work is that the very short-lived application of the name *Microgaster* to the genus otherwise known as *Microplitis*, and replacement of *Microgaster* in its more familiar sense by the name *Lissogaster*, that was fleetingly in vogue in the mid 1980s has of course persisted into the translated version, long after it has reverted elsewhere. A few translation errors and misprints also exist: my favourite is a reference on page x to a work by Tobias (1976) on *Braconids of Canada* [as opposed to the Caucasus], but users should be alert to the possibility of others that may be more troublesome, especially if they would elude a spell-check programme.

On the whole, though, this is a good translation and anyone with an interest in European Braconidae whose English is better than their Russian will warmly welcome it, as the original is an important work. The real value of the translation is not so much that at last it gives English-speaking punters a comprehensive set of easily used and wholly reliable keys, because not surprisingly it doesn't, but rather that we in the West now have a better means to appreciate the extent of the faunal overlap between West/Central Europe and the western part of the former USSR and—especially—that this translation gives us some help in reducing the divergence in taxonomy and classification between the West and East of which there has been a tendency. Not, then, the panacea for all our problems, but certainly a means to understand them better. The price of the work is high and its specialized nature will mean that few individuals will buy it. But, provided institutions take the saving of staff time into account, anywhere where English is spoken that has more than a fleeting involvement with Braconidae should see it as an absolute bargain.

MARK R. SHAW

OBITUARY

H. N. MICHAELIS 1904–1995

Hugh Michaelis was brought up in Manchester where his family was involved in the cotton trade. In his early days he spent summer holidays with his grandparents, who lived at Deganwy, and came to love this area of North Wales. During the First World War his brothers, who were considerably older, were away in the army and Hugh spent much of his summer wandering round the dunes of Deganwy and Conway, learning all the wild flowers with the aid of *Wild flowers shown to the children*. The companion book, *Moths and butterflies shown to the children*, then led him on to an interest which was to last all his life.

He attended Manchester Grammar School where G. S. Kloet was a fellow pupil and together they would explore the countryside for specimens. Later, Kloet acquired a small motor bike and, with Hugh on the parcel rack, they were able to venture further afield. Membership of the flourishing Manchester Entomological Society opened the door to a wider circle of other entomologists, like William Mansbridge who encouraged the young man to study micros. Even nowadays many Lepidopterists shy away from this large group of species; how much more difficult it must have been then with few illustrations for comparison and much scantier literature to be consulted.

During the Second World War he served in the army as company sergeant major in the Intelligence Corps and spent over 3½ years in India with no home leave. After the war, as a manager of the Westminster Bank in Manchester, he came to know entomologists at the nearby university and at the Manchester Museum. As a member of the Lancashire and Cheshire Entomological Society he became a friend of S. Gordon Smith and the thriving group of entomologists in the north west, joining them in many field outings over the years. He took part in the extensive survey of the fauna of the Spurn Peninsula carried out by members of the Entomological Section of the Yorkshire Naturalists' Union. Over 40 years later he still recalled those days with pleasure and referred to specimens collected there.

On retiring to Glan Conway in 1964 he donated his Lepidoptera collection to Manchester Museum. But it was not long before he began to investigate the fauna of Denbighshire and beyond, and to build up a new collection containing many bred species, some new to Wales and some new to Britain. One of the highlights of each year was a visit to the 'South London' exhibition with a box of recently collected Lepidoptera and the opportunity to meet and chat with fellow enthusiasts. Old friends may remember him better as 'Jim', but on moving to Wales he reverted to his given name of 'Hugh'.

He joined the North Wales Naturalists' Trust and took a particular interest in the Trust's nature reserves in the Conway Valley as well as carrying out surveys of several NNRs for the Nature Conservancy Council further afield. He was a welcome companion at field meetings, always adding a good list of species to the records for the day. Children would cluster round him with their finds or enjoy an evening's light trapping in his company, and many have been inspired by his enthusiasm and encouraged to retain an interest for life in natural history. After serving on the Council of the NWNT, including a term as treasurer, he was made a vice-president in recognition of his services for conservation.

During his thirty-year residence in Glan Conway he published numerous scientific papers and articles on the North Wales moths and butterflies, and was respected for

his wealth of knowledge on the subject. It was only during the last few years that failing health curtailed his activities, but he was always interested to hear what others were recording, or give an opinion on the identification of a difficult species. Shortly before he died he gave his collection of mainly North Wales Lepidoptera into my safe keeping.

It was a great sadness to him when his wife Maude died suddenly ten years ago, but he took over the house-keeping, became an excellent cook and always welcomed visitors from near or far. We all miss him greatly but are glad that we had the privilege of knowing him for so long.

M. JOAN MORGAN

PUBLICATIONS BY H. N. MICHAELIS

A published list of many of his articles is to be found in Chalmers-Hunt, J. M. 1989. *Local lists of Lepidoptera*. Hedera Press, items 2082–2109a. Other articles are listed below.

- Proc. Chester Nat. Sci. Lit. Art*, ed. S. Gordon Smith, Natural History Vols II, III, IV, V, 1948–1953, 1953/4, 1954/5. All contain numerous records from Cheshire and Welsh counties by H. N. M.
- 1952 *Ent. Rec. J. Var.* **64**: 359, Lepidoptera at Spurn, Yorks.
- 1957 *Rep. Lancs. Chesh. Fauna Committee* **31**: 72–76, Lepidoptera for 1954–56.
- 1957 *Raven Ent. Nat. Hist. Soc.* 3–38, The Lepidoptera of Formby, M. J. Leach & H. N. Michaelis.
- 1958 *Ent. Rec. J. Var.* **70**: 305–6, *Gelechia boreella* Douglas in England.
- 1962 *Lancs. Chesh. Fauna Committee* Lepidoptera Report, 1957–1961.
- 1963 *Entomologist* **96**: 11–14, Microlepidoptera on *Vaccinium vitis-idaea* L. (Ericaceae).
- 1969 *Ent. Gazette* **20**: 261–262, Some notes on the occurrence of *Amphipyra pyramidea* (L.) and *A. berbera* Rungs (Lep. Noctuidae), H. N. Michaelis & M. J. Morgan.
- 1973 *Ent. Rec. J. Var.* **85**: 226–227, *Hyles galii* and other Lepidoptera in North Wales.
- 1977 *Ent. Rec. J. Var.* **89**: 183–185, The history and present status of *Luperina nickerlii gueneei* Doubleday in Britain.
- 1990 *North Wales Wildlife Trust Newsletter* 79, Spring 1990, Butterflies of the Great Orme, Llandudno.
- 1990 *North Wales Invertebrate Group Newsletter* no. 2, Microlepidoptera in North Wales.

LETTER TO THE EDITOR

The Society's logo.—In your recent notes on the Society's new logo (*Br. J. Ent. Nat. Hist.* 1996; **9**: 1–2, 128), you refer to the strange beast as probably being a member of the Nemopteridae. I am sure you are correct. I thought that it might be of interest to members to report that two species, *Halter halteratus* and a *Dielocroce* are illustrated in colour in *Insects of Eastern Arabia* (D. H. Walker & A. R. Pittaway, illustrations by A. J. Walker, Macmillan Publishers, pp. 44–45). Both of these insects have narrow wings, more closely resembling the logo than the broader-winged Mediterranean species. A copy of this book is in the Society's library.—DON WALKER, 'Bellargus', 9 Elmfield Way, Sanderstead, Surrey CR2 0EG.

BENHS SUBSCRIPTION ANNOUNCEMENTS

Junior members and students.—The current annual subscription is £12.50 for ordinary members and £4.00 for junior members who are defined as those who have not reached their eighteenth birthday on 1st January. We have very few junior members and Council has decided that it would like to extend the benefit of the lower subscription rate to all those in full-time education. This change will require amendment to the bye laws, but because of the cost of doing so I wish to defer such action until some time in the future when we will require further changes.

So that effect may be given to Council's decision in the shorter term however, use of bye law 13e will be made. This gives Council power to remit wholly or in part a subscription due from any member should some special circumstances appear to warrant such action.

I would therefore like to inform members that Council will look favourably on any application from students to remit the annual subscription to £4.00.

Non-student members who find difficulty in paying the ordinary subscription may also apply to Council under this bye law.

A. J. PICKLES, *Treasurer*

Life membership.—Some years ago the Society was homeless. The library and collections were in store and unavailable to members. The cost of renting rooms in central London was prohibitively expensive and the Society faced an uncertain future, at least in financial terms. One of the lesser decisions taken to resolve this situation was to raise the life membership rate to a comparatively high level, but instead of bringing in much-needed funds, the effect has been to restrict the number of new life members coming forward. We are however most grateful to the generous souls who have taken out life membership during the last few years.

The present Council takes the view that life membership should positively be encouraged and have determined that the rate should in future be set at 20 times the annual rate for ordinary members. The new life member's rate will therefore be £250, and this will be available from 1st January 1997.

Life membership can be of mutual benefit to the Society and to the member, although it does of course assume that the member is committed to the study of entomology and to the Society, and will remain so. The sum paid is invested and the income therefrom goes to fund our activities. The annual routine of reminders and payments is avoided, with all the complications arising from late payments, double payments, payments at old subscription rates and complete failure to pay. The life member is also protected from any increases in subscription rates. Above all, in these days when all employment is uncertain, taking out life membership avoids the unpleasant decision to cancel Society membership when hard times come. The purchase of the necessary equipment and books, with a few life memberships, makes entomology into a cheap and pleasant pastime with which to occupy the years of retirement.

R. D. HAWKINS, *Assistant Treasurer*

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Meetings of the Society are held regularly in London, at the rooms of the Royal Entomological Society, 41 Queen's Gate, London SW7 and the well-known ANNUAL EXHIBITION is planned for a Saturday in October 1997 at Imperial College, London SW7. 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, R. F. McCormick, at the address given below.

The Society maintains a library, and collections at its headquarters in Dinton Pastures, which are open to members on various advertised days each month, telephone 01734-321402 for the latest meeting news.

Applications for membership to the Membership Secretary: A. Godfrey, 90 Bence Lane, Darton, Barnsley, South Yorkshire S75 5DA.

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Non-arrival of the Journal, faulty copies or other problems arising from distribution of the Journal or notices to the **Distribution Secretary:** D. Young, 9 Marten Place, Tilehurst, Reading, Berkshire RG31 6FB.

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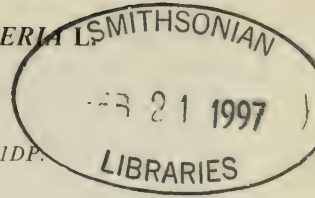
Cover illustration: Larvae of the stag beetle *Lucanus cervus* (Linnaeus).

NOTE: The Editor invites submission of photographs for black and white reproduction on the front covers of the journal. The subject matter is open, with an emphasis on aesthetic value rather than scientific novelty. Submissions can be in the form of colour or black and white prints or colour transparencies.

WING HOMOEOSIS IN *PARARGE AEGERIA* L.
(LEPIDOPTERA: SATYRIDAE)

LEONARD WINOKUR

55 Palmer Park Avenue, Reading, Berkshire RG6 1DP.



A female speckled wood butterfly, *Pararge aegeria* L. subspecies *oblita* Harrison, emerged 2.x.1995 among a bred stock derived from two females collected at Glen Lonan, east of Oban, Argyll, 18–25.viii.1993 (56° 24' N, 5° 22' W). Pattern typical of left hindwing underside spaces 2 and 3 (s2 and s3) was reproduced at corresponding positions in left forewing underside s2 and s3 (Fig. 1). There was no corresponding pattern transformation on the right forewing underside nor on the upper surface.

Homoeosis refers to the development of tissue typical of one part of an organism at a position typical of another tissue type. In Lepidoptera this is typically recognized by an area on one wing showing the pattern of another wing. Homoeosis is rare in Lepidoptera (Ford, 1957) but has been reported in several families including the Satyridae.

Insect forewings belong to the middle thoracic segment or mesothorax, and the hindwings to the hind thoracic segment or metathorax. The incidence of different types of homoeotic transformation in Lepidoptera, has revealed also that each wing is divided further into anterior and posterior developmental units or 'compartments', along a baso-distal axis that borders s5 and s6 (Sibatani, 1980). In the following discussion, s1 to s5 on the forewing and s1 to s4 on the hindwing represent the 'posterior' of the respective wing, while the forewing area between s6 and the costa and the hindwing area between s5 and the costa represent the 'anterior' of the respective wing.

The most common type of homoeosis in Satyridae concerns the presence within the underside posterior hindwing of the underside posterior forewing pattern. The present case is unusual therefore in demonstrating the presence within the underside posterior forewing of underside posterior hindwing pattern, analogous to



contra-bithorax transformations in the fruit fly, *Drosophila melanogaster* L. (in which the posterior section of the middle thoracic segment shows features of the posterior section of the hind thoracic segment) (Sibatani, 1980).

Insect homoeoses and segmentation abnormalities are informative because they provide insights into the development and evolution of biological patterns (Sibatani, 1980; Ho, 1989). In Lepidoptera, each wing develops from a group of primordial cells known as an imaginal disc (Ford, 1957). The presence of homoeosis on one surface only is typical of homoeotic transformations in Lepidoptera, and points to the establishment, very early in development, of independence between upperside and underside compartments within each wing disc. As homoeosis can involve an area of forewing pattern appearing on the hindwing, independence between forewing and hindwing discs must therefore be established later, and consequently homoeotic transformations on one surface between fore- and hind-wing are commoner than transformations between the two surfaces.

In the present case, the transformation involved corresponding compartments (namely posterior compartments, these include s2 and s3) within each respective wing disc. This suggests that prior to the establishment of independence between fore- and hind-wing, the anterior compartments of both wings function collectively as one developmental unit and the posterior compartments as another (cf. Ho, 1989).

Hence symmetry with left/right independence is the first distinction to be established, and in multicellular animals occurs in early egg development (Goodwin, 1984; Sibatani, 1980). This is followed by upperside/underside independence, then corresponding (and likely coordinated) antero-posterior distinctions within each disc (cf. Ho, 1989). Lastly forewing/hindwing independence is established (Sibatani, 1980).

The cause of homoeotic transformation in the present *P. aegeria oblita* has yet to be firmly established. Ford (1957) suggested that homoeosis in Lepidoptera might result from genetic mutation. However, a mutant gene could be expected to affect both sides similarly because each gene is copied during embryonic cell division into every cell of a given individual, and no deviations from left/right symmetry (other than minor, random discrepancies resulting from developmental disturbances) are known in Lepidoptera (Winokur & White, in prep.). In *Drosophila*, chemical agents can produce effects that mimic, i.e. 'phenocopy', the effects of genetic homoeotic mutants. However, contra-bithorax phenocopies are produced more readily in *Drosophila* by the short-term application of high temperatures or 'heat shock' than by exposing immature stages to organic compounds such as ether (Sibatani, 1980). The comparable transformation in *P. aegeria oblita* therefore, might similarly represent an effect of unusually high temperature.

The stock was reared outdoors on cultivated wood false brome grass, *Brachypodium sylvaticum* L., at Worksop, Nottinghamshire (53° 19' N, 1° 7' W) until 25.viii.1995 when the stock was divided and the rearing of a sample was continued similarly at Reading, Berkshire (51° 27' N, 0° 56' W). Though temperatures were not recorded, ongoing temperatures in S. England during July and August 1995, when the affected individual would have been a larva or young pupa, were reported by the Meteorological Office (via the media) to have been the hottest for many years. Moreover, since annual July and August temperatures are generally higher in S. England than in N.W. Scotland where the stock originated, *P. aegeria oblita* is expected to be less well suited to developing under such temperatures than S. England *P. a. tircis* Butler (Winokur, 1995).

A further factor affecting developmental stability in the species is inbreeding (Oliver, 1981). The stock was originated in August 1993, the F₁ emerged in July 1994 and the F₂ in September, and the F₃ started to emerge in July 1995; the present

individual (emerging October 1995) thus represents an F₄. Oliver (1981) found that inbreeding depression in *P. aegeria* (as evidenced by the percentage of fertilized eggs failing to hatch) increased with inbreeding, and suggested that inbreeding in the species may reduce the genetic balance of individuals and consequently developmental stability. However, further investigation will be required before firm conclusions can be drawn, and the stock is being continued in the hope that it might yield further insights into the nature of wing homoeosis in *Pararge aegeria*.

ACKNOWLEDGEMENT

I thank Martin C. White of Worksop for assistance with maintaining the stock from which the present study arose.

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BOOK REVIEWS

Collins field guide. Spiders of Britain and northern Europe by Michael J. Roberts. London, HarperCollins, 1995, 384pp, 32 colour plates, hardback, £14.99.—The book reckons to cover over 450 species, all but the very difficult black 'money' spiders, a few far northern endemics and southern rarities. Of these 247 are illustrated in colour. A tightly packed introduction on spiders and how to study them is followed by the main text. Within this are keys to families and genera. Each species has brief description and notes on habitat and distribution and every entry has a very detailed drawing of male palp and female epigyne. As a popular field guide, this book is probably one of the most important to be published in recent years since it suddenly brings serious arachnology within reach of so many people. Roberts' previous book, *The spiders of Great Britain and Ireland* published by Harley Books in 1985–7, became the great authoritative work on these creatures, but its price and complexity put it beyond the reach of many, especially the more casual observers who ought to buy the Collins guide. My only gripe is with the colour figures, where every plate has spiders painted similar sizes, even though they may be of completely different sizes in life. Thus, for example, we have *Scytodes thoracica* (3–5 mm) shown larger than and right next door to *Pholcus phalangioides* (8–10 mm). Although the plate captions give dimensions in millimetres, this is nothing compared to the visual reference of a life-size silhouette or size-range bars.

The butterflies of Wiltshire by Michael Fuller. Pisces Publications, 1995. xii+196 pp, 77 colour photographs, 65 maps, 40 figures and 38 flight period diagrams, hardback, £22.50.—During the past few years I have read several books dealing with the butterflies of a single county, but none which has treated the subject so fully or brought me as much pleasure.

The book draws on historical records from the last 150 years and on records from the Wiltshire Butterfly Mapping Scheme to present an authoritative account of the changing fortunes of the 48 butterfly species found in the county. Distribution maps are provided for each species and diagrams showing typical flight periods and results of transect counts are also included for many species. It often seems that illustrations in such books are superfluous, there being so many butterfly books, but the photographs here, although of variable quality, are for the most part fresh and informative. Many aspects of butterfly behaviour are shown including courtship, pairing and egg-laying; all the species are illustrated, often with two photographs, and these are for the most part adequate as an identification guide. A number of Wiltshire habitats are also shown. Most of these photographs have been contributed by members of the county recording scheme.

Beatrice Gillam, who edited the book, has contributed a chapter on Wiltshire's butterfly habitats and this is illustrated with a topographical and a geological map. A further chapter is provided on the history of butterfly recording in the county from 1900 to 1994 which mentions most of the well-known lepidopterists who have been associated with Wiltshire over this period. Short chapters are included on the butterfly recording scheme and the status of butterflies in the county.

Michael Fuller is the county butterfly recorder and established the Wiltshire Butterfly Mapping Scheme in 1982. He professes a boyhood love of butterflies rekindled when he and his family moved to the county in 1978. It is in the treatment of each species, which forms the main section of the work, that he has been able to communicate his enthusiasm for his subject through the little touches of personal observation that he has included. The general layout of each species review is to firstly consider the history of the butterfly's name, to discuss the flight period in the county, the status before and after 1982 and to conclude with future prospects. Within this format Dr Fuller treats each species more or less fully, as they deserve and includes detailed comments on aspects of the butterfly's life history, food plants and matters pertinent to the distribution within the county. To quote from those for the Adonis blue: "Males spend much of their flying time searching for emerging females. After mating, the females rest in hot depressions among the short chalk or limestone grassland until their eggs are ready to be laid". He finds plenty of opportunity to include anecdotes such as J. E. Green's story of picking up a purple emperor feeding on dry deer dung and stroking it in an attempt to persuade it to open its wings.

The book concludes with indices of abundance, and a section on rare, extinct and exotic species. There is also a useful bibliography. Pisces Publications is the imprint of the Nature Conservation Bureau Limited and the project has been grant-aided by English Nature. The book is well produced on good quality paper at a price which must be considered fair. *The butterflies of Wiltshire* is recommended not only for those with an especial interest in the county but also for anyone interested in butterflies.

THE BENHS EXPEDITION TO BELIZE, JANUARY–FEBRUARY 1996

PAUL WARING, GRAHAM COLLINS AND ADRIAN SPALDING

The BENHS expedition to Belize (proposed in *Br. J. Ent. Nat. Hist.* 8: 72) departed from Britain on 18 January 1996 with the following aims.

(i) To begin an investigation of the Lepidoptera, particularly the macro-moths, of Belize (formerly British Honduras) in Central America, by commencing inventories for sites and establishing habitat associations in different types of forest and cultivated areas where the owners are interested in management for nature conservation.

(ii) To raise the profile of Belizean Lepidoptera and conservation issues.

(iii) To provide BENHS members with an opportunity to contribute to the study and conservation of wildlife in Belize and gain experience of the neotropics.

(iv) To establish contacts with landowners and conservation organizations and to investigate potential bases for future expeditions so that the BENHS can continue to contribute skills and expertise.

(v) To raise the profile of the BENHS and demonstrate our concern for the conservation of invertebrates in the tropics.

We are delighted to report that the expedition has been successful in fulfilling all its objectives. A workshop on the planning of this and other expeditions and on our results and future plans will be held at Dinton Pastures on 14 December 1996. The purpose of this note is simply to provide a brief overview of what took place on the expedition.

The expedition comprised three men (the authors—PW, AS & GC) plus all our equipment, making a comfortable car-load. The main part of the expedition consisted of two weeks spent at “Tamandua” nature reserve and organic fruit farm situated in the centre of Belize, south-east of the village of St Margarets, along a track from Over-The-Top on the Hummingbird Highway, adjacent to the Five Blue Lakes National Park and about 17 miles south-east of Belmopan, the new capital city of Belize.

Tamandua is owned and managed by Janet and Bernard Dempsey. The site name comes from the scientific name for the Lesser Anteater *Tamandua mexicana*, which still occurs in the area. Janet and Bernard own 170 acres which consist of a smallholding surrounded by the majestic limestone outcrops of the foothills of the Mayan Mountains. The annual rainfall varies from 80 to 120 inches per annum and the whole area was formerly covered by tropical moist broadleaved forest. Much of this “jungle” currently survives on the steeper slopes and in the valleys remote from roads, as at Tamandua. However, along the main roads, including plots near to Tamandua, the accessible forest has been or is being cleared rapidly for intensive growing of citrus crops, particularly oranges, grapefruit and limes. This is being practised on a large scale, using a regime of chemical herbicides and insecticides. All woody plants are cleared from the orchard area and herbaceous plants around the base of the trees are sprayed out. Consequently, the jungle components and humid micro-climate are completely lost from the farmed area. The only exception is along the edge of watercourses where government regulations require that a border of woody vegetation is retained to protect the banks from erosion. Unfortunately, not all landowners comply.

In contrast to their near neighbours, the Dempseys are experimenting with less intensive organic methods on their farm, to grow a greater variety of fruit and

vegetables in a more sustainable and less environmentally damaging way than elsewhere in this region. They have retained belts of jungle along watercourses and across the farmed area to act as refuges and corridors for wildlife and are retaining the surrounding forest as an attraction for tourists interested in viewing animal and plant life. They have built three comfortable thatched "cabanas" with beds and washing facilities and offer full board including three-course evening meals of Janet's first-class home cooking. As with a number of other ventures in Belize, the intention is that the increasing interest in wildlife tourism will help produce a revenue from the forest without destroying it.

Janet and Bernard kindly offered the expedition special rates in return for helping them to find out which butterflies and moths occur on their property and the impact and benefits of their land management methods. To do this we operated four low bulk, high volume actinic light traps simultaneously from before dusk till after dawn on a total of nine nights at Tamandua. Two of the light traps were set up within the forest and two on the edge of the orchards, by wildlife corridors, to compare and contrast the catches. Figure 1 shows one of these traps, which were operated from



Fig. 1. Actinic trap.

12 V car batteries recharged after every three nights of use. The light traps were supplemented by four bait traps (Fig. 2) operated day and night throughout our time at Tamandua, two in the forest and two by the wildlife corridors, attracting both butterflies and moths. In addition, hand-netting of butterflies in both habitats was carried out on several days. Occasionally, it was possible to run a blended 160 W mercury vapour bulb in front of a sheet to supplement the insects recorded by other means.

The results of our work will be presented in subsequent articles, once the specimens have been identified and the data analysed.

A variety of other wildlife was also recorded. GC made a small collection of dragonflies (Odonata) and AS studied the behaviour of the Ithomiid butterflies. Mammals seen included the four-eyed possum *P. possum*, coati *Nasua narica* and kinkajou *Potos flavus*. Snakes included the fer-de-lance *Bothrops asper*, spotted rat-snake *Spilotes pullatus mexicanus* and the black water-snake *Tretanorhinus nigroluteus*. A large number of birds were seen, including the keel-billed toucan *Ramphastos sulfuratus*, collared aracari *Pteroglossus torquatus* and mealy parrots *Amazona farinosa guatemalae*. Whip-scorpions (amblypygids) and bats were observed in a cave in the limestone outcrops above the farm.



Fig. 2. Bait trap.

We were able to assist the members of another expedition from Britain by loaning them our light-traps and bait-traps when we departed for the UK so that one of their number, Philip Gould, an AES member of some years, could collect moths over a four-week period after we had left. Philip was the entomological member of the Five Blues expedition, a four-person private expedition of recent graduates from Southampton University who also studied the birds and bats.

It will be fascinating and necessary to return to Tamandua to collect at other times of the year, to extend the coverage of the Lepidoptera at this interesting site.

Also with a view to setting up further expeditions, PW stayed on in Belize for two weeks after GC and AS returned to the UK with the specimens collected at Tamandua. During this time contacts were developed and logistics explored at three potential bases for subsequent BENHS expeditions. These are as follows.

(i) The Programme for Belize Research Centre in the Rio Bravo Special Conservation Area in the north of Belize, near Blue Creek Village. This offers the opportunity to investigate a variety of forest types in a lower rainfall area, with on-site accommodation, catering and other facilities supplied. The Centre is visited by a range of other people with natural history interests and we could assist with demonstrations of light-trapping and slide presentations on the interest and value of Lepidoptera and other invertebrates. During this visit an impromptu display of mercury vapour light-trapping was provided for a visiting group of wildlife enthusiasts from the USA.

(ii) The Fallen Stones Butterfly Ranch near the Mayan ruins of Lubaantun in the south of Belize. The Ranch is concerned with the captive breeding of various species of butterfly for exhibition in the butterfly houses of Europe, where they act as ambassadors to raise awareness and interest in tropical Lepidoptera and their threatened habitats. The Ranch provides employment and interest for local people and is also involved in conserving and creating butterfly-rich habitat and providing facilities for tourists to come and visit.

(iii) The Seven Hills area of coastal mangrove swamp and forest, 20 minutes by boat from Punta Gorda in the south. This area is being investigated as a potential nature reserve and the various zones of vegetation are already being mapped and studied. Any useful data on the Lepidoptera and other invertebrates will be greatly welcomed. The Belize Centre for Environmental Studies (BCES) arranged my visit, which was hosted by John Spang, Tanya Russ and family who own part of the area and provided generous hospitality, accommodation and the use of a generator. The BCES already organize events for local communities, including schoolchildren, and would be delighted to have participation from the BENHS.

As at Tamandua, all three of the above bases were extremely keen to host BENHS expeditions in appreciation of the useful survey results we can produce, and all offered very favourable rates to encourage us. Light traps were operated on all nights at each base to demonstrate the techniques and provide some data as a result of these initial visits.

It is clear from this first expedition to Belize, and the contacts made, that the country has a great deal to offer the entomologist and that the results of entomological survey work will be useful in helping to develop effective conservation measures to the benefit of people and wildlife. It is also worth mentioning that at the time of this visit the national postage stamps were featuring a range of Belizean insects from several orders, which must surely be helpful in drawing attention to the diversity of the local invertebrates. On the negative side, Malaysian forestry companies have recently obtained licences for logging some of the remaining climax rainforest in the south of the country. This is causing great concern among the

Belizean conservation non-government organizations and the local Mayan communities who are fearful of the effects the logging may have on the environment, the roads, the water supplies and the local wildlife, particularly in view of the poor track record of these companies elsewhere in the world. In addition, we saw the forests in



Fig. 3. G. Collins and A. Spalding at Tamandua.



Fig. 4. P. Waring securing a Saturniid.



Fig. 5. Cabin at Tamandua.

the north of Belize being cleared for agriculture right up to the boundaries of the areas owned and protected by Programme for Belize. There can be no stronger testimony to the value of the work of Programme for Belize.

Our expedition was successful in its aims and also extremely enjoyable, without any illness or mishaps. It is hoped that further expeditions can be planned. The current proposal is for visits of two weeks duration, taking in two of the above bases; the Society to assist with administration and entomological equipment. Participating members would need to find the costs of their air fares, insurance and basic subsistence. Members who would like to be considered for an expedition in 1997 are invited to advise the Field Meetings Secretary, Dr Paul Waring, 1366 Lincoln Road, Werrington, Peterborough PE4 6LS.

ACKNOWLEDGEMENTS

We would also like to thank:

Mr and Mrs Collins for allowing us to use their home in Croydon as a meeting-up point and base from which to launch the expedition;

Tom Hughes, of the former Entech Services, and Bob George, of Marris House Nets, for making up the light-trapping and bait-trapping equipment specially for the expedition;

Rex Johnson for obtaining the blended m.v. bulbs;

Janet and Bernard Dempsey of "Tamandua", St Margarets, for hosting the major part of the expedition and providing excellent food, accommodation and company, for obtaining four 12V car batteries on our behalf and for the detailed correspondence involving in setting up the expedition;

Bart Romero and his staff at the Rio Bravo Research Station of Programme for Belize, and Audrey Wallace, Senior Project Co-ordinator at the Belize City headquarters for demonstrating the facilities available and the opportunities for expeditions to the Rio Bravo Conservation and Management Area;

Charles Wright, Will Hayman and Will Mahwe of the Belize Centre for Environmental Studies for inviting us down to Punta Gorda and for arranging our visit to John Spang and family in the mangroves at Seven Hills;

John, Nathaniel and Lyra Spang and Tanya Russ for their kind invitation to the expedition and their hospitality in looking after us at Seven Hills;

Ray and Elsie Harberd for their welcome and accommodation at Fallen Stones Butterfly Ranch and Agapita Requena for guiding us through the climax rainforest there;

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The expedition was assisted by a grant from the BENHS towards the costs of some of the equipment, its transport, and of travel within Belize.

BOOK REVIEWS

Alien empire by Christopher O'Toole. BBC Books, 1995, 224 pp, hardback, £17.99.—You have watched the television series, now read the book. Covering the same themes as the BBC series, the book looks at the diverse structure of insects, how they perceive their world, insect flight and walking, feeding strategies, camouflage and protection against would-be predators, mating and reproduction, social behaviour, and the relationship between insects and Man. Using the world's insect fauna as examples, the book makes a good case for showing some respect to animals that most people regard as pests, or at best as animals of little consequence. Any human inventions, from chastity belts to microcomputers, are it seems already in use in the insect world. The book is illustrated throughout with colour photographs, which tend to be of some of the more spectacularly coloured species, rather than the small drab types that make up most of the world's insect fauna. Disappointingly the book does not have an illustration of the frustrated Australian jewel beetles attempting to copulate with a certain design of beer bottle that triggers their mating instincts!

The text is full of facts to show why the class Insecta has been so successful in occupying almost every conceivable habitat. It is also useful propaganda in favour of insects, showing their essential role in food chains, as pollinators, as recyclers of dead animals and plant material, and as predators and parasitoids of insects and other invertebrates that might damage cultivated plants. It will be interesting to see if this book, or more realistically the television series, does have any impact on the way the general public regards insects.

Hyménoptères Sphecidae d'Europe Occidentale. Volume 1. Généralités—Crabroninae by J. Bitsch and J. Leclercq. *Faune de France* 79, 1993, 325 pp, 59 figures, 98 maps, A5, softcover, £55.—The sphecid subfamily Crabroninae contains a diverse assemblage of solitary wasps, ranging in size from very small to medium species (body length 4–17 mm). Some are entirely black, whereas others are black and yellow. They nest in burrows excavated in the soil or in dead wood and plant stems. Depending on the species of wasp, the cells are provisioned with paralysed Ephemeroptera, Hemiptera, Psocoptera, Lepidoptera, Trichoptera, Diptera (as with the majority of species), Hymenoptera and Coleoptera.

The crabronine wasps of the British Isles have been most recently described in detail by O. W. Richards in his 1980 Royal Entomological Society of London's handbook (*Handbooks for the Identification of British Insects*, 6, Pt 3(b)), and by P. F. Yeo and S. A. Corbet's handbook (*Solitary wasps*, Naturalists' Handbooks 3, Richmond Publishing Co. Ltd, revised edition, 1994). The list of crabronines reported from the British Isles totals 45 species placed in 8 genera, compared to 88 species in 9 genera in France. All species found in Britain and Ireland are included in this French monograph.

The book has the usual sections that one would expect to find in a work of this kind: morphology, classification, phylogeny, biology and distribution, together with illustrated keys to all western European sphecid genera. There are keys and descriptions to each crabronine genus and subgenus, and separate keys to both sexes of all the species found in western Europe (not just France, though the work is obviously heavily biased towards that country). There are succinct notes for each species, including synonymies, literature references, detailed descriptions of each sex, information on the species' biology and world distribution (with separate details of the French range). The species notes are further complemented with distribution maps for the 95 French Departments, including Corsica. The book concludes with a bibliography, two appendices (one on recent nomenclatorial changes, the other listing flowers visited by these wasps), and the index.

This work has been written by the two leading authorities on Palaearctic Crabroninae. It is a book I can recommend to all hymenopterists, though the high price may be beyond the means of many amateurs. The obvious advantage over a handbook concerned with purely the British crabronines, is that it may be possible to identify species new to the British list, which, using a provincial key (such as the two listed above), would either not run to any species in that publication, or would lead to a misidentification based on a species already known from the British Isles.

GEORGE ELSE

ANNOUNCEMENT

Fourth International Congress of Dipterology 1998.—The Fourth International Congress of Dipterology will be held in Oxford, UK, 6–13 September 1998. Chairman: Dr R. P. Lane, Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5BD, UK (fax: +44-171-938-8937; email: R.Lane@nhm.ac.uk). Secretary: Dr A. C. Pont, Hope Entomological Collections, University Museum, Parks Road, Oxford OX1 3PW, UK (fax: +44 1491 873749). To register your interest or for further information, please contact: Oxford International, ICD4, Summertown Pavilion, Middle Way, Oxford OX2 7LG, UK (fax: +44-1865-511570; email: 101475.1765@compuserv.com).

LETTER TO THE EDITOR

Butterfly conservation, post-1925.—Alan Stubbs' article on Butterfly Conservation in this journal serves admirably to highlight the striking lead taken by the society in butterfly conservation in the United Kingdom (*Br. J. Ent. Nat. Hist.* 8: 171–174), a most remarkable achievement for any conservation body, in fact better than many others who specifically target butterflies.

Since Alan Stubbs widens the consideration of butterfly conservation by discussing the shortcomings of other entomological societies in influencing conservation, I feel obliged to comment that he has omitted mention of some of the rich days of butterfly conservation in the 50 years *before* Butterfly Conservation emerged as a force.

He curiously glosses over these 50 years as if they did not contribute anything to the subject. To imply that conservation is only of recent origin is a serious omission. And to state that the three leading entomological societies made little headway in influencing conservation is to ignore the facts.

A lot of foundation work on the ecology and conservation of butterflies was done since at least 1925 by many notable entomologists, including L. H. Newman and E. B. Ford. In fact it was on the 25th September 1925 that the Committee for the Protection of British Lepidoptera was set up under the aegis of Lord Rothschild, H. M. Edelsten, J. C. F. Fryer, N. D. Riley and W. G. Sheldon. We have just passed its 70th anniversary with hardly a hint of a mention. Credit must be given to all those members of at least a dozen committees which considered the increasingly threatened state of butterflies from these early years to the present (Feltwell, J. 1995. *The conservation of butterflies in Britain, past and present*).

Some of this historic conservation work has been overlooked in more recent research. Not that the official conservation of butterflies as effected by the Nature Conservancy and the Nature Conservancy Council (for whom Alan Stubbs worked) has always been effective. It carries the spectre of extinctions and controversy over methods of conserving species and habitats.

Alan Stubbs is right that the Royal Entomological Society of London 'has tended to duck potentially controversial issues', but they were heavily involved in conservation in the 1920s subsidizing their own nature reserve for the large blue. Lobbying government did not come easily to them, and their role in conservation cooled off significantly.

The secrecy which surrounds the work of the Large Blue Committee, in the world of British butterfly conservation, does not help their scientific case when their main means of promulgating successes is via the media. It is fair enough having secret large blue sites where successful Swedish large blues emerge, but as for their annals, there is little accountability for this uni-directional and blinkered form of butterfly conservation.

English Nature has honed down insect conservation (let alone butterfly conservation in the great world of insect biodiversity) to a few easily-marketed, eye-catching species to which funds can be directed. But then what is new; have we made progress? Lord Rothschild's first meeting in 1925 to protect butterflies focused attention on seven threatened or extinct species, the large blue, the heath fritillary, the marsh fritillary, the black-veined white, wood white, large copper and the mazarine blue, rather more than the single species which is currently core-funded by English Nature in their Species Recovery Programme (the swallowtail was on the programme, but is not now, and both the high brown fritillary and the large copper receive 50% grants).

An enthusiasm for a more habitat-based conservation strategy is always difficult to effect when faced with an endangered species which always needs special attention. However there have been people who have tried to have a habitat-based conservation strategy in the UK in the past, but their ideas have never prevailed.

Overall, the track record of conserving butterflies in Britain has not been terribly successful, nothing that lepidopterists, statutory conservation bodies, 'secret' conservation societies or individuals can be very proud of. Great progress has been made since 1975 through Butterfly Conservation, but there were significant moves in the conservation process for the 50 years before. That most conservation bodies can come together and talk via Wildlife Link is to be applauded.

As for conserving Britain's butterflies, the theory can be easy – and has been well spelt out over 70 years – but getting it right can be very confusing and controversial, with a lot of duplication of research. – JOHN FELTWELL, 'Marlham', Henley's Down, Battle, East Sussex TN33 9BN.

A response to the letter by John Feltwell. – My note was clearly addressing the era of which Butterfly Conservation has been a part, and with a concern that the various societies should take a constructive view for the future. I am, therefore, pleased to see that John Feltwell endorses the positive role Butterfly Conservation has played.

It is disappointing that John has been so negative in much of his letter, with aspersions liberally cast. As a historian he must surely be aware of the pitfalls of injecting bias and failing to balance the facts.

I am aware of the historical context and the lessons to be learnt, one of which is that success in preventing decline in butterflies and other invertebrates takes far more detailed knowledge of species ecology than was earlier realized. More broadly, the historic perspective includes the rapid land-use changes since the Second World War and the limited resources for invertebrate conservation. A further historic lesson is that whilst there have been plenty of moaners about the lack of action to halt the decline in butterflies and other insects, relatively few entomologists made a personal commitment to take constructive action themselves. Let's be positive and recognize that a great deal has been achieved in recent years and that there has been a considerable turn-round in the willingness to be constructive within the agencies, many of the societies and the entomological community as a whole – and everyone is on a learning curve.

Some of John's statements, direct and implied, are patently untrue if applied to the agencies. For instance, the criticism that species conservation has become predominant over habitat conservation, and that past concerns for habitat conservation have not prevailed, flies in the face of reality. The predominant effort over the last 20 years has been habitat-based. This is the only way of catering for 30 000 species of invertebrates and most of the conservation network is site-based, including site management.

It is entirely healthy that organizations, particularly government ones, should be held accountable for their policies and practice. In NC I was Deputy Head of Geology and Physiography with no locus in entomology; in 1974 I joined the Chief Scientist's Team of NCC with the remit to develop an invertebrate conservation strategy. I am happy to be held accountable for matters that were under my control. Regrettably, the nature of John's letter risks cultivating myths about the agencies that will not serve future historians. – ALAN STUBBS, 181 Broadway, Peterborough PE1 4DS.

1995 ANNUAL EXHIBITION
Imperial College, London SW7—28 October 1995

The following account of exhibits has been compiled by R. D. G. Barrington (British butterflies), B. Elliott (British Macrolepidoptera), J. M. Chalmers-Hunt (British Microlepidoptera), B. Goater (Foreign Lepidoptera), P. J. Chandler (Diptera), P. J. Hodge (Coleoptera and Hemiptera), A. J. Halstead (Hymenoptera and other orders), and R. Dyke (illustrations). The photographs for the two colour plates were taken by D. E. Wilson and the cost of printing these plates was met by a grant from the Hammond Memorial Fund.

BRITISH BUTTERFLIES

BARRINGTON, R. D. G.—(1) Series of *Maniola jurtina* L. ssp. *cassiteridum* Graves and *Pararge aegeria* L. ssp. *insula* How. from the Isles of Scilly, viii.1995. The *M. jurtina* were very variable, some having extensive upperside fulvous in both sexes and with the pattern of the underside hindwings sharply defined and with a “grainy” effect—the described characteristics of this subspecies. However, other examples were little different from mainland insects. Its status as a genuine subspecies has been questioned. The *P. aegeria* were more consistent, with the upperside pale spots often very orange (as in the European race) and with extensive pale markings at the base of the forewings on the underside. This seems to be a distinct subspecies. Both species were found commonly on several islands, with *aegeria* occupying more open, and less shaded, habitats than on the mainland. Two female examples of *jurtina* ab. *fracta* Zweigt from St Mary’s Island.

(2) Three female and one male *Pieris napi* L. showing homoeosis. This consisted of streaks of underside hindwing coloration reproduced on the underside on one or both forewings. They were reared in an F₁ brood of 150 adults from an Oxford female showing ab. *fasciata* Kautz. About 15% of the brood showed homoeosis of this kind. Pairings were taken between type females and homoeotic males. Large numbers of eggs were laid but survival of eggs and larvae was very poor and an F₂ of only 21 adults was achieved. This included 3 males with minor homoeosis. Homoeosis would appear to be an inherited form with a significant weakening effect.

(3) An extreme male example of *Pyronia tithonus* L. ab. *multicellata* Ober. from Devon, viii.1995 (Plate III, Fig. 6). This had two very large, pupilled, extra forewing spots and four spots on the upperside of each hindwing. From the same location a male ab. *subalbida* Verity with dirty cream replacing the usual fulvous coloration. A female *M. jurtina* from Dorset, vii.1995, showing brown streaks of homoeosis on the underside of the right hindwing. A heavily marked *Aglais urticae* L. ab. *pseudocconnexa* Cab. bred from Gloucestershire larvae. A female *Lysandra coridon* Poda ab. *discreta* Courv. with all forewing spots pushed outwards to touch the lunules. Two pairs of *Lycæna phlaeas* L. ab. *extensa* Tutt showing inward streaking of the forewing spots, two on the upperside and two on the underside (in each case the opposing surface showed typical spotting) from a large third brood in Dorset, ix.1995. Also a female ab. *obsoleta* Tutt with black hindwings.

(4) Two pairs of *Pararge aegeria* L. ab. *cockaynei* Goodson bred F₁ from typical Wiltshire stock in the spring of 1995. These emerged from larvae which completed their development unusually early, as is always the case with this environmental aberration.

COLLINS, G. A.—A female *Hipparchia semele* L. ab. *monocellata* Lempke and a female with an extra spot below the lower forewing eyespot. A pretty male *Lysandra*

coridon Poda ab. *marginofowleri* South and a female ab. *punctata* B. & L., transitional to *fowleri*. All Dorset, vii.1995. *Pyrgus malvae* L. ab. *taras* Bergstr. from the Sussex Coast, v.1995.

DENNIS, R. C.—Several male *Lysandra coridon* Poda with the blue upperside scaling mixed in with darker scales, giving a curious, rough appearance. These examples were fresh (and one incorporated ab. *fowleri* South). Probably this coloration was due to the effect of the heat wave during the period of pupation. A bred male *Quercusia quercus* L. with uneven distribution of purple scaling, probably a scale defect. Three pairs of *Pararge aegeria* L. ab. *saturation* Crombrughe and an extreme male of the form, all taken by Reg Griffiths in the third brood during the 1970s and 80s.

GARDNER, A.—*Aglais urticae* L. ab. *semiichneusoides* Pronin, taken 16.viii.1995, Charlecote.

HARMER, A. S.—Three very fine and extreme examples of *Aphantopus hyperantus* L. ab. *lanceolata* Shipp, taken in a restricted location in Sussex, 13–14.vii.1995 (Plate III, Fig. 7). Eggs have been obtained.

HART, C.—A melanic example of *Polygonia c-album* L. approaching ab. *suffusa* Frohawk, taken in the exhibitor's garden at Buckland, Reigate, Surrey on 16.vii.1995.

JONES, A. M.—(1) Two interesting breeding experiments with analogus aberrations in two Lycaenids. *Aricia agestis* ab. *pallidior* Oberthur has the normal orange lunules replaced by yellowish coloration. The F₁ generation from a female example (taken 27.viii.1994) contained only typical examples. The F₂, which emerged in xi/xii.1994, contained 48 specimens of *pallidior* (23% of the brood). Breeding from a female *Strymonidia w-album* L. (which emerged from wild-collected ova) with the hindwing orange bands replaced with yellow yielded similar results—a typical F₁ and exactly 25% of the F₂ being aberrant (these examples also showed a dark, slaty ground colour). Both aberrations are clearly recessive.

(2) A bred female *Quercusia quercus* L. ab. *obsoleta* Tutt with virtually no purple on the upperside, and a good, bred male example of ab. *latefasciata* Courv. having strong white bands on the underside hindwings and darkly suffused forewings.

(3) An unusual aberration of *Aphantopus hyperantus* L. with no rings on the underside forewings but with a light ochre suffusion. A bilateral gynandromorph of *Argynnis paphia* L. (left side male) which was captured a week after it was originally seen. It appeared not to have suffered great damage in the intervening period. A bilateral gynandromorph of *Pyronia tithonus* L. (left side male) bred in a brood of seven specimens from a small spotted female (Plate III, Fig. 5). There are very few recorded gynandromorphs in this species and at least one of these has been shown to be a fake. A pair of *Eurodryas aurinia* Rott. ab. *virgata* Tutt bred in the F₃ generation from *virgata* parents. This is a multifactorial aberration.

KENDRICK, R. C.—An example of *Argynnis lathonia* L. found dead in a pitfall trap set on 1.ix.1995 and checked on 16.ix.1995 at Minsmere Nature Reserve, Westleton, Suffolk. At least three other examples of the species were seen in Suffolk in viii.1995 (Scots Hall Cottages, Minsmere, 6.viii; Holbrook, Shotley, 12.viii and Bradfield Woods Nature Reserve, Felsham, 21.viii) and one other in September (Westwood Marshes, Walberswick, 10.x).

KNILL-JONES, S. A.—A specimen of the *Phalanta phalantha* Drury (the leopard butterfly) captured at Spinfish, Freshwater, Isle of Wight on 29.vi.1995. Probably an escape from Butterfly World, Wootton, about 14 miles away.

MEREDITH, S.—Photographs of *Thecla betulae* L. from Noar Hill Nature Reserve, Hants in viii/ix 1995; 6–10 adults may usually be seen at this location in a day of searching, and occasionally males may be seen feeding from hemp agrimony.



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However in 1995 50 adults were seen on 14.viii (all but one on hemp agrimony and all but 4 or 5 were male). On average, from 7.viii to 21.ix, up to 30 adults could be seen per day. The reason for the high numbers of adults of this normally secretive species being seen feeding at flowers might be because the honeydew high up on oak and ash trees dried up in the heat of this exceptional summer, or perhaps because aphid numbers were low due to heavy wasp predation.

PAYNE, J. H.—A photograph of a strong example of *Coenonympha pamphilus* ab. *excessa* Leeds (Northants, 1960) and an extreme form of *Cynthia cardui* L. ab. *rogeri* Meilhan, with very dark hindwings (Plate III, Fig. 8). This striking aberration emerged from a temperature-shocked pupa.

PORTER, J.—Selected specimens of races of *Pieris napi* L. from southern England, north Wales, central Scotland and western Ireland. One female from the single-brooded Scottish form was quite yellow and two female specimens of the Spring brood from western Ireland were very dusky. The English and Irish races of *Leptidea sinapis* L. were compared. The Irish race (ssp. *juvernica* Williams) is strongly coloured on the underside of the hindwings. An extreme *Pyrgus malvae* L. ab. *taras* Bergstr. from East Sussex, 21.v.1995. A fine *Coenonympha pamphilus* L. ab. *caeca* Oberthur from Fanore, Co. Clare, 5.vi.1995 and a female *Argynnis aglaja* L. bred from a Fanore larva which showed the dusky markings of ssp. *scotica* Watkins. A male *Anthocharis cardamines* L. ab. *parvipuncta* Turci, having the discal spot almost absent, from Downside, Surrey, 2.v.1995.

REVELS, R. C.—(1) Three bred generations from a wild female *Polyommatus icarus* Rott. taken in viii.1994. This showed ab. *discoelongata* B. & L. on the forewings but had typical hindwing spotting. The F₁ of about 50 insects contained 10 examples of *discoelongata*, mainly affecting the forewings. Several of these were paired together. An F₂ of about 250 adults emerged in vii.1995. 15 were good ab. *radiata* Courv. and 40 were of the transitional form, ab. *discoelongata*. The remainder were typical. Ab. *radiata* adults were paired together. The F₃ of 243 adults emerged in viii/ix.1995. This contained about 100 *radiata*, some being fine examples with streaked spotting on all wings. Most of the remainder were *discoelongata* with only 14 typical insects. Four of the *radiata* adults were also ab. *costaextrema*, one male was ab. *antialba* B. & L. and several combined *radiata* with ab. *confluens* B. & L. (Plate III, Fig. 2). *Discoelongata/radiata* is a multifactorial form.

1	2	3
4	5	6
7		8
9		
10	11	12

PLATE III. ANNUAL EXHIBITION 1995

1: *Polyommatus icarus* ab. *radiata*, and ab. *basielongata*, bred, 1995, L. D. Young. 2: *Polyommatus icarus*, ab. *confluens* and ab. *radiata*, bred, 1995, R. C. Revels. 3: *Aricia agestis* ab. *glomerata*, Northants, viii.1995, P. Tebbutt. 4: *Pyronia tithonus* ab. *lugens*, bred, 1995, R. C. Revels. 5: *Pyronia tithonus* gynandromorph, bred, 1995, A. M. Jones. 6: *Pyronia tithonus* ab. *multiocellata*, Devon, viii.1995, R. D. G. Barrington. 7: *Aphantopus hyperantus* ab. *lanceolata*, Sussex, 13–14.vii.1995, A. S. Harmer. 8: *Cynthia cardui* ab. *rogeri*, bred, 1995, temperature shock, J. H. Payne. 9: *Apatura iris* ab. *lugenda*, Northants, 14.vii.1995, D. Stokes. 10: *Chrysopilus erythrophthalmus*, Lanark, 15.vii.1995, P. J. Chandler. 11: *Eristalis cryptarum*, male, Dartmoor, 13.viii.1995, M. J. Parker. 12: *Eristalis cryptarum*, female, Dartmoor, 20.viii.1995, M. J. Parker.

(2) A brood of *Pyronia tithonus* L. ab. *lugens* Oberthur from a strain that has been maintained for several years. It has been shown to be a fully dominant form. Some of these were extreme examples of this very rare aberration including a male with the forewing dark borders extending across the apical spot (which lacked the pupil). The remaining fulvous of the forewings was suffused and the upperside hindwings lacked fulvous coloration altogether (Plate III, Fig 4).

SOFTLY, R. A.—The hairstreak *Deudorix anatalus* Hopffer reared from “Kenyan beans” purchased from a Hampstead corner shop on 15.viii.1995. Larva fed on packeted frozen runner beans, pupated 26.viii and emerged 8.ix.

STANDING, P. A.—Aberrant examples of *Melitaea cinxia* L. bred in 1995 from stock that has been inbred for 4 years. These included ab. *wittei* Geest and others lacking some markings from the underside of the hindwings.

STOKES, D.—A beautiful male example of *Apatura iris* L. ab. *lugenda* Cabeau, captured in Northants on 14.vii.1995 (Plate III, Fig. 9). This rare insect had the white bands of the forewings almost entirely absent and was in perfect condition. An accompanying photograph showed the equally extreme underside.

TEBBUTT, P.—An *Aphantopus hyperantus* L. underside with the yellow rings replaced by red. Other markings were normal. A male *Polygonia c-album* L. ab. *suffusa* Frohawk and a female *Limenitis camilla* L. ab. *obliterae* Robson & Gardner (these two were taken within 30 yards of each other).

An interesting series of *Aricia agestis* D. & S. ab. *glomerata* Tutt. (Plate III, Fig. 3). One example was captured at this locality in 1994. A population of 150–200 adults in viii.1995 produced 15 aberrations. Two weeks later, in a population of 50 adults, a further 5 aberrations were seen. Most examples seen were male. In some of these aberrations some of the spots were missing—a character which appears to be part of the expression of *glomerata*. This is a very rare aberration in this species.

Two bred gynandromorphs of *Pieris rapae* L. From 50 pupae one emerged in a late third brood (ix.1994). This had a few small areas of male scaling on the left side of an otherwise female insect. A bilateral gynandromorph emerged from the same stock in the spring of 1995.

Various nymphalid aberrations reared from temperature-shocked pupae, including *Vanessa atalanta* L. ab. *klymene* Fischer (the only aberration from over 70 treated pupae), *Cynthia cardui* L. abs. *varini* Meilhan and *emielymi* Verity, *Aglais urticae* L. ab. *lucia* Derenne, *Polygonia c-album* L. ab. *obscura* Closs and *Inachis io* L. ab. *semi-ocellata* Frohawk and *belisaria* Oberthur.

TUBBS, R. S.—The results of breeding from *Melanargia galathea* L. ab. *craskei* Tubbs, 1974–1978. In this aberration the central black costal blotch of the forewings is extended outwards to join the sub-apical bar. The original live females were given to the exhibitor by R. M. Craske, for whom the form was named. The aberration occurred in the F₁ generation in approximately equal numbers to type, suggesting that it is a dominant form. More extreme examples occurred in the F₂ generation which were probably homozygotes.

WINOKUR, L.—A female *Pararge aegeria* L. ssp. *oblita* Harrison showing homoeciosis. This emerged on 2.x.1995 from females taken at Glen Lonan, east of Oban, Argyll (18–25.viii.1993). This shows an area of patterning from the underside of the left hindwing (in spaces 2 and 3) reproduced on the underside of the left forewing.

YOUNG, L. D.—The results of crossing the exhibitor's well-known strain of *Polyommatus icarus* Rott. abs. *basielongata* B. & L. + *discoelongata* B. & L. with the ab. *radiata* Courv. strain bred by R. C. Revels. Amongst the progeny were some fine specimens combining *radiata* on all wings with *basielongata* (Plate III, Fig. 1). An unusual male showed ab. *anticaeca* B. & L. and *postradiata* Courv.

BRITISH MACROLEPIDOPTERA

BRITTON, M. R.—A specimen of *Eulithis testata* (L.) taken 17.viii.1995 at Skirwith Common showing a complete absence of hindwings.

BROTHERIDGE, D. J.—An exhibit of a dark almost unicolorous *Charanyca trigrammica* (Hufn.). A dark broad-winged form of *Lacanobia oleracea* (L.), a yellow form of *Mitochondria miniata* (Forst.) and an *Agrilus convolvuli* (L.) from near Swindon, Wilts.

BROWN, D. C. G. From Malham Tarn, Yorks., four specimens of the Continental form of *Eurois occulta* (L.) taken 5.viii.1995. Four bred specimens of *Xylota exsoleta* (L.) from a Scottish female taken iv.1995. Also a selection of migrants caught on the Lizard, Cornwall. 8–18.x.1995, consisting of: *Chrysodeixis acuta* (Walker) (Plate IV, Fig. 8), *Spodoptera cilium* (Gueneé) (Plate IV, Fig. 1), *Spodoptera exigua* (Hübner), *Utetheisa pulchella* (L.), *Trichoplusia ni* (Hübner), *Eublemma parva* (Hübner) and *ostrina* (Hübner), *Rhodometra sacraria* (L.) and *Orthonama obstipata* (F.).

CLANCY, S. P.—An exhibit consisting of interesting migrant species and unusual aberrations from the Dungeness area of Kent. The migrants were: *Acherontia atropos* (L.) 10.x.1995, *Nola aerugula* (Hübner) 12.vii.1995, *Coscinia cribraria arenaria* (Lempke) 26.vii.1995, *Eublemma parva* (Hübner) 28.vii.1995 and the first British record of *Herminia plumigeralis* ([D. & S.]), Greatstone, Kent, 12.x.1995 (Plate IV, Fig. 6). The aberrations consisted of *Idaea biselata* (Hufn.) a suffused example from Ham Street, Kent, *Mimas tiliae* ab. *brunnea* Tutt from Folkestone, Kent, *Spilosoma lutea* (Hufn.), 11.vii.1995, *Hadena albimacula* (Borkh.) with reduced white scaling (Plate IV, Fig. 7), *Eupithecia phoenecata* (Ramb.) a banded specimen from Greatstone, Kent, and an *Orthosia gothica* (L.) with asymmetrical scaling (Plate IV, Fig. 3).

Also a separate exhibit showed an example of *Trichoplusia vittata* (Wall.) taken at Rye Harbour, E. Sussex by D. Funnell on 31.vii.1995 (Plate IV, Fig. 11) along with a specimen for comparison from the Natural History Museum, Kensington (Plate IV, Fig. 12).

CLANCY, S. P., HONEY, M. R. AND SKINNER, B. F.—For comparison, with *T. vittata* (Wall.), mentioned above, specimens of *Trichoplusia albostrigata* (Br. & Grey) from Asia and *T. oxigramma* (Geyer) from America, its close relatives. Also to accompany Sean Clancy's exhibit of *Herminia plumigeralis*, four other European hermiinid species. Also a drawer of historic *Eublemma parva* (Hübner) and its close allies from the national collection. Finally in this series of exhibits, a drawer of European *Cucullia* also from the national collection along with a specimen taken at Portland, Dorset by Bernard Skinner recently and tentatively identified as a possible *Cucullia umbratica* (L.).

CLARKE, DR J.—An exhibit of larvae of *Anarta cordigera* (Thunb.) The following migrants: *Nola aerugula* (Hübner) (2) from Winterton Dunes, Norfolk 11.vii.1995; *Clypeophora pupillaria* (Hübner), 16.x.1995, to m.v., East Grinstead, West Sussex; *Clostera anachoreta* ([D. & S.]) 5.viii.1995, Folkestone, and *Utetheisa pulchella* (L.), 19.x.1995, Prawle Point, South Devon. The rest of the exhibit consisted of: *Sabra harpagula* (Esp.) Tintern; *Rheumaptera hastata* (L.) Shaftesbury, Dorset; *Coenocalpe lapidata* (Hübner); *Semiothisa carbonaria* (Clerck), Newtonmore, flying in good numbers 28.v.1995; *Phragmatobia fuliginosa* (L.), an abnormally pale example from Holme next the Sea, Norfolk; *Electrophaea corylata* (Thunb.) ab. *alboarenata* Curtis, from Newtonmore; *Xylota vetusta* (Hübner) and *exsoleta* (L.) both species at sugar, Rannoch; *Autographa jota* (L.) ab. *percontationis* Ochs.; *Apamea lithoxylea* ([D. &

S.]), a dwarf example: *Agrotis exclamationis* (L.) an asymmetrical example from East Grinstead and an ab. *plaga* Tutt from Lingfield, Surrey; *Agrotis puta* (Hübner.), a mixed gynandromorph: *Spilosoma lubricipeda* (L.) from Tintern, Wye Valley; one specimen of *Chilodes maritimus* (Tausch.), with conjoined stigmata from Holme next the sea, along with *Cosmia trapezina* (L.) from the same locality; two pale examples plus typical ones of *Agrotis vestigialis* (Hufn.) were shown from Winterton Dunes plus a similar exhibit of unicolorous *Euxoa tritici* (L.). Finally, a small series of *Horisma vitalbata* ([D. & S.]) demonstrated a possible autosomal recessive trait.

COLLINS, G. A.—An exhibit consisting of Lepidoptera from Co. Clare, Eire, during a visit in vi.1995: *Odontognophos dumetata hibernica* Forder, *Semiothisa clathrata hugginsi* (Baynes), *Hadena caesia mananii* (Gregs.) *Hadena perplexa capsophila* (Dup.) *Photodes captiuncula tincta* (Kane) and *Zygaena purpuralis sabulosa* Trem.

COLENUTT, S.—An exhibit of *Euplagia quadripunctaria* (Poda) ab. *lutescens* (Stdgr), 11.viii.1995 and *Stilbia anomala* (Haw.) 19.ix.1994, both from Chale Green, Isle of White.

COOK, R. R.—An exhibit of moths from several visits to Scotland: *Coenocalpe lapidata* (Hübner.) from Trinafour, and *Xylena vetusta* (Hübner.) and *exoleta* (Linn.), Rannoch, Perthshire; from Inverness-shire, specimens of *Enargia paleacea* (Esp.), *Aporophila lueneburgensis* (Frey.), *Celaena leucostigma scotica* Cock. and *haworthii* (Curtis), *Eugnorisma depuncta* (L.), *Stilbia anomala* (Haw.), *Chloroclysta citrata* (L.) and *Euxoa nigricans* (L.). From other localities: *Eupithecia egenaria* (H.-S.), from Tintern, Wye Valley; *Euphia biangulata* (Haw.), from Bere Forest, Dorset; *Tyta luctuosa* ([D. & S.]) from Portland, Dorset, 5.viii.1995. Finally, jointly with P. R. Cook, *Archearias notha* (Hübner.) from Merrytown Heath, Dorset, iv.1995.

CORLEY, M. F. V. Some unusual second broods of the following species: *Eupithecia pygmaeata* (Hübner.), Gozzards Ford, Abingdon, 31.vii.1995; *Lobophora halterata* (Hufn.) Gozzards Ford, 31.vii.1995 and *Laspeyria flexula* ([D. & S.]), Pucketty Farm, Faringdon, 31.viii.1995.

CRONIN, A. R.—A specimen of *Eupithecia phoeneciata* (Rambur), to light, 16.viii.1995, Portslade, Sussex. Also, two imagines of *Panaxia dominula* (L.) ab. *bimacula* Cockayne which were bred in 1995.

DAVEY, P. AND STERLING, P.—Migrant or vagrant Lepidoptera taken in Dorset in 1995: *Cyclophora puppillaria* (Hübner.), Parkstone, 12.x. A. Bromby; *Scopula nigropunctata* (Goeze), Arne, 26.vii, B. Pickess; *Hyles gallii* (Rott.), Chalbury, 20.viii, S. Amos; *Pelosia muscerda* (Hufn.), Woolgarston, 12.vii, D. Birt; *Cryphia algae* (F.), Weymouth, 10.viii, P. Sterling; *Trachea atriphleis* (L.), Christchurch, 31.vii, M. Jeffes; *Spodoptera ciliatum* (Guen.), West Bexington, 14.x, R. Eden; *Heliothis virescens* (Hufn.), Ashmore, 9.viii, P. Davey; *Chrysodeixis chalcites* (Esp.), West Bexington, 10.x, R. Eden, and *Hypena obsitalis* (Hübner.), Christchurch, 2.v, M. Jeffes.

DICKERSON, B.—An unusual exhibit of a male *Agrotis exclamationis* (L.) in copula with a female *Abrostola triplasia* (L.), found in a moth trap at Old Fletton, Peterborough, 10.vi.1995. It was not possible to separate them without injuring them.

DOBSON, A. E. An exhibit of *Acasis viretata* (Hübner.), from Health End Farnham, Surrey, 31.vii.1995. A dark imago of *Agrotis ripae* (Hübner.), from Dawlish Warren, Devon. A *Heliothis virescens* (Hufn.), Mads Cross Hill, Suffolk and a female specimen with increased black clouding on the hindwing bred from larvae obtained from a variety of plants in that area. Finally a single example of *Parascotia fuliginaria* (L.) in a Rothamstead light trap at Starcross, S. Devon, 14–17.vii.1995, a first county record.

ELLIOTT, B.—An imago of *Chrysodeixis chalcites* (Esp.), bred from a larva in a bunch of flowers, i.1994, Mansfield, Notts.; *Spodoptera littoralis* (Biosd.), bred from a number of larvae found in a consignment of plants from Israel in a heated greenhouse in Spalding, Lincs., xi.1994; *Agrotis crassa* (Hübner), to m.v., St Mary's, Isles of Scilly, 24.viii.1995; *Eurois occulta* (L.), to m.v., Allerthorpe Common, Yorks., one of two seen in this locality within days of each other; also, a bred series of *Idaea sylvestriaria* (Hübner) from Strensall Common, Yorks.

EMMET, A. M.—An aberrant example of *Xanthorhoe fluctuata* (L.) to m.v., Yealand Conyers, North Lincs., 26.v.1995. A *Eupithecia* species provisionally identified as *insignata* (Hübner), taken at m.v., in the same place on 22.v.1995. If it proves to be that species, then this will be an extension of its range in north-west England. Also a *Pelosia muscerda* (Hufner), taken at m.v., at Saffron Walden, Essex on 11.viii.1995. This is assumed to be a migrant from the Continent and a first record for North Essex [VC 19].

EZARD, A. S.—The following migrants at Rudston East Yorks.: *Catocala fraxini* (L.) and *Agrius convolvuli* (L.), both to m.v. on 19.ix.1995; *Heliothis peltigera* ([D. & S.]), m.v., 13.x.1995; *Eurois occulta* (L.), m.v., 2 on 6.viii.1995, 1 on 12.viii.1995. Other records from E. Yorks.: at Rudston, *Lithophane leautieri hesperica* Bours.; at Bridlington, *Eupithecia intricata arceuthata* (Freyer) on 20.vi.1995 and 21.vi.1995 (K. Barrow); *Lomographa bimaculata* (F.) to m.v., Northcliffe Wood, 16.vi.1995; also in the same wood, *Dypterygia scabriuscula* (L.) on 13.vi.1995. The following moths were taken on 1.vii.1995 on Crowle Moor: *Idaea muricata* (Hufner), *Mythimna pudorina* ([D. & S.]), *Cybosia mesomella* (L.), *Dypterygia scabriuscula* (L.) and *Lygephila pastinum* (Treitsch).

FOSTER, A. P.—Two examples of *Photodes captivumcula* ssp. *expolita* (Stainton) from Cowside, between Malham and Arncliffe, Mid-West Yorks. Also single examples of three immigrant noctuids from the Dorset coast: *Mythimna vitellina* (Hübner), to m.v., 11.x.1995, Abbotsbury; *Trigonophora flammea* (Esp.), to m.v., 14.x.1995, Portland; *Heliothis armigera* (Hübner), to m.v., 14.x.1995, Portland.

GARDNER, A.—Six bred examples of *Trigonophora flammea* (Esp.). Also, from the Burren, Co's Clare and Galway: *Zygaena purpuralis sabulosa* Trem. (4), *Semiothisa clathrata hugginsi* (Baynes) (2), *Photodes captivumcula tincta* (Kane) (2), *Setina irrorella* (L.) (4), *Odontognophos dumetata hibernica* Forder.

HALL, N.—A bred series of *Conistra rubiginea* ([D. & S.]) from Reading, Berks.; *Eublemna parva* (Hübner) and *Spodoptera exigua* (Hübner) from Portland, Dorset taken 15–16.x.1995. Also a dark specimen of *Lithophane socia* (Hufner) from Sandford, Wareham, Dorset 22.ix.1995.

HART, C.—An almost immaculate form of *Spilosoma lutea* (Hufner) to light, Dawlish Warren, Devon, vi.1995. Also exhibited were an adult and a pupa of *Agrius convolvuli* (L.); the former came to m.v., at Buckland, Surrey and the latter was found as a larva at Bass Point, Lizard, Cornwall, 18.ix.1995.

HAYWARD, R.—Some interesting species from the m.v. trap or bred from the garden, Slough, Bucks.: *Aploclera efformata* (Guen.), to m.v., 24.v.1995, with obsolete markings; *Noctua fimbriata* (Schreber), a possible ab. *nigrescens* Busse, with a typical specimen for comparison; *Archanara sparganii* (Esp.), to m.v., 29.vii.1995.

HENWOOD, DR. B. P.—Two migrant species from Abbotskerswell, South Devon: *Heliothis armigera* (Hübner), 13.x.1995 and *Cyclophora pupillaria* (Hübner), 19.x.1995.

HIGGS, G. E.—Aberration of *Abraxas grossulariata* (L.) which was taken at light by M. Killeby, Stony Stratford, North Bucks., 12.vii.1995.

JENKINS, A. E.—*Eurois occulta* (L.), taken at light Rannoch, Perthshire; *Heterogenea asella* ([D. & S.]) taken at Ham Street, Kent; *Biston betularia* (L.), an

ab. taken at Loch Rannoch; *Cosmorhoe ocellata* (L.), an ab. taken at Chardstock, Devon (Plate IV, Fig. 16); *Tetheella fluctuosa* (Hübner), an ab. taken at Chiddingfold, West Sussex; *Psodos coracina* (Esp.), taken at Coire Chuirn, Inverness-shire.

KENDRICK, R. C.—An interesting exhibit of *Thaumetopoea processionea* (L.). This appears to be one of three records from the Landguard Bird Observatory, Felixstowe, Suffolk. The specimen exhibited was taken by Mr M. Marsh on 4.viii.1995. Also exhibited was an example of *Scopula rubiginata* (Hufn.), to m.v., 19.vii.1995, Woodbridge, Suffolk; an example of *Eurois occulta* (L.) at light, 22.viii.1995, Minsmere Suffolk; an example of *Euphyia biangulata* (Haw.), to m.v., 27.vi.1995, Ryton Wood, War. This specimen was taken by the Ryton Wood Moth Recording Group.

KNILL-JONES, S. A.—An extensive exhibit of macrolepidoptera largely from Freshwater, Isle of Wight (unless otherwise stated). *Dryobotodes eremita* (F.), a dark black form, 11.x.1995, Cranmore; *Archearias parthenias* (L.), 8.iv.1995, Whitefield Woods, Ryde; *Idaea biselata* (Hufn.), 4.viii.1995; *Schrankia taenialis* (Hübner), 25.vii and 3.viii.1995; *Epirrhoe rivata* (Hübner), 11.vii.1995; *Hoplodrina ambigua* ([D. & S.]) ab. taken 22.viii.1995; *Ourapteryx sambucaria* (L.), a late date 2.xi.1994, wingspan only 32 mm; *Colotois pennaria* (L.), one light and one dark form; *Mythimna pallens* (L.), dwarf example, wingspan only 23 mm; *Opisthographitis luteolata* (L.), an ab. with a white head; *Tholera cespitis* ([D. & S.]); *Thera cupressata* (Geyer), 20.x.1994 and 13.x.1995; *Stauropus fagi* f. *obscura* (Rebel); a bred series of *Rhodometra saccharia* (L.), bred ix.1995; *Euplagia quadripunctaria* (Poda), 16 and 30.viii.1995; *Heliothis armigera* (Hübner), bred from a larva in imported tomatoes, 1.ii.1995; *Hadena lepida* (Esp.), a very pale form 8.v.1995; *Trigonophora flammea* (Esp.), 18.x.1995; *Drepana culttraria* (F.), Shalcombe Down, I.o.W.; *Chilodes maritimus* (Tausch.) ab. *bipunctata* (Haw.), 1.ix.1995; *Mythimna unipuncta* (Haw.), 27.xi.1994; *Scoliopteryx libatrix* (L.), 5.iv.1995; *Agrotis exclamationis* (L.), unnamed ab., 2.vii.1995; *Agrotis ipsilon* (Hufn.), 2 unnamed abs, 24.xi and 13.xii.1995; *Mythimna vitellina* (Hübner), 6 and 7.x.1995; *Spilosoma lubricipeda* (L.), 29.xi.1994; *Hada nana* (Hufn.), ab., 30.v.1995; *Zygaena lonicerae* (Schev.) ssp. *latomarginata* Tutt, from Malvern, Wores., vii.1995; *Orthosia opima* (Hübner), 9.v.1995 and at Cranmore, I.o.W., 8.iv.1995; *Ennomos fuscantaria* (Haw.), a bred series emerged vii.1995; *Conistra rubiginea* ([D. & S.]), three bred from Cranmore, I.o.W., ix.1995.

KOLAJ, A. An exhibit of moths from Co. Clare, v.1995: *Odontognophos dumetata hibernica* Forder, bred from larvae and *Hadena caesia manani* (Gregs.) (*Eupithecia venosata plumbea* Huggins from Doolin. Also, *Thaumetopoea processionea* (L.) and *Eurois occulta* (L.) from Sea Palling, Norfolk, 12.viii.1995; *Archanara algae* (Esp.) and *sparganii* (Esp.), bred from Ansty, East Sussex, 6.viii.1995; *Cabera exanthemata* (Scop.), ab. and a type specimen shown for comparison. Finally, *Adscita globulariae* (Hübner), to m.v., Tilshead, Wilts, 1.vii.1995.

LANGMAID, DR. J.—*Eupithecia ultimaria* (Boisd.) (Plate IV, Fig. 17), two taken at m.v. light; larvae found on 30.vii.1995 and two bred from *Tamarix gallica*, larvae found 4.viii.1995 and emerged late ix/early x.1995. *Opisthographitis luteolata* (L.) f. *albescens* Cockerell, taken at m.v., Thornton, Northumbs., 14.vi.1995; *Cryphia algae* (F.), a specimen to m.v., Southsea, Hants., 26.vii.1995 (Plate IV, Fig. 10).

OWEN, D. F.—An exhibit demonstrating the rise and fall of melanism in *Biston betularia* (L.) to stimulate interest in this phenomenon and an appeal for recording information in 1996.

MCCORMICK, R.—*Malacosoma castrensis* (L.), examples from Axmouth, S. Devon where it was caught commonly at light on 31.vii.1995. Kent examples were shown for comparison. *Lampropteryx suffumata* ([D. & S.]), two extreme variations

of this species from Feshiebridge Inverness-shire, late v.1995. *Lampropteryx otregiata* Metc., a bred specimen, Holne, Chase, Dartmoor, Devon. *Thera obeliscata* (Hübner), m.v., garden, Exmouth, South Devon, 31.viii.1995. *Hydriomena ruberata* (Freyer), bred specimens shown from larvae found at Trinafour, Perthshire, ix.1994. *Eupithecia abietaria* (Goeze), after specimens noted in a local collection captured in the mid-eighties, a follow-up resulted in a worn specimen from Bellever Forest on Dartmoor, 18.vii.1995. *Hydrelia sylvata* ([D. & S.]), examples from Dartmoor, 1995. *Trichopteryx carpinata* (Borkh.), bred from Feshiebridge, Inverness-shire, 1994. *Semiothisa carbonaria* (Clerck.), examples captured on Granish Moor, near Aviemore, 28.v.1995. *Hyles galli* (Rott.), taken at Prawle Point, South Devon, 12.viii.1995. *Agrotis ripae* (Hübner), a well-marked specimen taken, unusually at Hartland Point, North Devon, 1.vii.1995. *Anarta melanopa* (Thunb.), seen commonly at Lecht, Aberdeenshire. *Hadena confusa* (Hufner), two dark specimens, reminiscent of the Shetlands ab. *obliterae* Robson. *Enargia paleacea* (Esp.), examples from Budby Heath, Notts., taken at light, 19–22.viii.1995. *Macdunnoughia confusa* (Steph.), a specimen which laid infertile ova, from a light trap in Plymouth, 10.viii.1995. Also an oversized *Agrotis segetum* ([D. & S.]) from Teignmouth, Devon, taken 8.x.1994, measuring 46 mm across the wings, and in contrast a diminutive *Agrotis ipsilon* (Hufner) from Prawle Point measuring only 34 mm across the wings, taken 29.ix.1995.

PHILLIPS, J. W.—*Heliothis virescens* (Hufner), bred female from Maidscross Hill, Suffolk, 1995. *Arctia villica* ab. *flavo-abdominalis* Cock., bred from a larva found on Sinah Common, Hayling Island, Hants., 1993. *Egira conspiciellaris* (L.), bred female from Kynaston Common, Herefordshire, 1994. *Mythimna turca* (L.), Richmond Park, Surrey, 1995. *Cyclophora linearia* (Hübner), bred female, Tintern, Mon., 1994. *Elaphria venustula* (Hübner), from Tugley Wood, Chiddingfold, Surrey, 1995. *Senta flammula* (Curtis), from Wicken Fen N.N.R., Cambs. *Lithomoia solidaginis* (Hübner), from Drumguish, Inverness-shire, 1995. *Aporophyla lutulenta lunebergensis* (Freyer), also from Drumguish, 1995.

PICKLES, A. J. AND C.—*Hadena caesia* ssp. *mananii* (Gregs.), two specimens bred from the Isle of Skye. Also a long series of *Hadena confusa* (Hufner) from a range of localities including Kent, Surrey, South and North Cornwall, North Devon, West Argyll, Skye and Unst (Shetland). It showed darker and more obscure forms to predominate in Shetland and North Devon.

PLANT, C.—An exhibit of scarce immigrants recorded in the Bishop's Stortford area in 1995: *Eurois occulta* (Linn.), from Parndon Wood Nature Reserve, 19.viii.1995, a much later date than others recorded and having the facies of a freshly emerged specimen; *Trachea atriplicis* (L.) 10.viii.1995, this is an extinct British breeding species, last recorded as having bred here in 1915, it is a common species in Europe; *Macdunnoughia confusa* (Steph.), 30.viii.1995, a westward spreading Palaearctic species which has started appearing in Britain since 1951.

REID, J. W.—The following migrants were exhibited: *Thaumetopoea processionera* (L.), one male to light, Meldreth, Cambs., 13.viii.1995; *Agrotis crassa*, (Hübner), Chesterford Park, Saffron Walden, Essex, 13.viii.1995, a single female which laid a few ova from which a dozen or so larvae were feeding; *Rhodometra sacraria* (L.), one, 13.x.1995, a buff coloured specimen possibly indicating that it had bred here.

REVELL, R. J.—The following macrolepidoptera were exhibited, all from Cambridge, unless stated otherwise: *Xanthorhoe fluctuata* (L.), lacking a median fascia; *Colostygia olivata* ([D. & S.]) from Porlock, Som.; *Apamea scolopacina* (Esp.), 26.viii.1995, (first county record); *Protoschinia scutosa* ([D. & S.]), 2.viii.1995; *Heliothis virescens* (Hufner), 2.viii.1995.

SHARPE, S.—The following moths taken or found as larvae at Carrbridge, Inverness-shire, 1–6.iv.1995: *Xylena vetusta* (Hübner) and *exoleta* (L.), *Brachionycha nubeculosa* (Hufn.), *Dasytopia templi* (Thunb.), *Cryphia domestica* (Hufn.), *Phragmatobia fuliginosa* ssp. *borealis* (Stdgr), *Achlya flavicornis* ssp. *scotica* Tutt, *Ellopia fasciaria* (L.) and *Xanthorhoe fluctuata* (L.).

SIMS, I.—An exhibit of the following moths taken at Medmenham, Bucks., unless otherwise stated: *Catarhoe cuculata* (Hufn.), m.v., Warberg, Bix, Oxon., 21.vii.1995; *Discoloxia blomeri* (Curt.), Homefield Wood, 10.vi.1995; *Abraxas sylvata* (Scop.), m.v., Homefield Wood, 7.vii.1995; *Semiothisa liturata* (Clerck), Bernwood Forest, Oxon., 23.v.1995; *Deileptenia ribeata* (Clerck), m.v., Homefield Wood, 7.vii.1995; *Cucullia lychnitis* (Rambur), larvae, vii.1994 and *verbasci* (L.), larvae, on *Scrophularia* sp., vi.1994; *Xanthia aurago* ([D. & S.]), to m.v., 25.ix.1994; *Apamea subultrix* (Esp.), to m.v., Homefield Wood, 10.vi.1995; *Colocasia coryli* (Hufn.), adults from Hambleden, larvae bred on *Fagus*, emerged 21.iii.1992, also bred from Henley-Hill Wood, em. 8.iii.1989; *Polychrysis moneta* (F.), Rothamstead light trap, Chigwell Row, Essex, 25–27.vi.1982; *Lygephila pastinum* (Treits.), m.v., Homefield Wood, 10.vi.1995; *Hypena rostralis* (L.), m.v., Knowl Hill, Berks, 1.v.1994.

SKINNER, B. F. A male *Luperina dumerilii* (Dup.), from the Lizard, Cornwall, 7.ix.1983 (Plate IV, Fig. 2). Also the following aberrant examples of macrolepidoptera taken or bred in 1995: *Tetheella fluctuosa* (Hübner) f. *albilinea* Cockayne, Loch Arkaig, Argyllshire, 26.vi.1995; melanistic *Eilema deplana* (Esp.), Windsor Forest, Berks., 28.vii.1995 (Plate IV, Fig. 4); a heavily banded form of *Semiothisa liturata* (Clerck), Windsor Forest, 28.vii.1995 (Plate IV, Fig. 13); a weakly marked *Eupithecia pulchellata* (Steph.), Loch Arkaig, 26.vi.1995; a pale *Peribatodes rhomboidaria* ([D. & S.]), Sandwich, Kent, 12.viii.1995. Specimens of *Entephria flavicinctata* (Hübner), bred from larvae collected in Co. Antrim, N. Ireland, v.1995, together with examples of the paler ssp. *flavicinctata* (Hübner), from Yorks. and the darker ssp. *ruficinctata* (Guenée).

On behalf of Lynn Hirst, a male *Thaumetopoea processionea* (L.), a male taken in her garden light trap at Sholden, Kent, 10.viii.1995.

SKINNER, B. F. AND CLANCY, S.—A joint exhibit of *Peribatodes manuelaria* (H.-S.), from a female taken at Lydd, Kent, on 4.viii.1994 by K. Redshaw. They emerged both in 1994 and 1995. The display also included photographs of the larvae in different instars, the pupa and the living adult.

SMITH, E. G. AND M. H.—An exhibit of some interesting macrolepidoptera from Wilts.: *Meganola strigula* ([D. & S.]), one to m.v., Great Wood, 12.vii.1994, rare in Wilts.; *Meganola albula* ([D. & S.]), one to m.v., Bullen Hill Farm, VC 8, 26.vii.1995, new Wilts. record.

WARING, P. News from some projects on British moths in 1995 in conjunction with JNCC, CCW, EN, SNH, Butterfly Conservation and BENHS. *Eriopygodes imbecilla* (F.), was investigated in its haunts in Wales, a project commissioned by the Countryside Council for Wales. It was found to be more widespread than previously thought. *Coenocalpe lapidata* (Hübner) was studied in its rushy haunts by a Scottish National Heritage project and an account given of its rearing in captivity. It was not thought to be much more widespread than previous records suggested. *Siona lineata* (Scop.): English Nature's Species Recovery Programme worked upon a third locality for this moth which was found in 1995. *Acosmetia caliginosa* (Hübner) was also a subject of the recovery programme and flew again on mainland Britain in 1995 for the first time since the early 60s.

As part of his exhibit, the following were also shown: *Dyscia fagaria* (Thunb.), recorded at two sites in Monmouthshire in 1995, first records for the county

(G. A. N. Horton, pers. comm.); a variant *Agrotis exclamationis* (L.), an unusual specimen taken at m.v., Helpston, Northants, 19.vii.1995 by Malcolm Hillier; *Thaumetopoea processionea* (L.), taken at m.v., Helpston, Northants, by M. Hillier.

WARD, J.—An ab. of *Camptogramma bilineata* (L.), bred from Newton, Northants.

WARNE, B. J.—An exhibit of moths taken in the recorder's garden at Ryde, Isle of Wight, unless otherwise stated: *Meganola strigula* ([D. & S.]), to m.v., first in 6 years, 5.v.1995; *Cyclophora punctaria* (L.), a black and grey streaked ab., 18.viii.1995; *Agrotis vestigialis* (Hufn.), 21.vi.1995; *Hypena crassalis* (F.), to m.v., first in 6 years, 9.vii.1995; *Rheumaptera undulata* (L.), 29.vi.1995, only the second record for the garden; *Hypena rostralis* (L.), taken at Ryde by Mr D. Peach, first autumn record; *Cosmia affinis* (L.), to m.v., 4.viii.1995, first record for garden; *Agrotis clavis* (Hufn.), to m.v., a very dark form, 5.vii.1995; *Spodoptera exigua* (Hübner.), to m.v. on 6.viii and 9.ix.1995; *Archiearis parthenias* (L.), netted by day, Whitefield Woods, Ryde, 20.iii.1995; *Chloroclysta truncata* (Hufn.), ab., 11.x.1995; *Heliothis armigera* (Hübner.), seven specimens in all between 12 and 27.x.1995; *Rhodometra sacraria* (L.), a normal and a pink specimen, 11 and 21.x.1995.

WEDD, D.—Macrolepidoptera captured or bred in 1995: *Agrotis ripae* (Hübner.), contrasting forms from Devon, Essex and S. E. Ireland; *Agrotis vestigialis* (Hufn.), a strongly marked form from Findhorn, Morayshire; *Paradiarsia glareosa* (Esp.), from Melvich, Sutherland, with a specimen approaching form *edda* (Staint.); *Zygaena purpuralis* ssp. *sabulosa* Trem. from Co. Clare, showing the typical coastal form and a small inland "montane" form from AGLISH; *Chrysodeixis chalcites* (Esp.), bred from female taken West Wittering, Sussex, 11.viii.1995; *Spodoptera exigua* (Hübner.),? new to Henley-on-Thames, Oxon; *Thera britannica* (Turn.), extreme ab. from Melvich, Sutherland, taken on 2.viii.1995 (Plate IV, Fig. 15), on sand dunes, an improbable place and date; *Agrochola haematidea* (Dup.), bred from Sussex ova, emerged 29.v.1995; *Luperina nickerlii demuthii* Goater & Skinner, from Essex showing heavily suffused hindwings (the majority of specimens seen were like this and may have been due to the hot summer); *Hadena caesia* ssp. *mananii* (Gregs.), from the Flaggy Shore, Co. Clare, a new locality; *Hypena obsitalis* (Hübner.), a short series from a new locality in Dorset; *Gortina borellii lunata* (Freyer), bred on celeriac, from an Essex locality; *Gnophos* group was illustrated with *obfuscatus* ([D. & S.]), from Scottish and Irish localities to show distinct differences and also *Odontognophos dumetata hibernica* Forder from Co. Clare bred 1995; *Lymantria monacha* (L.), a range of specimens bred over three years, originally from Bockmer End, Marlow, these demonstrated the rapidity of change in a species; *Noctua comes* (Hübner.), a colour range of specimens taken or bred in 1994–5, from Findhorn, Morayshire (e.g. Plate IV, Fig. 5).

YOUNG, D.—The following specimens were exhibited: *Synanthedon myopaeformis* (Borkh.), larvae of all sizes were collected from ornamental cherry trees from a suburban road in West London, showing a preference for those with dark red flowers, larvae collected iv.1995 and emerged 6.v–24.vi.1995; a series of *Chloroclysta citrata* (Linn.) from Inverness-shire showing an incredible amount of variation and markings; *Eugnorisma depuncta* (L.), fairly common at sugar and m.v., 12–18.viii.1995, in the Aviemore and Kingussie areas; *Paradiarsia sobrina* (Dup.), not uncommon in the Aviemore and Kingussie areas in viii.1995; *Apamea oblonga* (Haw.), two specimens from Keyhaven, Hants., to m.v., 8.viii.1995; *Aplocera plagiata scotica* Rich., two specimens taken at m.v., Drumguish, near Kingussie, viii.1995; *Scopula ornata* (Scop.), three specimens from the North Downs, Surrey, 23.v.1993 and 25.vii.1995; *Archanara neurica* (Hübner.), Walberswick, Suffolk, 27.vii.1995; fairly common at m.v., *Aporophyla lutulenta luenebergensis* (Freyer),

specimens from Drumguish, Inverness-shire, viii.1995; *Antitype chi* (L.), also a series from Drumguish, viii.1995.

BRITISH MICROLEPIDOPTERA

AGASSIZ, D. *Monopis monachella* Hübn., Sandwich, Kent, 12.viii.1995, new county record; *Cydia medicaginis* Kuznetsov, Gravesend, Kent, 27.vi.1995, new county record; *Eccopsis effractella* Zeller (Pyralidae), Buckingham Palace Gardens, 13.vii.1995, new to Britain (Plate IV, Fig. 20).

BEAUMONT, H. E.—*Calybitis phasianipennella* Hübn., West Melton, Rotherham, S. Yorks., VC63, 28.vii.1995, there are only two previous Yorkshire localities, both in VC63; *Depressaria weirella* Staint., West Melton, Rotherham, S. Yorks., VC63, several vii.1995; *Blastobasis decolorella* Woll., West Melton, Rotherham, S. Yorks., VC63, 25.vi.1995; *B. lignea* Wals., West Melton, Rotherham, S. Yorks., VC63, 3.viii.1995; *Stenolechia gemmella* L., West Melton, Rotherham, S. Yorks., VC63, 23.viii.1995, apparently the first Yorkshire record for 50 years; *Mompha subbistrigella* Haw., West Melton, Rotherham, S. Yorks., VC63, 15.vi.1995; *Piercea vectisana* H. & W., Conheath, Glenclepe, Dumfries, VC72, several on R. Nith banks, first Scottish record?; *P. alimana* Rag., Rushy Moor, Askern, S. Yorks., VC63, pupae in stems of water plantain, 23.iv.1995, moths reared in May, first Yorkshire record; *Epinotia demarniana* F. v R., Treeton Dyke, Rotherham, VC63, 4.vi.1995, Crowle, Moors, Lincs., VC63, 1.vii.1995; *Margaritia sticticalis* L., Hooton Roberts, Rotherham, S. Yorks., VC63, 18.viii.1995; *Leioptilus liegianus* Zell., West Melton, Rotherham, S. Yorks., VC63, 31.viii.1995.

BLAND, K. P.—*Caloptilia leucapennella* Steph., Mailermore Wood, Glen Artney, Perth., VC88, 5.viii.1995, NN7518, Laggan Wood, Comrie, Perth., VC88, 16.ix.1995, NN7623, Campsie Hill Wood, Perth., VC89, 31.viii.1995; *Eutromula diana* Hübn., still present in Glen Affric, E. Inverness-shire, VC96, several seen there 16.viii.1995; *Elachista bedellella* Sirc., reared from mines in *Helictotrichon* grass collected Linkim Bay, Berwickshire, NT9265, VC81 on 15.vi.1995, imago emerged 9.vii.1995; *E. regificella* Sirc., a very scarce species in S. E. Scotland with only four known localities; this specimen reared from mines in *Luzula sylvatica* collected in Dura Den, Fifeshire, NO4115, VC85, 10.vi.1995, imago emerged 16.vii.1995; *Schiffermuelleria similella* Hübn., Glendoll, Lodge, Angus, NO2776, VC90, 9.vii.1995; *S. subaquilea* Staint., Craigmead, Lomond Hills, Fife, VC85, 10.vi.1995, NO2205, Craig Melton, Glen Doll, Angus, VC90, 9.vii.1995; *Reuttia subocella* Steph., Linkim Bay, Berwickshire, NT9265, VC81, many imagines flying around wild thyme, 15.vi.1995, larval cases feeding on thyme at same site 22.viii.1995, this appears to be a new food plant for the species in Britain; *Ancylis tineana* Hübn., larval workings in *Betula pubescens* now discovered, heavily grazed dwarf birches are chosen, the larva makes rough spinings of leaves and lives in a frass-coated silk tube within the spinning, see *Ent. Gaz.* (in press) for details, larva collected at Struan Wood, Perthshire, NN7965, VC88, on 4.ix.1994, imago emerged 15.v.1995.

BRITTON, M. R.—A year for Yorkshire ancylids: *Ancylis geminana* Don., Bridestones Moor, N. Yorks. Moors, larva 30.viii.1994, adult 23.v.1995, Jugger Howe Bec, Scarborough, 23.v.1995; *A. uncella* D. & S., Jugger Howe Beck, Scarborough, 23.v.1995; *A. upupana* Treits., Skipwith Common, Selby, beaten from birch 31.v.1995, apparently new to Yorkshire.

BROTHERIDGE, D. J.—The following from Wiltshire: *Oegoconia deauratella* H.-S., Wroughton, 21.vii.1994, 13.vii.1995, 30.vii.1995, 12.viii.1995; *Blastobasis decolorella*

Woll., Swindon, 10.vii.1995; *Epiphyas postvittana* Walk., Wroughton, 30.viii.1995; *Eucosma conterminana* H.-S., Wroughton, 20.vii.1993, 4.vii.1994, 11.vii.1995, 1.viii.1995; *Alucita hexadactyla* L., Wroughton, 22.vii.1995, Swindon, 9.viii.1994; *Pyrausta cespitalis* D. & S., a small brightly marked form, Beckhampton, 18.viii.1990; *Margaritia sticticalis* L., Wroughton, 10.viii.1995, 22.viii.1995.

BROWN, D. C. G. — A selection of migrants caught on the Lizard, Cornwall: *Hymenia recurvalis* F., 17.x.1995; *Hellula undalis* F., 9.x.1995; *Euchromius ocella* Haw., 14.x.1995; *Uresiphita polygonalis* D. & S., 17.x.1995.

CARTER, D. — Moths from Buckingham Palace Gardens in the National Collection: a drawer showing some of the pyralid moths collected over a period of more than 30 years. In 1995 a further 10 species were added to the already impressive list of 600 species of Lepidoptera from the gardens. Amongst this year's new additions is the pyralid moth *Eccopisa effractella* Zell., a species new to the British list (see D. Agassiz, above).

CLANCY, S. P. — A few species of Pyralidae including three migrant species and two scarce resident species. The migrants comprised specimens of *Antigastra catalaunalis* Dup. from Dungeness, 12.x.1995; *Euchromius ocella* Haw. from Dungeness, 27.vii.1995; and *Hellula undalis* F. from Lydd, Kent on 14.ix.1995. The residents included examples of *Microstega pandalis* Hübn. from Kent and *Homocosoma nebulella* D. & S., from Suffolk.

COLENUTT, S. — *Evergestis limbata* L., Chale Green, Isle of Wight, 14.vii.1995; *Margaritia sticticalis* L., Chale Green, Isle of Wight, 11.viii.1995; *Homocosoma sinuella* F. ab. from St Catherines, Isle of Wight, 19.vii.1995.

CORLEY, M. F. V. — *Pediasia aridella* Thunb., Redlynch Common, Wilts., VC8, 7.vii.1995, normally a coastal species. Species refound in VC22: *Aethes francillana* F., Pucketty Farm, Faringdon, 17.vii.1995, previous VC records 1899 and 1901; *Cochylis hybridella* Hübn., Gozards Ford, Abingdon, last recorded 1913; *Ectoedemia atrifrontella* Staint., Bagley Wood, 2.viii.1995, last recorded 1920; *Biselachista utonella* Frey, Gozards Ford, Abingdon, 31.vii.1995, last recorded before 1929; *Cydia gallicana* Guenée, Pucketty Farm, Faringdon, 27.vii.1995, also seen in 1994, previous record before 1929. Uncommon VC22 species: *Aethes dilucidana* Steph., Pucketty Farm, Faringdon, 31.viii.1995; *Calamotropha paludella* Hübn., Gozards Ford, Abingdon, 31.vii.1995; *Caryocolum proximum* Haw., Pucketty Farm, Faringdon, bred 3.vii.1995 from *Stellaria media*; *Pammene aurantiana* Staud., Pucketty Farm, 2.viii.1995.

CRAMP, P. J. — *Stenoptilia lunaedactyla* L., 1.vii.1995, Blackgang, Isle of Wight; *Ypsolopa sequella* Clerck, 19.viii.1995, Parkhurst, Isle of Wight; *Eurrhypara perlucidalis* Hübn., 27.vii.1995, Godshill, Isle of Wight, new VC record; *Ephestia figulilella* Greg., x.1991, Godshill, Isle of Wight, new VC record.

CRONIN, A. R. — *Evergestis limbata* L., Portslade, Sussex, 11.ix.1995, one at light in garden.

DICKERSON, B. — *Ectoedemia amani* Svensson, discovered in Waresley Wood, Hunts. (VC31) on 12.vii.1994. A photograph of the genitalia dissection of the first *E. amani* found in Britain was shown, along with a reduced copy of the plate from Johansson *et al.*, *Fauna Ent. Scand.* 23. Also shown were three examples of *E. amani* taken in Waresley Wood on 10.vii.1995.

DOBSON, A. H. — *Blastobasis decolorella* Woll., North Baddesley, Hants, 9.vi.1995, one at m.v. light, third county record of this rapidly spreading species; *Epiphyas postvittana* Walker, Basingstoke, 8.x.1995, at m.v. light, the furthest inland Hants record; *Pseudargyrotoza conwagana* F., a dark form, Bartley Heath Reserve, Hants; *Pediasia contaminella* Hübn., Dawlish Warren, Devon, 25.vii.1960 and *P. aridella*

Thunb., Dawlish Warren, 24.vii.1968, the first Devon 20th century specimens of both species; *Evergestis extimalis* Scop. and *Sitochroa palealis* D. & S., both species at Mads-cross Hill, Suffolk field meeting, 15.vii.1995; *Margaritja sticticalis* L., Starcross, Devon, 4-6 and 8.viii.1995, two specimens of this migrant at Rothamsted light trap; *Phlyctaenia perlucidalis* Hübn., Abbotsworthy, Hants, 5.vi.1995, disturbed in a water meadow, a new locality.

ELLIOTT, B. — *Caloptilia leucapennella* Steph., bred from leaf cones on *Quercus ilex*, Tresco, Isles of Scilly, x.1994; *Crocidosema plebejana* Zell., bred from stems of *Lavatera arborea* St Mary's, Isles of Scilly, x.1994; *Nothris congressariella* Bruand, bred from sprun leaves of *Scrophularia nodosa*, Tresco, Isles of Scilly, x.1995; *Margaritja sticticalis* Boisd., Allerthorpe Common, Yorks., 3.viii.1995, four others seen at same locality a few days earlier by N. Gill. Subsequently, further imagines were seen at Portland and Winchester a week later; the Portland specimen laid and the progeny were hibernating as full grown larvae. *Leioptilus chrysocomae* Rag., Blean Woods, Kent, bred *Solidago* stems viii.1995; *Piercea alimana* Rag., Hilton, Derbyshire, bred stems of *Alisma plantago aquatica*, 6.viii.1995; *Aethes beatricella* Wals., Sawley Derbys., bred from old *Conium* stems vii.1995; *Lampronia rubiella* Bjerk., Linacre, Derbyshire, vi.1995; *Exapate congelatella* Cl., Beeley Moor, Derbys., very common, 3.xi.1995.

EMMET, A. M. *Coleophora salicorniae* Wocke, taken at m.v. light at Saffron Walden, Essex on 26.vii.1995, about 40 miles from its salt-marsh breeding ground; *Apotomis lineana* D. & S., Saffron Walden, Essex, taken at m.v., 11.viii.1995, a rare species in Essex.

FOSTER, A. P. — *Ochsenheimeria vacculella* (F. v. R.), Great Coxwell, Berks., VC22, 7.viii.1995, adults found congregating in rot holes of ash and oak trees; *Crocidosema plebejana* Zell., Church Ope Cove, Portland, Dorset, VC9, 14.x.1995; *Sitochroa palealis* D. & S., Cricklade, N. Wilts., VC7, at m.v., 27.vii.1995; *Callamotropha paludella* Hübn., Cricklade, N. Wilts., VC7, at m.v., 6.viii.1995, possibly the first county record.

HALL, N. — *Numonia suavella* Zinck., Earley, Reading, Berks., bred 1995 from *Cotoneaster*; apparently a new food plant.

HART, C. *Platyptilia tesseradactyla* L., a short series mostly reared from two sites in the Burren, County Clare: the exhibitor went at the end of May for the adults but found the season so late most individuals were still in pupa. The larva feeds on the rootstock and developing leaves of *Antennaria dioica* and the pupa is hidden in the cavity formed by a newly opening leaf as it grows away from the main rosette. The larva secures the leaf in place with silk to prevent the leaf opening further and the pupa being exposed. *Agdistis bennetii* Curtis, a single example which came to a garden trap at Buckland near Reigate, Surrey on 20.viii.1995. This coastal plume which feeds on sea lavender, is well known as a wanderer on warm nights and can turn up at light many miles from the sea. Members may recall a specimen exhibited by G. Higgs in 1994, which was caught at Willen near Milton Keynes.

HARVEY, M. — *Choreutis pariana* Clerck, Homefield Wood, BBONT Reserve, Bucks., 25.ix.1994; *Argyresthia semifusca* Haw., Upper Basildon, Berks., 27.viii.1995; *Ypsolopha alpella* D. & S., 3.viii.1995, Upper Basildon, Berks.; *Depressaria badiella* Hübn., Thatcham Reedbeds, Berks., 28.vii.1995; *Pancalia leuwenhoekella* L., Hurley Chalk Pit, BBONT Reserve, Berks., 2.v.1994, Homefield Wood, BBONT Reserve, Bucks., 15.v.1994; *Margaritja sticticalis* L., Upper Basildon, Berks., 3.viii.1995, at m.v., one of two seen; *Phlyctaenia perlucidalis* Hübn., Parsonage Moor, BBONT Reserve, Berks., 10.vi.1995; *Mecyna flavalis flavicularis* Caradja, Hartslock Nature Reserve, BBONT, Oxon, 10.vii.1995.

HENWOOD, B. P. — Photograph of *Phyllonorycter* mines on *Trifolium repens*; they appear to be those of *P. nigrescentella* Log., which has not been previously recorded

on *Trifolium* in this country. They were found in a garden at Abbotskerswell, Devon.

KENDRICK, R. C.—*Opostega crepusculella* Zell., Ryton Wood, War., second county record; *Blastobasis decolorella* Woll., Cheylesmore, Coventry, War., this species is now common in Coventry, occurring in some abundance for several years; *B. lignea* Wals., Coventry, War., 1994, 1995; *Epagoge grotiana* F., Ryton Wood, War., third county record; *Eudemis profundana* D. & S., Cheylesmore, Coventry, War., 18.viii.1993, Ryton Wood, War.; *Pseudosciaphila branderiana* L., Ryton Wood, War., 8.vii.1993 at m.v.; *Ancylis upupupana* Treits., Ryton Wood, War., at m.v., 8.vii.1993, second county record; *Agriphila latistria* Haw., Ryton Wood, War., at m.v., 29.viii.1993; *Agriphila selasella* Hübn., Ryton Wood, War., 21.vii.1993, at m.v.; *Margaritia sticticalis* L., Minsmere NR, Westleton, East Suffolk, 2.viii.1995, at light; *Phycitodes saxicola* Vaughan, Cheylesmore, Coventry, War., 15.viii.1995, at m.v., second county record (det. B. Skinner). The high number of unusual records in one night at Ryton Wood, Warwickshire shows the degree of under-recording of smaller moths. This wood was considered to be well recorded, but only a small amount of the area had been regularly worked, thus on 8.vii.1993, when a previously unworked part of the reserve was monitored, that so many "unusual" records occurred should not be a surprise.

KNILL-JONES, S. A. All the following recorded from the Isle of Wight: *Tortricodes alternella* D. & S., Binstead, 7.ii.1995; *Acleris cristana* D. & S., Whitefield Woods, 28.iv.1995; *Ptychloma lecheana* L., The Causeway, Freshwater, 30.v.1995; *Dichomeris marginella* F., Freshwater, 12.vii.1995; *Anacampsis blattariella* Hübn., Ryde, 28.iv.1995; *Depressaria pastinacella* Dup., Shalcombe Down, 9.viii.1995; *Ypsolopha parenthesella* L., Shalcombe Down, 9.viii.1995; *Udea fulvalis* Hübn., Freshwater, 11 and 17.vii.1995; *Plodia interpunctella* Hübn., Freshwater, 22.v.1995; *Scoparia pyraella* D. & S., ab., Tennyson Down, 4.vi.1995; *Hellinsia (Leioptilus) carphodactyla* Hübn., High Down, Freshwater, 25.vii.1995; *Heterographis oblitella* Zell., Freshwater, 21 and 22.viii.1995; *Acleris emargana* F., Fort Victoria, three; *Epinotia solandriana* L., Freshwater, 2.viii.1995; *Pyrausta cingulata* L., High Down, Freshwater, 25 and 31.vii.1995; *Epiblema foenella* L., Cranmore, 2.viii.1995; *Hedya salicella* L., Freshwater, 26.vii.1995; *Crociosema plebejana* Zell., Freshwater, 23.x.1995.

LANGMAID, J. R.—*Coleophora currucipennella* Zell., Ham Street, Kent, 14.vii.1995, two at m.v.; *Bisigna procerella* D. & S., Ham Street, Kent, 14.vii.1995; *Sitotroga cerealella* Ol., Southsea, Hants, one taken at m.v., 28.vii.1995, new to Hampshire; *Neofriseria singula* Staud., a series of four bred from *Rumex acetosella*, Enfield, Middx, larvae found 8.vi.1995, emerged 2–22.vii.1995; *Caryocolum proximum* Haw., two bred from *Stellaria media*, Petts Wood, Kent, larvae found 18.v.1995, emerged 24.vi.1995; *Cochylis molliculana* Zell., Thorney Island, Sussex, one bred from *Pteris echioides*, larva found 11.ix.1994, emerged 18.vi.1995, new to Sussex; *Acleris logiana* Clerck, Botley Wood, Hants, one bred from *Betula pubescens*, larva found 17.ix.1994, emerged 15.x.1994; *Apotomis semifasciana* Haw., Botley Wood, Hants, two bred from *Salix cinerea*, larvae found 19.v.1995, emerged 29–30.vi.1995; *Epinotia fraternana* Haw., a particularly boldly marked specimen beaten from *Abies grandis* at Charterhall Wood, Berwickshire, 13.vi.1995; *Eucosma tripoliana* Barr., Farlington Marshes, Portsmouth, Hants; a unicolorous specimen, 10.viii.1995 (Plate IV, Fig. 18) *Cryptophlebia leucotreta* (Meyr.), Southsea, Hant, 11.viii.1995, a perfect male specimen taken at m.v.; *Acrobasis tumidana* D. & S., a single specimen taken at m.v. at Southsea, Hants, 30.vii.1995, second authenticated VC11 record.

MCCORMICK, R.—*Agapeta zoegana* L. f. *ferrugana* Haw., Great Haldon, Devon, 10.vii.1995; *Aphelia viburnana* D. & S., Hartland Point, Devon and Hurley near

Fernworthy Reservoir, Dartmoor, all in 1995; *A. paleana* Hübn., Hartland Point, Devon and Hurley, Dartmoor, all in 1995. *A. unitana* Hübn., Hartland Point, at light, 1995, det. subject to confirmation; *Eudonia alpina* Curtis, Grannish Moor, Aviemore, several 28.v.1995; *Eurrhyncha terrealis* Treits., abundant at light, Hartland Point and Shipload Bay, North Devon, 1.vii.1995; *Udea decrepitalis* H.-S., in several locations along the coast of Loch Arkaig, 30 and 31.v.1995; *Platyptilia calodactyla* D. & S., larvae at one location in North Devon, moths at light at another also in North Devon; *Hellinsia (Leioptilus) tephradactyla* Hübn., larvae at one location in North Devon, moths at light at another location again in North Devon, all in 1995.

O'KEEFE, D.—From Kent: *Caryocolum proximum* Haw., Petts Wood, bred from *Stellaria media*, vii.1995; *Gelechia senticetella* Staud., Petts Wood at m.v., now established in the area; *Monochroa niphognatha* Gozm., Stodmarsh, at m.v., 20.vi.1995; *M. elongella* Hein., Stodmarsh, at m.v., 20.vi.1995; *Coleophora currucipennella* Zell., usually a scarce species, but common at Ham Street, at m.v., 11.vii.1995; *Cosmopterix zieglerella* Hübn., from a new colony at Swanley 3.vii.1995; *Phalonidia curvistrigana* Staint., ex *Solidago*, Ham Street, vii.1994; *Eucosma aemulana* Schläg., ex *Solidago*, Ham Street and Thornden Wood, vii.1995; *Hellinsia (Leioptilus) chrysocomae* Rag., ex *Solidago*, Thornden Wood, vii.1995. From Scotland: *Aethes rutilana* Hübn., bred ex *Juniperus communis nana*, Beinn Eighe, Wester Ross, vi.1995; *Swammerdamia compunctella* H.-S., bred ex *Sorbus aucuparia*, Beinn Eighe, Wester Ross, vi.1995; *Archinemapogon yildizae* Koçak, bred ex *Piptoporus*, Forres Inshriac and Alvie, Inverness, 5.viii.1995. From Kent: *Caloptilia falconipennella* Hübn., typical form bred x.1993 and at m.v. iv.1995, with f. *oneratella* taken at m.v. vii/viii.1993-95, first records of the summer generation f. *oneratella* in Britain, all from Petts Wood. From Hampshire: *Psammotis pulveralis* Hübn., Matley Bog, female, taken by day 1995.

PARSONS, M. S.—A selection of species recorded in 1994-1995 including: *Margaritia sticticalis* L., Richmond Park, Surrey, 11.viii.1995; *Panneme inquilina* Fletch., Richmond Park, 17.iv-1.v.1995; *Tinea columbariella* Wocke, bred from larvae feeding on dead insects killed by an Insect-o-Cutor, Richmond Park, viii.1994, and Raynes Park, Surrey, 29.vii.1995; *Monopis fenestratella* Heyd., Richmond Park, 20.vi.1995 (Plate IV, Fig. 19); *Niditinea piercella* Benthinck, Richmond Park, 18.vi.1995; *Aroga velocella* Zeller, Richmond Park, 22.vii-26.viii.1995; *Apomyelois bistriatella neophanes* Durr., Raynes Park, 14.viii.1995; *Euzophera cinerosella* Zell., Raynes Park, 3.vii.1995; *Platyedra subcinerea* Haw., Richmond Park, 6.v.1995; *Gelechia senticetella* Staud., Raynes Park, 31.vii-16.viii.1995; *Caloptilia populetorum* Zell., Raynes Park, 20.vii.1995; *Ancylosis oblitella* Zell., Sandwich Bay, Kent, 12.viii.1995; *Scoparia ambigualis* Treits, dark almost unicolorous form, Malham Tarn, Yorks., 29.vi.1995; *Olethreutes palustrana* L. & Z., Malham Tarn, 29.vi.1995; *Sitochroa palealis* D. & S., Thorney Island, Sussex, larvae 11.ix.1994; *Scoparia pyraella* f. *alba* Tutt, Holywell, Sussex, 11.vi.1995; *Eudonia lineola* Curt., Cow Gap, Sussex, 26.vii.1995; *Acleris logiana* Clerck, Havant Thicket, Hants, 2.iv.1995; *Cydia succedana* f. *asseclana*, Glen More, Easternness, 26.vi.1995; *Eudarcia richardsoni* Wals., Church Ope Cove, Portland, Dorset, larvae 28.ii.1995; *Telephila schmidtiiellus* Heyd., Rodborough Common, W. Glos., larvae 20.v.1995 and Eastbourne, larva v.1995; *Elachista subocellea* Steph., Barnsley Warren, Glos., 20.v.1995 and Eastbourne, E. Sussex, 27.v.1995.

SIMS, I. *Eriocrania haworthi* Bradley, Medmenham, Marlow, Bucks., 7.iv.1995; *E. sangii* Wood, Bear Wood, Wokingham, Berks, 2.iv.1995; *E. semipurpurella* Steph., Bramshill Plantation, Bramshill, Hants, 14.iv.1995; *Ectoedemia argyropesa*

Zell., Hainault Forest, Chigwell Row, Essex, in aspen, 6.xi.1992, bred 4.v.1993; *E. atricollis* Staint., adults and cocoons in crab apple, Medmenham, Marlow, Bucks., 19.x.1994, bred 12.v.1995; *E. occultella* L., Burnham Beeches, adults and cocoons in birch, 31.x.1994, bred 5.v.1995; *E. subbimaculella* Haw., adults and cocoons in oak (*Quercus robur*), Medmenham, Marlow, Bucks., 31.x.1994, bred 21.iv.1995; *E. heringi* Toll, Lower Earley, Reading, Berks., 23.x.1994, bred 2.v.1995; *Stigmella floslactella* Haw., Medmenham, Marlow, Bucks., in hazel, 6.x.1994, bred 1.iv.1995; *S. basiguttella* Haw., Winnersh Triangle, Reading, Berks., 24.x.1994, adults and cocoons in oak, bred 22.iv.1995; *S. malella* Staint., Medmenham, Marlow, Bucks., in apple cultivar (*Malus* sp.), 26.x.1994, bred 27.iv.1995; *S. regiella* H.-S., Medmenham, Marlow, Bucks., adults and cocoons, 8.x.1994, bred 1.v.1995; *S. microtheriella* Staint., Pheasant Wood, Hambleden, Marlow, Bucks., mine in oak, 19.x.1994, bred 9.v.1995; *S. alnetella* Staint., Medmenham, Marlow, Bucks., adults and cocoons in alder (*Alnus glutinosa*), 10.x.1994, bred 19.v.1995; *Tischeria ekebladella* Bjerk., Medmenham, Marlow, Bucks., adults and mine with pupal exuvae, in oak 3.xi.1994, bred 28.iv.1995; *T. angusticolella* Dup., Hainault Forest, Chigwell Row, Essex, adults and mine with pupal exuvae, in dog-rose 6.xi.1992, bred 12.ii.1993; *Incurvaria pectinea* Haw., Bramshill Plantation, Bramshill, Hants., 14.iv.1995; *Nemophora metallica* Poda, Homefield Wood, Medmenham, Marlow, Bucks., 26.vii.1995; Warburg Wood, Bix, Oxon, 21.vii.1995 and Hambleden, Marlow, Bucks., 30.vii.1995, all netted at flowers of *Knautia arvensis*; *N. rufimitrella* Scop., Lower Earley, Reading, Berks., 20.v.1994; *Taleporia tubulosa* Retz., Bear Wood, Wokingham, Berks., 2.iv.1995, bred 27.iv.1995 and Winnersh Triangle, Reading, Berks., 5.v.1990, bred 19.v.1990; *Luffia lapidella* Goeze, male and female cases from its Cornish locality, already emerged 15.viii.1995; *Bacotia sepium* Spey., Bramshill, Plantation, Bramshill, Hants., 14.iv.1995, parasite and case, hatched 22.iv.1995, host larva alive when found; *Infurcitinea argentimaculella* Staint., Medmenham, Marlow, Bucks., old wall, adults and larval tube, 31.iii.1995, hatched 7.v.1995; *Nemapogon clematella* F., Medmenham, Marlow, Bucks., adults and larval working mine in the fungus *Diatrype disciformis* and dead hazel from old coppice, 2.v.1995, hatched 15.v., 22.v., 23.v. and 15.vii.1995; *Tinea semifulvella* Haw., Warburg Wood, Bix, Oxon, 21.vii.1995, in m.v. trap; *Leucoptera laburnella* Staint., Hambleden, Marlow, Bucks., on *Laburnum anagyroides*, 22.vi.1995, hatched 3.vii.1995; *L. spartifoliella* Hübn., Lower Earley, Berks., on *Sarothamnus scoparius*, cocoons, bred 28.v.1995; *Calybitis auroguttella* Steph., Lower Earley, Reading, larval folds and cocoons on *Hypericum perforatum*, 16.ix.1992, bred 1.xii.1992; *Phyllonorycter platani* Stmgr, South Kensington, London, adults and mine in plane (*Platanus acerifolia*), 22.x.1994, hatched 22.ii.1995; *P. lantanella* Schr., Homefield Wood, Medmenham, Marlow, Bucks., in *Viburnum lantana*, mines in stunted bushes, low down amongst grasses, 17.ix.1995, hatched 21.x.1995.

C. falconipennella Hübn., summer adults: alder, Medmenham, Marlow, Bucks., 21.vi.1995, hatched 10.vii.1995 and Lower Earley, Reading, Berks., 26.vi.1994, hatched 4.vii.1994. Folds and cocoon: Medmenham, Marlow, 21.vi.1995. Autumn adult: Medmenham, Marlow, 23.x.1995, hatched 25.x.1995, intermediate form between *oneratella* and typical autumn form. Field work and rearing experiments have shown this species has two generations in southern England, as is the situation in Europe. The summer generation is quite unlike the autumn generation (this is also true of the first generation in Europe) and is referable to *oneratella*. Denis O'Keeffe and David Agassiz have examined specimens of both generations microscopically and found no structural differences between them. The apparent sudden extension of this species' range in the UK (four new county records last year, VCs 12, 22, 23 and

24) and now this oddity make it worthy of further study. Perhaps this is more evidence of a warming of climate.

Argyresthia brockeella Hübn., Burnham Beeches, Slough, Bucks., larvae descending from birch 12.iii.1995, hatched 19.iv.1995.

SKINNER, B.—Malham Tarn, Yorks., *Scoparia ambigualis* Treits., 29.vi.1995, specimens of the dark form; *Dioryctria mutata* Fuchs, Windsor Forest, two melanic examples, 21.vii.1995; *Phlyctaenia stachydalis* Germ., bred specimens from larvae collected in Devon together with photographs of half grown and full grown larvae.

SMITH, E. G. AND M. R.—Some interesting Wiltshire Lepidoptera: *Telephila schmidtiiellus* Heyd., series bred from *Origanum vulgare*, collected, Ford (VC7), 8.vi.1995, moths emerged 7.vii.1995, new for Wilts.; *Coleophora onosmella* Brahm, series bred from cases collected *Echium vulgare*, Shrewton Folly (VC7), 5.v.1995, first time the cases have been found in Wilts.; *Monochroa hornigi* Staud., Savernake (VC7), one taken m.v., 29.vi.1994, gen. det., new for Wilts.; *Reuttia subocellea* Steph., Ford (VC7), larvae on *Origanum vulgare*, 31.x.1994, bred 17.vii.1995; *Coleophora virgaureae* Staint., Bentley Wood (VC8), cases on *Solidago virgaurea*, moths bred; *Depressaria chaerophylli* Zell., Ashton Common, series bred from *Chaerophyllum temulentum* collected 20.vi.1994, moths emerged 5.viii.1994, new for Wilts.; *Aplota palpella* Haw., Redlynch (VC8), at m.v., 16.vii.1994; *Coleophora therinella* Tengst., Savernake (VC7), one at m.v., 29.vi.1994, gen. det., new for Wilts.; *Hellinsia (Leioptilus) carphodactyla* Hübn., Ford (VC7), 21.vi.1994, new VC record; *Pterophorus baliodactylus* Zell., Ford (VC7), 17.vii.1994, new VC record; *Coleophora limosipennella* Dup., Ashton Common (VC8), moths emerged second half of June 1994; showing the early stages of larval case and example of final case, new for Wilts.

STERLING, P. H. AND M. J.—*Stigmella acetosae* Staint., Portland, bred from mines on *Rumex acetosa* collected 7.vi.1995 by MJS; *Lampronia fuscata* Tengst., Higher Hyde Nature Reserve, Dorset, at m.v., 15.vi.1995 by PHS; *Pachythelia villosella* Ochs., a male from one of many cases found in 1994 and 1995 at Haymoor Bottom, Poole, VC9, by PHS. In the past few years cases have been found on other VC9 heaths including Arne, Creech, Gore, Holt, Studland and Turners Puddle, as well as Merritown Heath and Town Common, both in VC11. The species continues to occur throughout the Dorset heaths, occasionally in local abundance. *Eudarcia richardsoni* Wals., Punfield Cove, Swanage, Dorset, VC9; one case of several found in ii.1995 by PHS, M. Parsons *et al.* It was last seen at this site in the 1890s; elsewhere it is only known from Portland (British endemic). *Nemapogon variatella* Clem., Stoke Common, Bucks., VC24, bred from *Piptoporus betulinus* collected in winter 1994 by MJS; *Epermenia insecurella* Staint., Portland, Dorset, VC9, bred from larvae on *Thesium humifusum*, collected 9.vi.1995 by MJS; *Biselachista sericornis* Staint., Studland National Reserve, Dorset, VC9, collected by day 24.v.1995 by PHS; *Monochroa suffusella* Doug., Studland National Nature Reserve, Dorset, VC9, by day on 24.v.1995 by PHS, new VC record; *Cosmopterix lienigiella* L. & Z., Holton Heath National Nature Reserve, Dorset, VC9, bred from mines on *Phragmites* collected 14.x.1994 by PHS; *Piercea luridana* Greg., Portland, bred from larva on *Bartsia odontites* collected 12.viii.1994 by PHS; *Cydia prunivorana* Rag., Weymouth, Dorset, VC9, at m.v., 10.vii.1995 by PHS, new VC record; *C. cosmophorana* Treits., Warmwell Heath, Dorset, by day on 30.v.1995 by PHS; *Homoeosoma nebulella* D. & S., Frome St Quintin, Dorset, at m.v. on 20.viii.1995 by PHS.

STERLING, P. AND DAVEY, P.—Potential Immigrant Lepidoptera to Dorset caught by Dorset Moth Project contributors during 1995: *Hellula undalis* F., Gaunts Common, 11.x.1995 (P. Davey); *Margaritia sticticalis* L., Gaunts Common,

5.viii.1995 (P. Davey); *Psammotis pulveralis* Hübn., Sixpenny Handley, 28.vii.1995 (P. Davey); *Antigastria catalaunalis* Dup., Gaunts Common, 11.x.1995 (P. Davey); *Hymenia recurvalis* F., Portland, 11.x.1995 (M. Cade); *Etiella zinckenella* (Sodoffsky), Christchurch, 11.viii.1995 (M. Jeffs); *Ancylosis oblitella* Zell., Hartland Moor, 6.viii.1995 (P. Davey).

WARNE, B. J.—*Sitochroa palealis* L., netted by day at Newtown rifle ranges, Isle of Wight, 20.vii.1995, nectaring on a saw-wort flower; *Ostrinia nubilalis* Hübn., Binstead, Ryde, Isle of Wight, at m.v., 23.viii.1995(2), 25.viii.1995(1); *Margaritia sticticalis* L., at m.v., Binstead, Ryde, Isle of Wight, 7.viii.1995, 21.viii.1995; *Ancylosis oblitella* Zell., Binstead, Ryde, Isle of Wight, at m.v., 15.viii.1995.

WEDD, D.—*Ancylosis oblitella* Zell., Henley-on-Thames, Oxon, 21.viii.1995; *Sclerocona acutellus* Evers., 20.vi.1995, Henley-on-Thames, Oxon.

WOOLDRIDGE, D. B. *Schoenobius gigantella* D. & S., The Causeway, Freshwater, Isle of Wight, 1.viii.1995.

FOREIGN LEPIDOPTERA

CORLEY, M. F. V.—(1) Pterophoridae from Portugal, 22 out of a total of 35 species recorded for Portugal: *Agdistis tamaricis* Zell., *A. satanas* Mill., *A. meridionalis* Zell., *A. frankeniae* Zell., *A. heydeni* Zell., *A. bifurcata* Agenjo, *Crombrugghia laeta* Zell., *C. distans* Zell., *Stangeia siceliota* Zell., *Marasmarcha lunaedactyla* Haw., *Amblyptilia punctidactyla* Haw., *Stenoptilodes taprobanes* Felder & Rogenhofer, *Stenoptilia zophodactyla* Dup., *Tabulaephorus punctinervis* Const., *Calyciphora adamas* Const., *Merrifieldia leucodactyla* Hübn., *M. malacodactyla* Zell., *Gypsochares baptodactylus* Zell., *Pterophorus obiactylus* Mill., *Emmeline monodactyla* Linn., *Hellinsia inulae* Zell. and *H. osteodactyla* Zell..

(2) Geometridae, Ennominae from Portugal, 45 out of the 111 species recorded in the country. These were all collected in the southern half of Portugal, mostly in the Algarve, but a few in Alentejo. The northern half of the country has a greater number of species in this subfamily, because the majority of them occur in woodland, particularly deciduous woodland. In the southern half of Portugal, nearly all the woodland is evergreen. Here, a number of species are associated with shrubs such as *Cistus*, *Erica* and *Juniperus*; others feed on lichens and a few on herbaceous plants. The species exhibited were *Stegania trimaculata* Vill. in two strikingly different forms, *Itame vincularia* Hübn., *Tephрина inconspicuaria* Hübn., *Enconista miniosaria* Dup., *Gnopharmia stevenaria* Boisd., *Rhoptria asperaria* Hübn., *Menophra abruptaria* Thunb., *M. japygiaria* Costa, a very variable species, *Afriberina terraria* Bang-Haas, *Calamodes occitanaria* Dup., *Peribatodes abstersaria* Boisd., *P. rhomboidaria* D. & S., *P. manuelaria* H.-S., another variable species, *Selidosemia brunnearia* subsp. *olivierata* Mab., possibly an endemic Portuguese subspecies, *S. taeniolaria* Hübn., *Ekboarmia atlanticaria* Stdgr, *Hypomecis punctinalis* Scop., *Adactylotis gesticularia* Hübn., *Tephronia cineraria* D. & S., *Lycia hirtaria* Cl., *Aleucis distinctata* H.-S., *Campaea honoraria* D. & S., *C. margaritaria* Linn., *Petrophora chlorosata* Scop., *P. narbonea* Linn., *P. convergata* Vill., *Pachycnemia hippocastanaria* Hübn., *Sthalia tibiaria* Ramb., *Opisthograptis luteolata* Linn., *Pseudopanthera macularia* Linn., *Toulgoetia cauteriata* Stdgr, *Selenia lumularia* Hübn., *Ennomos fuscantaria* Steph., *Crocallis elinguaris* Linn., *C. dardoinaria* Donzel, *Gnophos perspersatus* Treits., *G. mucidiarius* Hübn., *G. variegatus* Dup., *G. predotae* Schawerda, *G. obscuratus* D. & S., *Aspitates ochrearis* Rossi, *Iberafra penulataria* Hübn., *Dyscia distinctaria* Bang-Hass, *Onychora agaritharia* Dardoin and *Compsoptera opacaria* Hübn..

DOBSON, A. H.—(1) Rhopalocera from the coast of Corfu between Nissaki Beach Hotel and Agni, 16–22.ix.1995: *Gegenes punilio* Hoffmsg., *Muschampia proto* Ochs., *Gonepteryx cleopatra* L., *Artogeia krueperi* Stdgr., *Melitaea didyma* Esp., *Hipparchia aristaeus senthes* Fruh., and *H. syriaca* Stdgr., which was the commonest species in flight at the time, unusually late, probably because of inclement weather that had prevailed during August.

(2) Heterocera: a sample of species occurring at the Nissaki Beach Hotel lights during the same period, with indication of their relative frequency. Pyralidae: *Duponchelia fovealis* Zell. (c.), *Hydriris ornatalis* Dup. (f.c.), *Antigastra catalaunalis* Dup. (sc.), *Endotricha flammealis* D. & S. (f.c.), *Herculia incarnatalis* Zell. (sc.), *Lamoria anella* D. & S. (c). Geometridae: *Xenochlorodes beryllaria* Warr. (sc.), *Idaea flicata* Hübn. (f.c.), *Scopula minorata ochroleucaria* H.-S. (c.), *Menophra japygiaria* Costa (sc.), *Nychiodes dalmatina* Wagner (sc.), *Gnophos sartatus* Treits. (c.), *Aspitates ochrearia* Rossi (sc). Thaumetopoeidae: *Thaumetopoea solitaria* Freyer (f.c.). Ctenuchidae: *Dysauxes famula* Frey. (v.c.). Arctiidae: *Cymbalophora pudica* Esp. (sc.), *Eilema caniola* Hübn. (v.c.). Noctuidae: *Agrotis crassa* Hübn. (sc.), *Mythimna prominens* Walk. (sc.), *M. putrescens* Hübn. (sc.), *M. loreyi* Dup. (sc.), *Mniotype solieri* Boisd. (sc.), *Dysgonia algira* L. (sc.), *Orectis proboscidata* H.-S. (sc.), *Pechipogo plumigeralis* Hübn. (sc.).

(3) Heterocera from Cyprus, 8–14.xii.1994. A sample from Paphos streetlights. Pyralidae: *Evergestis isatidalis* Dup. (f.c.). Geometridae: *Larentia clavaria* Haw. (c.), *Dasycephala modesta* Stdgr. (sc.). Arctiidae: *Ocnogyna loewii* Zell. (c.). Noctuidae: *Cucullia chamomillae* D. & S., genit. det. (c.), *Mniotype leuconota* H.-S. (f.c.), *Aporophyla australis ingenua* Freyer (sc.), *A. canescens* Dup. (f.c.), *A. nigra* Haw. (v.c.), *Xylena exsoleta* L. (sc.), *Platysenta viscosa* Freyer, (sc.). From Agios Neophytes Monastery. Pyralidae: *Hellula undalis* F., *Antigastra catalaunalis* Dup. Noctuidae: *Spodoptera cilium* Guen. From Kykkou Monastery. Noctuidae: *Polymixis flavicincta* D. & S. From Polis. Pyralidae: *Duponchelia fovealis* Zell.

EDWARDS, DR. P. J.—A collection of moths, and one butterfly, from Prov. Gerona, Spain, caught 11–23.ix.1995. The butterfly was an extreme aberration of *Syntarucus pirithous* L., plain buff-brown without any markings; a typical male was shown for comparison. All the moths were taken in an m.v. trap; they included *Cucullia argentea* Hufn., two of which had been caught in the same area in September 1986, and which has been shown only recently to be very local in this restricted part of Spain; *Parascotia nissenii* Turati, a rare south-European species which resembles a small *P. fuliginaria* L.; *Hydraecia osseola hucherardi* Mab., very local in S. W. Europe, its distribution being dependent, as in Britain, on the presence of the food plant, marsh mallow (*Althaea*); *Ochroleuca leucogaster* Freyer, a very rare immigrant to Britain which bears a strong resemblance to the common *O. plecta* L., and others such as *Eublemma ostrina* Hübn. and *Protoschintia scutosa* D. & S.

GOATER, B.—A selection of Heterocera taken in Bulgaria 12–26.ix.1995. (1) Melnik, S. W. Bulgaria. Noctuidae: *Eugnorisma pontica* Stdgr. common at sugar and light; *Xestia cohaesa* H.-S., also seen commonly in the East Rhodopi mountains; *Autophila ligaminosa* Evers., three specimens found in a cave. (2) Kresna Gorge, S. W. Bulgaria. This famous locality produced a wealth of species unknown in western Europe. Geometridae: *Nychiodes dalmatina* Wagner. Arctiidae *Eilema morosina*, H.-S. Noctuidae: *Divaena haywardi* Tams, *Polyphaenis subsericata* H.-S. and *Praestilbia armeniaca* Stdgr., as well as the more widespread *Atethmia ambusta* D. & S., *Cryphaea ochsi* Boursin, *C. rectilinea* Warren and *Abrostola agnorista* Dufay. (3) East Rhodopi Mountains, S.E. Bulgaria. Pyralidae: *Agriphila dalmatinella* Hamps., *Pediasia matricella* Treits., *Evergestis serratalis* Stdgr., all common.

Lemoniidae: *Lemonia balcanica* H.-S., males only, at light. Thaumetopoeidae: *Thaumetopoea solitaria* Freyer, males common at light. Geometridae: *Scopula ochraceata* Stdgr, *Eupithecia ericeata* Rambur, the beautiful south-east European "thorn" *Eumera regina* Stdgr, *Nychiodes waltheri* Wagner, *Peribatodes correptaria* Zell., *Gnophos sartatus* Treits. Noctuidae: two specimens of the rare *Leucania herrichi* H.-S., *Episema tersa* D. & S., *E. lederi* Christ., *E. korsakovi* Christ., *Aporophyla canescens* Dup., *Polymixis serpentina* Treits., *Agrochola osthelderi* Boursin, *Cryphaea seladona* Christ. subsp. *burgeffi* Draudt, *C. amasina* Draudt, strongly-marked *Luperina dumerilii* Dup., *Acontia urania* Friv., *Euchalcia consona* F. and *Orectis proboscidata* H.-S. (4) Black Sea coast, including the famous "Silberküste" near Balchik. Pyralidae: *Euchromius ocella* Haw., *Spermatophthora hornigi* Led. Geometridae: *Eupithecia variostrigata* Alph., *Dyscia sicaniaria* Zell. Noctuidae: *Mycterophus puniceago* Bois., found rather commonly inside a hotel and a supermarket, whence specimens had been attracted to light, and dark specimens of *Luperina rubella* Dup.

HALL, N.—(1) *Cucullia reisseri* Boursin, *C. verbasci* L. and *C. lychmitis* Ramb., bred from larvae found feeding together on hoary mullein (*Verbascum pulverulentum*), Arlanzón, Prov. Burgos, Spain. The species could be separated easily as larvae, though two of the *C. reisseri* were very different from the others, and it was hoped that they would produce a fourth species, *C. thapsiphaga* Treits. Each species was displayed in two columns separated on the basis of hindwing colour, females having darker hindwings than males. One underside of each species was also shown. The cocoons were overwintered outdoors in a meat safe (never getting wet). When brought indoors in May, all the pupae were cut out of their cocoons, even though this is considered inadvisable, not least because *Cucullia* pupae often lie over for two or more winters. However, 30 out of 32 emerged, none of the adults was deformed and no parasites were obtained. The two remaining pupae had died.

(2) Bred *Macrothylacia digramma* Meade-Waldo, from eggs obtained in Portugal by a friend. Gomez Bustillo & Fernandez-Rubio, *Mariposas de la Peninsula Iberica*, treat *M. digramma* as a subspecies of *M. rubi* L., and state that the larva feeds again in March and April, after hibernation. De Freina & Witt, *Bombyces und Sphingides der Westpalaearktis*, give *M. digramma* as a separate species, with subspecies *alfacaria* Ribbe occurring in Portugal, but give no information at all about the larvae. The exhibitor was therefore uncertain how the larvae would behave when they approached full growth. Three larvae were put into separate boxes in the refrigerator after they had finished feeding in the autumn. In January they were removed and offered evergreen oak (*Quercus ilex*) and subjected to an 18-hour per day light cycle. After a week they had not eaten anything or pupated, so they were returned to the refrigerator for a further two weeks. On removal, they spun up immediately without feeding, producing the three moths displayed. An attempt was made to overwinter the rest of the larvae in a large tray of peat with evergreen oak, replaced regularly, laid on top. Half the tray was exposed to the weather. Larvae were observed wandering about a month or two, but more and more mouldy larvae were found until it was supposed that all had died. However, further investigation revealed that eight larvae had buried themselves in the peat and that six of them had not yet turned mouldy. Eventually, three survived the winter buried in the peat. Of these, one spun up and died as a pupa, one pupated without spinning up and then died, and one emerged properly.

(3) Bred *Clostera anastomosis* L. A female of this species was caught at light in the Marais de Chautagne, Savoie, Central France, on 20.vi.1995, and obliged with eggs. The larvae fed communally on poplar, with a near 100% survival rate, spun up in the

poplar leaves, and produced a second generation of moths in late July and August. Specimens of the other three European *Clostera* species, *C. curtula* L., *C. amachoreta* D. & S. and *C. pigra* Hufn. were shown for comparison.

(4) An unidentified hadenid aberration from Ile d'Olonne, Vendée, France.

(5) *Idaea saleri* Dominguez & Baixeras compared with *I. carvalhoi* Herbulot. Specimens of the recently described *I. saleri* (1992, *Nota Lepid.* **15** (2): 102–105) were exhibited from Cullera, Prov. Valencia, Spain, June and August 1994 and El Fangar, Ebro Delta, Prov. Tarragona, Spain, 7.ix.1995, and of *I. carvalhoi* from Caniles, Prov. Granada, Spain, June 1994. Both species are very dark, blackish, in colour, with unusually elongated wings, but those of *I. carvalhoi* are distinctly longer and the bases of the antennae and frons are shining white, whereas in *I. saleri* these parts are concolorous with the rest of the insect. Dominguez & Baixeras state that *I. saleri* is known from a single locality, El Saler, south of Valencia. The Cullera locality is only about 15 km south of El Saler, but the Ebro Delta is some 200 km further north.

(6) Moths from Fuerteventura, Canary Islands, December 1944. All were collected from lights around the hotel in Jandia 17–31.xii.1994. The lights were all fitted with "low energy" bulbs which seem quite attractive to moths. The following were exhibited. Pyralidae: *Ancylosis convexella* Led., *Cornifrons ulceratalis* Led., *Pseudarenipises insularum* Speidel & Schmitz. Noctuidae: *Tathorhynchus exsiccata* Led., *Earias insulana* Boisid., *Agrotis herzogii* Rebel.

(7) Moths from France and Switzerland incorporated into exhibits of species which may be of interest to British collectors, as follows. France, June 1995: (i) Bois de Merles, Meuse, 15–16.vi: *Herminia tarsipennalis* Treits., *Pechipogo strigilata* L., *Photodes extrema* Hübn., *Leucodonta bicoloria* D. & S., *Salebriopsis albicilla* H.-S., *Sciota hostilis* Steph. (ii) Marais de Cormoranche, Ain, 17, 18 and 21.vi: *Siona lineata* Scop., *Pechipogo strigilata* L., *Hypena rostralis* L., *Lygephila viciae* Hübn., *Lithacodia deceptoria* Scop., *Paradiarista punicea* Hübn. (iii) Marais de Chautagne, Savoie, 19 and 22.vi: *Trisateles emortualis* D. & S., *Paracolax tristalis* F., *Macrochilo cribrumalis* Hübn., *Eucarta amethystina* Hübn. (iv) Chapelle des Bois, Doubs, 25.vi: *Plagodis pulveraria* Linn., *Fagivorina arenaria* Hufn., *Hyppa rectilinea* Esp. (v) Boujailles, Doubs, 26 and 27.vi: *Thera stragulata* Hübn., *Ecliptopera capitata* H.-S., *Hypena crassalis* F., *Catephia alchymista* D. & S., *Acrionicta strigosa* D. & S., *Cucullia lactucae* D. & S., *Xestia collina* Boisid.

France, July/August 1995: (i) Col de la Lèbe, Ain, 27.vii: *Peribatodes secundaria* Esp., *Phlogophora scita* Hübn. (ii) Marais de Chautagne, 29 and 31.vii: *Drepana curvatula* Borkh., *Polypogon gryphalis* H.-S., *Herminia tarsicrinalis* Knoch, *H. tenuialis* Rebel, *Deltotes candidula* D. & S. (iii) Montclergeon, Haute-Savoie, 30.vii: *Schranksia taenialis* Hübn., *Amphipyra perflua* F. (iv) Forêt de Tavel, Gard, 2 and 4.viii: *Dysauxes famula* Freyer, *Eublemma suava* Hübn. (v) Boujailles, 13.viii: *Ephesia fulminea* Scop.

Switzerland, August 1995: (i) Pfywald, Valais, 7 and 9.viii: *Dysauxes ancilla* L., *Pelosia muscerda* Hufn., f. *umbrata* Urbahn, *Herminia lunalis* Scop., *H. tarsipennalis* Treits., *Athetis gluteosa* Treits., *Hypena rostralis* L., *Calamia tridens* Hufn. (ii) Zenegen, Valais, 8.viii: *Lymantria monacha* L., *Hypena obesalis* Treits., *Xestia speciosa* Hübn.

Mr Hall also presented an annotated display illustrating problems of identification of European *Eilema* species and of Cyclophorinae, and in differentiating *Semiothisa notata* L. from *S. alternaria* Hübn.

KENDRICK, R. C.—A presentation of Lepidoptera collected in Hong Kong between 22.vii and 6.ix.1994, being part of an undergraduate project on habitat preference of moth species. About 150 species were shown, including about 21 which

were thought to be undescribed and a number new to Hong Kong. Most collecting was done at night, but during the daytime, many photographs were taken of habitats, butterflies and of moth species being encountered at night. The folder containing the report was placed nearby, and visitors to the Exhibition were invited to peruse it. A graceful acknowledgement to those who had helped him was included.

PARKER, R.—An exhibit of butterflies (Rhopalocera) encountered during a single weekend in Serbia, from the ancient relict area of Topli Do, a warm valley, and the Stara Planina massif on the border between Serbia and Bulgaria, altitude between 750 and 1000 m. Seventy species were seen; a voucher specimen of every species encountered was retained, and the exhibit comprised 47 of these. Some of the others were on loan, others had been retained by a colleague, Pedrag Jaksic, who had conducted the exhibitor to the localities, and a few common species were not shown. A joint paper covering a wider range of localities in the same area is planned for the near future.

WAITE, P.—An extreme and beautiful male underside aberration of *Plebicula dorylas* Higgins taken on 6.vii.1986 on Mont Sirac, Valgaudemar, Hautes Alpes, France, compared with a normal underside, 19.vii.1987, from Biescas, Prov. Huesca, Spain.

WARING, P.—Some photographs of moths seen on a recording expedition to Poland, including a larva of *Hadena irregularis* Hufn. on *Silene otites* from sandy fringes of the Biebrza Marshes, and a specimen of *Catocala pacta* Linn. feeding at a wine rope set out in the Marshes. Photographs of the habitat were also shown.

WINTER, P. Q.—A selection of macrolepidoptera taken 13–19.v.1995 in a locality near Nevers, France, including second generation specimens of *Melitaea cinxia* L., bred from ova laid in Yorkshire, which had emerged in late August. Also *Erynnis tages* L., *Quercusia quercus* L. bred from a larva beaten from oak, *Scopula floslactata* Haw., *Paradarisa similaria* Hufn. (= *extersaria* Hübn.), a large form of *Ematurga atomaria* Hübn., *Hemaris fuciformis* L., *Peridea anceps* Goetze and *Craniophora ligustri* D. & S., all of which are widespread in Britain. The hawkmoth, *Proserpinus proserpina* Pall., of which there is a single British record. Several species which are local, rare migrants, or extinct in Britain: *Drepana curvatula* Borkh., *Sabra harpagula* Esp., *Lithosia quadra* L. from a larva beaten from oak, *Actinotia polyodon* Cl., *Egira conspicularis* L., *Moma alplium* Osbeck, *Acrionicta auricoma* D. & S. and *Trachea atriplicis* L. Species hitherto unrecorded from Britain were *Boloria dia* L., *Cerura erminea* Esp. and *Ochrostigma melagona* Borkh.

DIPTERA

This year *Myopites inulaedyssentericae* Blot took over as the most frequently exhibited tephritid. As usual a good range of Syrphidae and "larger Brachycera" were exhibited and Conopidae appear to have had a good year (13 species by 5 exhibitors). While some sun-loving species had evidently benefited from the weather conditions in 1995 it was a rather poor year for the more moisture-oriented groups of flies. Four species new to the British list were exhibited, three of them by Peter Hodge; all had been found in earlier years but only recently identified.

ALEXANDER, K. N. A. AND FOSTER, A. P.—Flies found in 1995 by the National Trust's Biological Survey: *Dictenidia bimaculata* (L.) (Tipulidae), Fallowlees Burn, Northumberland, 20.vii; *Oxycera dives* Loew (Stratiomyidae), same site, 21.vii; *O. morrisii* Curt., Thoragill Beck, Yorkshire Dales, 13.vii; *O. pardalina* (Meig.), Pipers Grove, Glos., 29.vi; *Stratiomys potamida* (Meig.) (Stratiomyidae), Cambo Quarry, Northumberland, 19.vii; *Symphoromyia crassicornis* (Panz.) (Rhagionidae), Cowside

Beck, Yorkshire Dales, 13.vii; *Acrocera orbicula* (F.) (Acroceridae), Fallowlees Burn, Northumberland, 21.vii; *Brachyopa scutellaris* R.-D. (Syrphidae), Alder Bed, Golden Cap, Dorset, 18.v.

CHANDLER, P. J. — (1) *Chrysopilus erythrophthalmus* Loew (Rhagionidae) (Plate III, Fig. 10), second Scottish and fifth British record: cattle-grazed field by River Mouse Water near Lanark, 15.vii.1995, a female like all other British records; a female of the common species *C. cristatus* (F.) was also exhibited for comparison.

(2) *Nanna multisetosa* Hackman (Scathophagidae), male from Woodwalton Fen, Cambs., 24.v.1980. New to Britain; recently recorded from Ireland (Speight, M. C. D., 1995, *Ir. Nat's J.*, 25: 113–115). This has been confused with *N. flavipes* (Fall.), exhibited for comparison, which is frequent in the south of England, but all Irish records have proved to be *N. multisetosa*, which may have a more northerly distribution in Britain.

(3) A selection of flies collected in North America in 1994: the three eastern Nearctic species of *Keroplatus* (Keroplattidae) — *K. carbonarius* Bosc. Coote's Paradise, Ontario, 20.viii (collected by A. E. Stubbs); *K. militaris* Joh., Hunter's Point, Michigan, 2.ix; *K. clausus* Coq., Catfish Creek, Ontario, 10.ix and Coote's Paradise, Ontario, 20.viii; *Palloptera superba* (Loew) (Pallopteridae), Elora Gorge, Ontario, 22.viii; *Chymomyza amoena* (Loew) (Drosophilidae), Spencer's Gorge, Ontario, 20.viii, on rotten apples (this species has been introduced into central Europe, where it develops in chestnuts as well as apples); *Sphyracephala brevicornis* (Say) (Diopsidae), Coote's Paradise, Ontario, 20.vii and near Arkell, Ontario, 23.viii (the only North American stalk-eyed fly, which has rather short broad stalks); *Lepidophora* species (Bombyliidae), Algonquin Park, Ontario, 29.viii; *Bombyliopsis* (= *Hystricia*) *abrupta* (Wied.) (Tachinidae), Stonington, Michigan, 2.viii and Catfish Creek, Ontario, 10.ix; *Spilomyia* species (Syrphidae), showing mimicry of a *Dolichovespula* species (Vespidae), also exhibited, both at *Solidago* flowers, Algonquin Park, Ontario, 29.viii (both have the abdomen black on more than the basal half with narrow yellow markings on the remainder).

(4) *Calotarsa pallipes* (Loew) (Platypozidae), male from Old Nairn road, Ontario, 31.viii and females from Algonquin Park, Ontario, 28.viii on the honey fungus *Armillaria mellea*, the food plant; with drawings of the male hind-tarsal structure of this and the other four species of the genus (all North American); the male of each species has specific silver and black flag-like structures on the hind tarsi, which are used in aerial courtship displays.

HACKETT, D. Syrphidae collected in 1995: *Xanthogramma citrofasciatum* (De Geer) at anthill, Tottenham Triangle railway land, London, 22.v; *Sphaerophoria rueppellii* (Wied.), Alexandra Park, Haringey, London, 13.vi; *Parhelophilus versicolor* (F.) on *Typha* at Gunnersbury Triangle, N.R., Middx.; *Mallota cimbiciformis* (Fall.) at *Fiburnum* flowers, same site, 21.vi; *Criorhina floccosa* (Meig.) at sap run on *Fagus*, Sandy Heath, Hampstead, Middx.; *Sericomyia silentis* (Harris) at *Hedera* flowers, Grafham, West Sussex, 3.ix.

HALSTEAD, A. H. — Some local flies collected in 1995: *Linnophila pulchella* (Meig.) (Limoniidae), north end of Mortimer's Meadows, Dinton Pastures, Berks., 8.iv; *Eutolmus rufibarbis* (Meig.) (Asilidae), reared from larva in soil, Brookwood, Surrey, emerged 7.vi; *Nephrocerus flavicornis* Zett. (Pipunculidae), near River Loddon, Dinton Pastures, Berks.; *Microdon analis* Macq. (= *eggeri* Mik) (Syrphidae), swept from heather, Whitmoor Common, Surrey, 11.vi; *Xylota tarda* (Meig.) (Syrphidae), Loch Libo, Renfrewshire, 8.vii; *Myopa fasciata* (Meig.) (Conopidae), wet grassland at Worts Gutter, New Forest, Hants, 12.viii; *M. tessellatipennis* Mots. (Conopidae), north end of Mortimer's Meadows, Dinton Pastures, Berks., 8.iv; *Euphranta*

toxoneura (Loew) (Tephritidae), on *Salix* near Baders Way, Dinton Pastures, 20.v; *Myopites inulaedysentericae* Blot (Tephritidae), on *Pulicaria dysenterica*, Chobham Common, Surrey, 22.viii; *Micropeza lateralis* (Meig.) (Micropezidae), Silchester Common, Hants, 19.viii; *Braula coeca* Nitzsch (Braulidae), on queen honeybee *Apis mellifera* L., RHS Garden, Wisley, Surrey, 15.ix.

HAWKINS, R. D.—A selection of the Syrphidae and all species of Conopidae found in 1995 on W. Kent (Spring Park and West Wickham) and Surrey (other 4 sites) commons owned and managed by the Corporation of London: *Rhingia rostrata* (L.), West Wickham Common, 2.viii; *Pipiza austriaca* (Meig.), Spring Park, 6.vi; *Helophilus trivittatus* (F.), Farthing Downs, 8 and 10.viii; *Volucella inanis* (L.), Riddlesdown, 17.vii; *Epistrophe diaphana* (Zett.), Riddlesdown, 9.viii; *Thecophora atra* (F.), Riddlesdown, 16.vi and West Wickham Common, 5.ix; *Physocephala rufipes* (F.), Farthing Downs, 31.vii and Kenley Common, 3.viii; *Sicus ferrugineus* (L.), Spring Park, 28.vi and Kenley Common, 3.viii; *Conops ceriaeformis* (Meig.), West Wickham Common, 2.viii and Spring Park, 18.viii; *C. quadrifasciatus* De Geer, West Wickham Common, 2.viii, Spring Park, 18.viii, Kenley Common, 25.vii and Coulsdon Common, 21.viii; *Conops flavipes* L., Spring Park, 1.viii.

HODGE, P. J.—Eight species of Diptera including three representing the first British records: *Stratiomys longicornis* (Scop.) (Stratiomyidae), Oxy Marsh, Lymington, Hants, 29.vi.1995 and Cooling Marsh, Kent, 16.vii.1995; *Haematopota subcylindrica* Pand. (Tabanidae), new to Britain, one female swept from dyke near Camber Castle, Rye, E. Sussex, 28.vi.1995 (another female had been swept from lake margin on Pett Level, E. Sussex, 6.vii.1987); *Hercostomus verbekei* Pollet (Dolichopodidae), sandy shore on bank of River Lark, Barton Mills, W. Suffolk, 17.vii.1987 (this species was first recognized by Marc Pollet, 1993, *Zoologica Scripta* 22: 101–109 and closely resembles *H. plagiatus* (Loew), with which it may previously have been confused); *Syntormon silvianus* Parvu (Dolichopodidae), new to Britain from Petworth Park, W. Sussex, 8.vi.1988 and Martins Wood, Ightham Mote, W. Kent, 13.vi.1990 (this resembles *S. monilis* (Hal.) and is mixed with it in British collections); *Myolepta luteola* (Gmelin) (Syrphidae), Hythe End, Bucks., 29.vii.1995; *Brachypalpus laphriformis* (Fall.) (Syrphidae), on old oak stump, Buxted Park, E. Sussex, 20.vi.1995; *Conops vesicularis* L. (Conopidae), on disused railway embankment at Lewes, E. Sussex, 10.v.1995; *Myopites inulaedysentericae* Blot (Tephritidae), Hythe End, Bucks., 28.vii.1995.

MCLEAN, I. F. G.—Flies from Cromer Cliffs, Norfolk in August 1995 (the cliffs are characterized by seepages and active erosion, and include both herb-rich grassland and dense scrub, surrounding wet glades dominated by horsetails): *Oxycera morrisii* Curt. (Stratiomyidae) on seepages; *Chrysotus suavis* (Loew) (Dolichopodidae); *Trichopsomyia flavitarsis* (Meig.) (Syrphidae); *Myopites inulaedysentericae* Blot (Tephritidae); *Helicophagella melanura* (Meig.) (Sarcophagidae).

PARKER, M.—A selection of flies collected in recent years, including the following: *Phthiria pulicaria* (Mikan) (Bombyliidae), swept from fixed sand at Stokeford Heath, Dorset, 25.vi.1995; *Thereva valida* (Loew) (Therevidae), Speybridge, Morayshire, 3.vii; *T. inornata* Verrall (Therevidae), Culbin Forest, Nairns, 4.vii.1994; *Asilus crabroniformis* L. (Asilidae), female caught in flight at Keysworth Farm, Wareham, Dorset, 6.viii.1994; *Pamponerus germanicus* (L.) (Asilidae), at umbels, Shewalton sands, Irvine, Ayrshire, 7.vii.1995; *Cheilosia* species B of Stubbs & Falk (Syrphidae), second British record from Dollarbeg, Clackmannan, 14.vi.1992; *C. uviformis* (Becker), first Scottish record from Dundonnell, Wester Ross, 18.vii.1991; *C. mutabilis* (Fall.), Culbin Forest, Nairns, on *Conopodium majus* flower, 26.vii.1995; *Eristalis cryptarum* (F.) (Syrphidae), male (Plate III, Fig. 11) hovering above

Sphagnum moss, Pizwell Farm, Dartmoor, Devon, 13.viii.1995 and female (Plate III, Fig. 12) flying over riverside vegetation, Pudsham Down, Dartmoor, Devon, 20.viii.1995; *Didea erratica* (L.) (Syrphidae), male on low-growing composites at Rothiemurchus Forest, Easter Ness, 25.vii.1995; *Eupeodes nitens* (Zett.) (Syrphidae), male at *Allium ursinum* flowers, Delcombe Wood, Dorset, 2.v.1995 and female at *Euphorbia amygdaloides* flowers, Cranbourne Chase, Dorset, 1.v.1995; *Xylota tarda* (Meig.) (Syrphidae) on bracken at Speybridge, Morayshire, 6.vii.1994; *Anasimyia humulata* (Meig.) (Syrphidae), Pizwell Farm, Devon, 13.viii.1995; *Microdon mutabilis* (L.) (Syrphidae), Oakers Wood, Dorset, 17.vi.1995 (new to Oakers Wood, syrphid list now at 115 species); *Myopa extricata* Collin (Conopidae), male at *Allium ursinum*, Powerstock village, Dorset, 11.iv.1995; *Physocephala nigra* (De Geer) (Conopidae), male hovering close to thistle at Stinchar Bridge, Carrick Forest, Ayrshire, 8.vii.1995; *Ictericia westermanni* (Meig.) (Tephritidae), on *Senecio jacobaea* on coastal wetland at Hythe, Hants, 22.vii.1995; *Psacadina vittigera* (Schiner) (Sciomyzidae), same site at Hythe, Hants, 30.vii.1995.

PERRY, I.—A selection of uncommon flies found in 1995: *Tabanus glaucopsis* (Meig.) (Tabanidae), Farley Mount Country Park, Hants, 19.vii (several females attracted to the collector in a short spell of hot sultry weather); *Dioctria cothurnata* (Meig.) (Asilidae), Mark Ash, New Forest, 18.vii, a female resting on *Juncus* in a woodland bog; *Ogcodes pallipes* Latreille (Acroceridae), Martin Down, Hants, swept from an isolated birch tree along with several *Acrocer orbicula* F.; *Platypalpus leucothrix* (Strobl) (Hybotidae), in chalk grassland at Farley Mount Country Park, 19.vii; *Rhamphomyia physoprocta* Frey (Empididae), Foulden Common, Norfolk, 4.vii and Holmsley Bog, New Forest, Hants, 15.vii; *Dolichopus agilis* (Meig.) (Dolichopodidae), in chalk grassland beneath pines at The Devil's Ditch, Cambs., 2.viii; *D. plumitarsis* Fall., Pashford Fen, Suffolk, 4.vii; *Hercostomus fulvicaudis* (Hal.) (Dolichopodidae), same site, 29.vii; *Callicera aurata* (Rossi) (Syrphidae), Farley Mount Country Park, Hants, 19.vii, several females on *Rubus* flowers; *Acrometopia wahlbergi* (Zett.) (Chamaemyiidae), Holmsley Bog, New Forest, 15.vii; *Gasterophilus nasalis* (L.) (Gasterophilidae), same site and date, two males flying back and forth about a metre from ground; *Phasia hemiptera* (F.) (Tachinidae), Wandlebury, Cambs., 14.ix, male at *Hedera* flowers, unusually late record and probably first for the county.

PLANT, A.—*Meligramma triangulifera* (Zett.) (Syrphidae), third Dorset record from a Malaise trap, Arne RSPB Reserve, 9–24.v.1995.

SIMMONS, M. J.—A collection of hoverflies (Syrphidae) from Crowborough, East Sussex, including examples of more than 90 species (not fully determined) found either in the exhibitor's garden or in an area of mixed woodland and grassland directly opposite his house; the latter area (of which photographs were shown) has been scheduled for housing development after an unsuccessful campaign to save it lasting seven years; the species shown were mostly common but included *Didea fasciata* Macq., *Brachypalpoidea lentus* (Meig.) and *Chalcosyrphus nemorum* (F.). It was stated that about 50 species of sawfly and 22 species of butterfly had been recorded, while 420 species of macromoth had been recorded in the garden.

WASS, S.—*Odontomyia angulata* (Pz.) (Stratiomyidae), pingos at Upton Fen, Norfolk, 5.vii.1993; *Atylotus latistriatus* Brauer (Tabanidae), Titchwell, Marsh, Norfolk, 7.vii.1993; *Bombylius minor* L. (Bombyliidae), hovering above heather, Stokeford Heath, Dorset, 19.vii.1995; *Meligramma guttata* (Fall.) (Syrphidae), at umbels, Shewalton sandpits, Irvine, Ayrshire, 7.vii.1995; *Pelecocera tricincta* (Meig.) (Syrphidae), Stokeford Heath, Dorset, 15.vii.1995; *Eumerus sabulorum* Fall. (Syrphidae), flying low over fixed sand, Shewalton sandpits, 3.vii.1995; *Myolepta*

luteola (Gmelin) (Syrphidae), third Dorset record, on umbels, Langton Matravers, 12.vi.1993; *Zodion notatum* (Meig.) (Conopidae), swept from *Senecio jacobaea*, Tadnoll Heath, Dorset, 30.vii.1995; *Leopoldius brevisrostris* (Germ.) (Conopidae), West Bexington, Dorset, 19.vii.1993, new county record.

COLEOPTERA

ALEXANDER, K. N. A. AND FOSTER, A. P. A selection of noteworthy species found during the National Trust's Biological Survey in 1995: *Agonum ericeti* (Panz.) (Carabidae), Greenleighton bog, Wallington, Northumberland, pitfall trap, 18–20.vii.1995; *Harpalus ardosiacus* Luts. (Carabidae), near West Bexington, Dorset, (not NT property), m.v. light, 18.viii.1995; *Harpalus dimidiatus* (Rossi) (Carabidae), Spyway Farm, Dorset, 16.v.1995; *Harpalus azureus* (F.) (Carabidae), Spyway Farm, Dorset, 16.v.1995; *Tachys bistriatus* (Duft.) (Carabidae), Cogden, Dorset, 23.v.1995; *Stictotarsus multilineatus* Falkenström (= *Potamonectes griseostriatus* (Deg.)) (Dytiscidae), Fountains Fell Tarn, 13.vii.1995; *Onthophagus vacca* (L.) (Scarabaeidae), Spyway Farm, Dorset, 16.v.1995; *Agrilus sinuatus* (Ol.) (Buprestidae), Coleshill Estate, Oxon, 8.viii.1995; *Selatosomus bipustulatus* (L.) (Elateridae), Cloutsham Ball, Somerset, 6.vi.1995; *Globicornis nigriceps* (F.) (Dermestidae), Worcs., 12.vi.1995; *Thymalus limbatus* (F.) (Peltidae), Stourhead Park, Wilts, 4.vii.1995; *Tillus elongatus* (L.) (Cleridae), Pipers Grove, Glos, 29.vi.1995; *Pseudocistela ceramboides* (L.) (Tenebrionidae), Pipers Grove, Glos, 29.vi.1995; *Abdera flexuosa* (Payk.) (Melandryidae), Newlands Batch, Dorset, 25.v.1995; *Anisoxya fuscula* (Ill.) (Melandryidae), Buscot and Coleshill Estate, Oxon, 8.viii.1995; *Conopalpus testaceus* (Ol.) (Melandryidae), Stourhead Park, Wilts, 4.vii.1995 and Rainbow Wood Farm, Somerset, 3.vii.1995; *Mordellistena variegata* (F.) (Mordellidae), Buscot and Coleshill Estate, Oxon, viii.1995 and Rainbow Wood Farm, Somerset, 3.vii.1995; *Calomicrus circumfusus* (Marsh.) (Chrysomelidae), Crook Peak, Somerset, 7.vi.1995; *Batophila rubi* (Payk.) (Chrysomelidae), Wavering Down, Somerset, 9.vi.1995; *Mantura matthewsi* (Curt.) (Chrysomelidae), Wavering Down, Somerset, 9.vi.1995; *Rhynchaenus testaceus* (Müller, O. F.) (Curculionidae), Ruan Laniorne, Cornwall, 12.viii.1978, off alder, (not NT property).

HACKETT, D.—*Laemostenus terricola* (Herbst) (Carabidae), Hampstead Heath, Middx, 1.vi.1994, under log; *Platyderus ruficollis* (Marsh.) (Carabidae), milk depot, Parkland Walk, Haringey, Middx, TQ 293878, 14.iii.1994, Highgate Wood, Middx, 28.iv.1995, Hanger Hill, Ealing, Middx, TQ 187820, 14.vi.1995, and Hampstead Heath, Middx, 16.vi.1995; *Agonum assimile* (Payk.) (Carabidae), Hampstead Heath, Middx, 19.ii.1995, in fallen branch; *Amara convexiuscula* (Marsh.) (Carabidae), The Paddock, Tottenham, Middx, TQ 349895, 19.vii.1995, under spoils; *Dendrophilus punctatus* (Herbst) (Histeridae), Grove Lodge, Alexandra Park, Middx, 13.vii.1995, in old elm; *Stenus fulvicornis* Steph. (Staphylinidae), The Grove, Alexandra Park, Middx, 24.vii.1995, on bracket fungus; *Sinodendron cylindricum* (L.) (Lucanidae), Graffham, W. Sussex, 3.ix.1995, in birch log and beside R. Kent below Kendal, Westmorland, 22.x.1995, elytron in elm; *Elodes marginata* (F.) (Scirtidae), near Kenwood Ponds outflow, Hampstead Heath, Middx, 26.v.1995; *Trixagus dermestoides* (L.) (Throscidae), near Kenwood Ponds outflow, Hampstead Heath, Middx, 26.v.1995; *Ampedus cardinalis* (Schiödt), Kensington Gardens, Middx, 12.vii.1995, in detritus under Sweet Chestnut; *Athous campyloides* Newman, Alexandra Park, Middx, TQ 303903, 30.vii.1994, in web, and Grove Park, Middx, TQ 200772, 14.vii.1995, under stone in churchyard; *Malthinus flaveolus* (Herbst) (Cantharidae), Queens Wood, Middx, 4.vii.1993; *Malthinus seriepunctatus* Kiesenw.

(Cantharidae), Queens Wood, Middx, 4.vii.1993; *Ochina ptinoides* (Marsh.) (Anobiidae), Gunnersbury Triangle NR, Middx, TQ 202787, 21.vi.1995, on dead ivy; *Hemicoeus fulvicornis* (Sturm) (Anobiidae), Alexandra Park, Middx, 27.vi.1995, on dead ivy; *Dorcatoma chrysomelina* Sturm (Anobiidae), Priory Park, Haringey, Middx, TQ 300890, on *Robinia* trunk; *Lymexylon navale* (L.) (Lymexylidae), Richmond Park, Surrey, 22.vii.1995, on newly cut oak log (coll. G. Collins); *Soronia grisea* (L.) (Nitidulidae), Alexandra Park, Middx, 14.vii.1995, at sugar on oak; *Cryptarcha strigata* (F.) (Nitidulidae), Highgate Wood, Middx, 28.iv.1995, in oak log; *Anthrophagus nigricornis* (F.) (Cryptophagidae), Gunnersbury Triangle NR, Middx, 21.vi.1995, swept off grass; *Enicmus brevicornis* (Mannerh.) (Lathridiidae), Queens Wood, Middx, 4.vii.1995; *Tomoxia bucephala* Costa (Mordellidae), Wimbledon Common, Surrey, 5.vii.1995, on fallen beech; *Synchita separanda* (Reitt.) (Colydiidae), The Decoy, Hendon, Middx, TQ 240888, 18.vii.1995, under dead sycamore bark; *Cicones undatus* Gué.-Mén. (Colydiidae), Nunhead Cemetery, Surrey, 10.vi.1995, under dead sycamore bark, Wooded Walk, Queens Wood, Haringey, Middx, TQ 291884, 4.vii.1995, on ivy-covered stump and The Decoy, Hendon, Middx, 18.vii.1995, under dead sycamore bark; *Lagria hirta* (L.) (Tenebrionidae), Tottenham Green Churchyard, Middx, TQ 337894, 8.vii.1995, on nettle; *Prionychus ater* (F.) (Tenebrionidae), by A406 Hanger Lane, Acton, Middx, TQ 194788, 23.vi.1995, in heart rot on *Robinia* trunk; *Isomira murina* (L.) (Tenebrionidae), Alexandra Park, Middx, 13.vi.1995, beaten off elder; *Nacerdes melanura* (L.) (Oedemeridae), New Kings Road, London, Middx, 12.vi.1995, dead on pavement (coll. M. Barclay); *Ischnomera sanguinicollis* (F.) (Oedemeridae), Oxwich Point Woods, Glamorgan, 21.v.1995, on herbage.

HALSTEAD, A. J. Some local Coleoptera taken in 1995: *Agonum muelleri* (Herbst) (Carabidae), Afton Water, S. of New Cumnock, Ayrshire, 4.vii.1995, on river shingle; *Agonum sexpunctatum* (L.) (Carabidae), Whitmoor Common, Surrey, 21.v.1995, under burnt log; *Opilo mollis* (L.) (Cleridae), Queen Elizabeth Plantation, Richmond Park SSSI, Surrey, 22.vii.1995, on oak trunk; *Malthodes guttifer* Kiessow (Cantharidae), W. of Catrine, Ayrshire, 3.vii.1995, swept; *Megatoma undata* (L.) (Dermestidae), Three Counties Show Ground, near Malvern Wells, Worcs., 7.v.1995, on trunk of old crack willow *Salix fragilis* (L.); *Ctesias serra* (F.) (Dermestidae), Three Counties Show Ground, near Malvern Wells, Worcs., emerged 7.v.1995, bred from larva found under loose bark of old crack willow *Salix fragilis* (L.); *Ptinomorphus imperialis* (L.) (Anobiidae), The Sheepleas SSSI, near West Horsley, Surrey, 9.v.1995, swept; *Lymexylon navale* (L.) (Lymexylidae), Sidmouth Wood, Richmond Park SSSI, Surrey, 22.vii.1995, ovipositing in cracks in cut end of fallen oak trunk; *Phloiortya vaudoueri* Muls. (Melandryidae), Queen Elizabeth Plantation, Richmond Park SSSI, Surrey, 22.vii.1995, on dead tree stump; *Hydrothassa glabra* (Herbst) (Chrysomelidae), W. of Catrine, Ayrshire, 13.vii.1995, swept; *Coeliodes erythroleucus* (Gmel.) (Curculionidae), Three Counties Show Ground, near Malvern Wells, Worcs., 7.v.1995, swept.

LOTT, D. A. -Leicestershire Red Data Book of Beetles published in 1995 containing 342 species of recognized conservation interest which have been recorded in Leicestershire and Rutland since 1970. Some of the species included were exhibited in groups associated with habitats of particular conservation value in Leicestershire.

(1) Dead wood. *Abraeus granulum* Er. (Histeridae), Barkby Holt, 12.ii.1995; *Microscydmus minimus* (Chaud.) (Scydmaenidae), Donington Park, 4.x.1991; *Euplectus bonvouloiri* Raff. (Pselaphidae), Burley Wood, 6.v.1990; *Plectophagus nitidus* Fairm. (Pselaphidae), Bradgate Park, 30.vi.1989; *Batrissodes venustus* Reichenb. (Pselaphidae), Shacklewell Hollow, 26.ix.1990; *Notolaemus unifasciatus* (Latr.) (Cucujidae), Bradgate Park, 1.v.1990; *Corticaria alleni* Johnson (Lathridiidae),

Croxtan Park, 17.ix.1994; *Ischnomera cinerascens* Pand. (Oedemeridae), Burley Wood, 6.v.1990; *Dryocoetinus alni* (Georg) (Scolytidae), Swithland Wood, 30.iii.1993; *Ernoporus caucasicus* Lind. (Scolytidae), Buddon Wood, 29.v.1995.

(2) Disturbed sites. *Harpalus obscurus* (F.) (Carabidae), Geeston Quarry, 26.vi.1995, in pitfall trap (coll. I. Philips); *Haliplus mucronatus* Steph. (Haliplidae), disused railway line, Thorpe Satchville, 19.vii.1989; *Lamprinodes saginatus* (Grav.) (Staphylinidae), High Sharpley, v.1992, pitfall trap; *Alaobia scapularis* (Sahl.) (Staphylinidae), Geeston Quarry, 20.v.1987; *Ocyusa nitidiventris* (Fag.) (Staphylinidae), Rawdykes Power Station, Leicester, v.1992, pitfall trap; *Oxyptoda lurida* Woll. (Staphylinidae), Rawdykes Power Station, Leicester, v.1992, pitfall trap; *Chrysolina sanguinolenta* (L.) (Chrysomelidae), Essendine Railway Sidings, 30.v.1987; *Squamapion cineraceum* Wencker (Brentidae), North Luffenham Quarry, viii.1992, pitfall trap; *Caenopsis fissirostris* (Walton) (Curculionidae), High Sharpley, vi.1992, pitfall trap; *Tychius lineatulus* Steph. (Curculionidae), King Luds Entrenchments, v.1992, pitfall trap.

(3) Undisturbed wetlands (fen and carr). *Badister dilatatus* Chaud. (Carabidae), Gravel Hole Spinney, 10.vi.1994; *Oxytelus fulvipes* Er. (Staphylinidae), Narborough Bog, 24.iv.1993; *Aloconota languida* (Er.) (Staphylinidae), Pond Spinney, Aston Flamville, 29.iv.1993; *Atheta difficilis* (Bris.) (Staphylinidae), Saddington Reservoir, 10.vi.1993; *Calodera nigrita* Mannerh. (Staphylinidae), R. Eye, Ham Bridge, 21.xi.1986; *Calodera riparia* Er. (Staphylinidae), Newtown Burgoland Marsh, 4.v.1993; *Calodera uliginosa* Er. (Staphylinidae), Loughborough Big Meadow, 9.iv.1991; *Oxyptoda nigrocincta* Muls. & Rey (Staphylinidae), Narborough Bog, 28.iv.1993; *Selatosomus nigricornis* (Panz.) (Elateridae), Loughborough Big Meadow, 16.vi.1991; *Donacia impressa* Payk. (Chrysomelidae), R. Eye, Melton, 7.iv.1989.

(4) Rivers and streams. *Bembidion fluviatile* (Dej.) (Carabidae), R. Trent, Sawley, 24.v.1992; *Ptenidium brenskiei* Flach (Ptiliidae), R. Lin, Bradgate Park, 4.v.1990; *Lesteva hanseni* Lohse (Staphylinidae), Grace Dieu Brook, Whitwick, 29.v.1994; *Carpelimus lindrothi* Palm (Staphylinidae), R. Soar, Lockington, 19.v.1992; *Carpelimus obesus* (Kiesenw.) (Staphylinidae), R. Soar, Lockington, 13.v.1990; *Carpelimus subtilis* (Er.) (Staphylinidae), Cribbs Meadow, 6.viii.1994; *Lathrobium pallidum* von Nord (Staphylinidae), R. Soar, Loughborough, vii.1994, pitfall trap; *Atheta nanion* Joy (Staphylinidae), R. Soar, Lockington, 12.i.1986; *Atheta obfusca* (Grav.) (Staphylinidae), R. Soar, Loughborough, 13.v.1990; *Baris lepidii* Germ. (Curculionidae), R. Eye, Melton, 10.ii.1990.

(5) Undisturbed grassland. *Trachys scrobiculatus* Kiesenw. (Buprestidae), King Luds Entrenchments, v.1992, pitfall trap; *Fleutiauxellus quadripustulatus* (F.) (Elateridae), Stonesby Quarry, vii.1994, pitfall trap; *Chrysolina violacea* (Müller, O. F.) (Chrysomelidae), The Drift, viii.1992, pitfall trap; *Aphthona nigriceps* (Redt.) (Chrysomelidae), Misterton, 1.ix.1984; *Omiamima mollina* (Boh.) (Staphylinidae), Harby Hills, v.1992, pitfall trap.

(6) Underground fungi. *Hydnobius punctatus* Sturm (Leiodidae), North Luffenham Quarry, ix.1992, pitfall trap; *Leiodes macropus* (Rye) (Leiodidae), North Luffenham Quarry, viii.1992, pitfall trap; *Leiodes rugosa* Steph. (Leiodidae), North Luffenham Quarry, ix.1992, pitfall trap.

(7) Mammal nests. *Catops longulus* Kellner (Leiodidae), Bradgate Park, 11.ix.1989; *Phyllodrepa puberula* Bernh. (Staphylinidae), Ashby de la Zouche, 22.x.1987, badger sett; *Anotylus saulcyi* (Pand.) (Staphylinidae), Ketton Quarry, 10.xi.1988, badger sett; *Liogluta pagana* (Er.) (Staphylinidae), Lount Meadow, ix.1992, pitfall trap; *Oxyptoda spectabilis* Mark. (Staphylinidae), Newfield Colliery, v.1992, pitfall trap.

PARSONS, M. S.—A small selection of Coleoptera recorded at light traps operated in Richmond Park, Surrey during 1994–5; *Bembidion varium* (Ol.) (Carabidae),

Copelatus haemorrhoidalis (F.) (Dytiscidae), *Ilybius ater* (Deg.) (Dytiscidae), *Trox scaber* (L.) (Trogidae), *Aphodius zenkeri* Germ. (Scarabaeidae), *Amphimallon solstitialis* (L.) (Scarabaeidae), *Heterocerus fenestratus* (Thunb.) (Heteroceridae), *Stenagostus villosus* (Fourc.) (Elateridae), *Dermestes peruvianus* Laporte de Castelnau (Dermestidae), *Necrobia violacea* (L.) (Cleridae), *Myzia oblongoguttata* (L.) (Coccinellidae), *Tenebrio molitor* (L.) (Tenebrionidae), *Prionychus ater* (F.) (Tenebrionidae), *Curculio glandium* Marsh. (Curculionidae), *Scolytus intricatus* (Ratz.) (Scolytidae).

HEMIPTERA

PARSONS, M. S.—Hemiptera recorded at light traps operated in Richmond Park, Surrey during 1994–5: *Reduvius personatus* (L.) (Reduviidae).

HYMENOPTERA

ALEXANDER, K.N.A. AND FOSTER, A. P.—Two noteworthy species found during the National Trust's biological survey in 1995: *Formicoxena nitidulus* (Nylander) (Formicidae) at Staward Gorge, Northumberland, 19.vii.95, from a *Formica lugubris* Zett. nest and possibly the first record for the county; *Eucera longicornis* (L.) (Apidae: Eucerinae), at St Gabriel's, Golden Cap Estate, Dorset, 25.v.1995, a single male visiting *Vicia* sp. flowers.

ARCHER, M. E.—Some uncommon bees and wasps taken in recent years, including a number of new county records. Vespidae: *Dolichovespula media* (Retz.), queens at Nicholas St, York, 12.viii.1995; Thixendale, Wolds, 18.viii.1995; Horse Dale, Wolds, 31.iii.1995; worker at Sherburn, Malton, 1995. This species was first recorded in Yorkshire in 1994. Sphecidae: male *Cerceris quinquefasciata* (Rossius), Roydon Common, Norf., 12.viii.1995; female *C. arenaria* (L.), Rossington Bridge, S. Yorks., 19.vii.1994 (new to Yorks in 1993); female *Argogorytes fargeii* (Shuck.), Stutton, Yorks., 23.vii.1994; female *Oxybelus argentatus* Curt., Hartlebury Common, Worcs., 5.vii.1994 and at Devil's Spittleful Nature Reserve, Worcs., 12.vii.1994; female *Philanthus triangulum* (F.), Hartlebury Common, Worcs., 10.viii.1995—this record greatly extends the range of this species from south-east England. Apidae: Andreninae: female *Andrena alfenella* Perkins, Sark, Chan. Is., 3.viii.1994, a new species for the Channel Islands; male and female *A. ocreata* (Christ), Gundale, N. Yorks., 5.vi.1994; male *A. synadelpha* Perkins, Gibraltar Point, Lincs., 1.v.1994, new to Lincolnshire. Apidae: Halictinae; male *Sphecodes niger* Sichel, Herm, Chan. Is., 25.vii.1994, new to Channel Islands; female *Lasioglossum brevicorne* (Schenck), Thetford Warren Lodge, Norf., 24.v.1992 and at Hartlebury Common, Worcs., 27.v.1991. Apidae: Colletinae; male and female *Colletes floralis* Evers., Sandscale Haws, Cumbria, 18.vii.1994, new to England. Apidae: Nomadinae; female *Nomada pleurostricta* H.-S., Hartlebury Common, Worcs., 20.vi.1994.

HALSTEAD, A. J.—Some local sawflies taken in 1995. Cimbicidae: female *Trichiosoma sorbi* Hartig, swept south-east of Brown Carrick Hill, Ayr., 6.vii.1995; female *Cimbex femoratus* (L.), swept Wood of Cree RSPB reserve, near Newton Stewart, Kirk., 7.vii.1995. Tenthredinidae: male *Strongylogaster lineata* (Christ), swept from bracken, Sidmouth Wood, Richmond Park, Surrey, 22.vii.1995—males are very scarce in this common species; female *Apethymus braccata* (Gmel.), swept from oak, near Furzey Lodge, New Forest, Hants, 12.viii.1995; male and female *Tenthredo moniliata* Klug, swept from bog bean, Little Loch, S.E. of Newton Mearns, Renf., 8.vii.1995; a dark colour form of female *Tenthredo olivacea* Klug,

Wood of Cree RSPB reserve, near Newton Stewart, Kirk., 7.vii.1995; female *Amauronematus sagmarius* Konow, swept from shallows, N. end of Mortimer's Meadow, Dinton Pastures County Park, Winnersh, Berks., 8.iv.1995; female *Nematinus acuminatus* (Thomson), swept, Failford Wood, Failford, Ayr., 3.vii.1995; female *Nematus fahraei* Thomson, swept High Wood, Woodley, Berks., 13.v.1995.

HARMAN, T. W.—A hornet, *Vespa crabro* L. taken 13.ix.1995, feeding on ripe apples at Turville Heath Farm, Bucks. This is believed to be the first record for this locality.

HODGE, P. J.—Twenty-five species of aculeate bees and wasps taken in 1995, and a parasitic wasp. Ichneumonidae: *Metopius dentatus* (F.), det. Dr M. R. Shaw, bred from a pupa of *Lasiocampa callunae* Palm (Lep.: Lasiocampidae), reared by Rosalind Hodge from larvae collected at Rannoch, mid Perth, in July 1994 by Rev. A. H. H. Harbottle. Pompilidae: *Anoplius concinnus* (Dahlbom), near the exposed root plate of a fallen lime tree, Buxted Park, E. Sussex, 20.vii.1995; Eumenidae: *Eumenes coarctatus* (L.), a female at *Pulicaria dysenterica* flower in a marshy meadow near a marina at Hermitage, W. Sussex, 12.viii.1995; female *Odynerus melanocephalus* (Gmel.), flying over sparsely vegetated sand, Midhurst Common sandpit, 12.vii.1995. Vespidae: female *Vespula austriaca* (Panz.) at *Vaccinium myrtillus* flower on moorland near Aughavannagh, Co. Wick., Ireland, 16.v.1995. Sphecidae: male *Crossocerus distinguendus* (Morawitz), swept Tilbury, S. Essex, 19.vi.1995, and a male on exposed lime tree root plate at Buxted Park, E. Sussex, 20.vii.1995; male *C. vagabundus* (Panz.), swept at Mottisfont, S. Hants, 16.vi.1995; male *C. walkeri* (Shuck.), beaten from oak, Dunbridge, S. Hants, 14.vi.1995; female *Mimumesa unicolor* (Vander Linden) and *Psemulus schencki* (Tourn.) on *Heracleum sphondylium* flower, Cooling Marsh, W. Kent, 19.vii.1995; female *Gorytes bicinctus* (Rossius) and *Passaloecus clypealis* Faester, swept, the latter from *Phragmites* in dyke at Horsham Marsh, E. Kent, 23.vii.1995. Apidae: Andreninae: *Andrena bucephala* Steph., basking on sycamore leaves, Arundel Park, W. Sussex, 1.v.1995; female *A. congruens* Schmiedeknecht on *Heracleum sphondylium* flowers, Basing Fen, N. Hants, 13.vii.1995; female *A. nigriceps* (Kirby), entering burrow on south-facing sandy bank, Pennington Marsh, S. Hants., 30.vi.1995; female *A. varians* (Rossius), on bramble leaf, south margin of wood, Lewes, E. Sussex, 10.v.1995. Apidae: Halictinae: male *Halictus confusus* Smith, swept Lakenheath Airfield, W. Suff., 8.viii.1995; *Lasioglossum paucillum* Schenck at Dunbridge, S. Hants, 14.vi.1995 and The Salterns, Lymington, S. Hants, 30.vi.1995; male *Sphecodes reticulatus* Thomson, near cliff top at Short Cliff, Cuckmere Haven, E. Sussex, 26.v.1995. Apidae: Nomadinae: female *Nomada hirtipes* Perez, basking on sycamore leaves, Arundel Park, W. Sussex, 1.v.1995; *N. sheppardana* (Kirby) numerous on exposed root plates of fallen lime trees, Buxted Park, E. Sussex, 5.v.1995. Apidae: Eucerinae: *Eucera longicornis* (L.), a colony nesting in a steep south-facing bank, bank of River Bewl, E. Sussex, 21.vi.1995. Apidae: Anthophorinae: female *Anthophora quadrimaculata* (Panz.) visiting *Nepeta* flowers in a garden at Harvard Road, Ringmer, E. Sussex, 20.vii.1995. Apidae: Ceratinae: *Ceratina cyanea* (Kirby), numerous females visiting bramble flowers and evidently nesting in nearby cut *Buddleja* stems, Lewes, E. Sussex, 27.v.1995 (new to E. Sussex). Apidae: Bombinae: queen *Bombus monticola* Smith, at *Vaccinium myrtillus* flowers on moorland at Aughavannagh, Co. Wick., Ireland, 16.v.1995.

ILEY, M.—An exhibit showing two generations of the sphecid wasp *Ectemnius cavifrons* (Thomson) bred in a garden at Great Missenden, Bucks. in 1994 and 1995. Also reared from the same nest were a single female of *E. sexcinctus* (F.).

MANN, D. J., PAVETT, M. AND SLADE, D. J.—A selection of insects recorded by the Welsh Insect Survey. This included the sawfly *Sterictiphora angelicae* (Panz.), syn. *furcata*, swept at Newbridge-on-Wye, Breck., 1.vii.1995, a new record for Wales.

MCLEAN, I. F. G.—The bee wolf, *Philanthus triangulum* (F.) (Sphecidae), 4.viii.1995, from the cliffs at the east end of Cromer, Norf. This formerly scarce species is continuing to spread through East Anglia and elsewhere.

PLANT, C. W.—A bilateral gynandromorph of an undetermined *Sphcodes* sp. (Apidae: Halictinae) taken at Sawbridgeworth Marsh Nature Reserve, Herts on 11.viii.1995. The specimen showed variation in the density and form of the silvery hairs on the left and right halves of the face. The left antenna was shorter than the right but had longer basal segments. The genitalia consisted of both a sting and modified male structures. There were also other smaller differences which terminated abruptly at the mid-body line.

ROBERTS, S. P. M. A selection of aculeate hymenoptera which are target species for the first provisional atlas. Mutillidae: *Mutilla europaea* L. male and female from Sandford, Dorset 13.vii.1994 and male and female from Holton Heath NNR, Dorset, 6.viii.1994. Pompilidae: *Cryptocheilus notatus* (Rossius) female Great Ovens Heath, Dorset, 10.vii.1994. Vespidae: *Vespa crabro* L. queen, Dean's Grove House, Wimborne, Dorset, 20.v.1992, worker at ivy flowers Denny Wood, New Forest, Hants, 24.x.1989; *Dolichovespula media* (Retz.) queen, Felbridge near East Grinstead, Sussex, 26.viii.1990, worker, Furzebrook, Dorset, July 1994, male Deeves Hall, Ridge, Herts, July 1994. Eumenidae: *Symmorphus crassicornis* (Panz.) female Sandford, Dorset, 13.vii.1994; *S. gracilis* (Brullé) male Holt Heath NNR, Dorset, 24.vi.1990 and female Dean's Grove House, Wimborne, Dorset, 3.viii.1990. Sphecidae: *Crabro cribarius* (L.) male and female Sandford, Dorset, 3.viii.1994; *C. scutellatus* (Scheven) female Crock Hill, New Forest, Hants, 4.vii.1991; *Ectemnius cavifrons* (Thomson) female White Barrow, Tilshead, Wilts, 26.viii.1991; *Oxybelus argentatus* Curtis male and female Sinah Common, Hayling Island, Hants, 12.vii.1994; *O. uniglutinis* (L.) male and female Sandford, Dorset, 13.vii.1994, female Kingsbridge Lakes, Dorset, 6.viii.1994; *Ammophila sabulosa* (L.) male Sandford, Dorset, 13.vii.1994 and female Godlingston Heath NNR, Dorset, 14.vii.1991; *A. pubescens* Curt. male and female Morden Bog NNR, Dorset, 14.vii.1994; *Podalonia hirsuta* (Scop.) male Studland Heath NNR, 20.vii.1989 and female Godlingston Heath NNR, Dorset, 14.vii.1991; *Cerceris arenaria* (L.) male Sandy Point, Hayling Island, Hants 24.vii.1991 and female Sandford, Dorset 3.viii.1994; *C. ruficornis* (F.) male Godlingston Heath NNR, Dorset, 14.vii.1991 and female Sandy Point, Hayling Island, Hants, 24.viii.1991; *C. rybyensis* (L.) male Durlston Head, Dorset, 14.vii.1991 and female Sandford, Dorset 3.viii.1994; *Philanthus triangulum* (F.) male and two females, one with *Apis mellifera* worker prey, Holton Heath NNR, Dorset, 6.viii.1994. Apidae, Xylocopinae: *Ceratina cyanea* (L.) male and female Oxenbourne Down, Hants, 11.x.1987. Apidae, Megachilinae: *Anthidium manicatum* (L.) male Wareham Meadows, Dorset, 29.vii.1994 and female Dibden Marshes, Hants, 22.vii.1995.

UFFEN, R. W. J.—Some new or locally rare species of bees and wasps recorded in Hertfordshire in 1995, with three others recorded elsewhere. Hertfordshire records: *Andrena cineraria* (L.) (Apidae: Andreninae) and *Nomada lathburiana* (Kirby) (Apidae: Nomadinae) from the Ashridge area. The *Andrena* nests in sand bunker walls on Ashridge golf course and on turfed knolls of powdery clay soil on Berkhamsted golf course. Male *A. cineraria* were flying round oaks on Gustard Wood Common golf course, 23.v.1995. *N. lathburiana* was first taken on Berkhamsted Common by David Marshall on flowers of American bramble, *Rubus pergratus*; *Nomada fucata* Panz.

found at the only locality in the county for its host bee, *Andrena flavipes* Panz. at Tyttenhanger sandpits, Colney Heath, spring brood female 12.iv.1995 and summer brood male 19.vii.1995; *Andrena helvola* (L.) female at Bricket Wood, 29.v.1995 and Frogmore Lakes, St. Albans, 1.v.1995; two female *Nomada panzeri* (Lepelletier) at Marshall's Heath, Wheathampstead, 22.v.1995—this is the first record amongst many *N. flava* Panz. examined in Herts.; *Hoplitis spinulosa* (Kirby) (Apidae: Megachilinae), a male at Pitstone Quarry, 16.viii.1995 and a female at Therfield Heath, Royston, 10.viii.1995. These records are at opposite ends of the Chilterns in Herts; *Ectemnius rubicola* (Dufour & Perris) (Sphecidae), on *Torilis japonica* flowers, Mardley Heath, 31.vii.1995; *E. sexcinctus* (F.) male on *Heracleum* flowers, River Lee at Wormley, 5.viii.1995; female *Gorytes tumidus* (Panz.), by a farm track at Tewin, 30.vi.1995; *Episyron rufipes* (L.) (Pompilidae), female at Tyttenhanger sandpits, 19.vii.1995; *Caliadurgus fasciatellus* (Spin.), female fluttering its wings erect as it moved in hedgerow at Tyttenhanger sandpits, 21.v.1995; *Ageniodes cinctellus* (Spin.), females entering bee burrows, one collecting soil pellets and fragments of grass of similar length to the spider wasp for packing the burrow, in hedgerows at Tyttenhanger sandpits, 27.vi.1995; male *Arachnospila spissa* (Schiodte) at Marshall's Heath, Wheathampstead, 25.v.1995; female *Chrysogona gracillima* (Forster) (Chrysididae), on fence post in hedgerow at Tyttenhanger sandpits, Colney Heath, 19.vii.1995. Other counties: *Sphecodes niger* Sichel (Apidae: Halictinae) and *Gorytes bicinctus* (Rossius) (Sphecidae), both males, at Dinton Pastures Country Park, Winnersh, Berks, 29.vii.1995; female *Heriades truncorum* (L.) (Apidae: Megachilinae) on ragwort flower, Fulmer, Bucks., 3.viii.1995.

ODONATA

PORTER, J.—Two migratory dragonfly species taken in 1995. A pair of the yellow-winged darter, *Sympetrum flaveolum* (L.) and a single vagrant darter, *S. vulgatum* (L.), both at Dungeness, Kent, 9.viii.1995.

MANTODEA

BROTHERIDGE, D. J.—Four unidentified mantids from Tenerife, Majorca and Crete.

NEUROPTERA

HARMAN, T. W.—A specimen of the local lacewing *Drepanopteryx phalaenoides* (L.) taken at m.v. light in a beech wood, Turville Heath Farm, Bucks, 30.vii.1995.

ORTHOPTERA

MANN, D. J., PAVETT, M. AND SLADE, D. J.—Grey bush cricket *Platycleis albopunctata* (Goeze) (Tettigoniidae), recorded at Oxwich Burrows, Glam. during the 1995 Welsh Insect Survey.

MISCELLANEOUS

HALSTEAD, A. J.—A Scots pine log cut from a four-foot-high trunk after the tree had been hacked down by vandals earlier in the summer. The stump had produced copious quantities of resin from under the damaged bark and in the subsequent weeks this had trapped a variety of invertebrates, including beetles, aphids, ants,

flies, a parasitic wasp, mites and spiders. The specimen was collected in September from Whitmoor Common, near Guildford, Surrey.

ILLUSTRATIONS

HAWKINS, R. D. AND SCOTT, A. N.—A photograph of *Dascillus cervinus* (L.) (Dascillidae) pollinating the common spotted orchid *Dactylorhiza fuchsii* (Druce), taken at Kenley Common, Surrey, in June 1994. The beetle inserted its head into each flower and was apparently feeding. It climbed to the top of the flower spike and was photographed, showing three orchid pollinia attached to its face.

HENDERSON, M.—A small selection of stamps featuring insects and other arthropods. Also a copy of the catalogue *Collect butterflies and other insects on stamps* by A. Coles and T. Phipps, published in 1991 by Stanley Gibbons and available at their shop on the Strand at a reduced price. Thematic collecting of insects on stamps could be considered as an adjunct to collecting, or to familiarize oneself with a popular major group, perhaps because one's opportunities for collecting actual specimens is limited. Many families of insects are now represented on stamps, but there is a heavy bias towards large colourful insects, thus the Lepidoptera and Coleoptera are more usual subjects than the Diptera or even the Hymenoptera.

HENWOOD, DR B. P.—Photograph of a larva of *Eupithecia abietaria* (Goeze).

HOPKINS, G. W.—A display showing the range and abundance of birch aphids. Fourteen species of aphid feed on birch in Britain, the greatest number of any deciduous tree. Photographs of nine of the eleven species were shown including the rare *Monaphis antennata*, *Callipterinella minutissima* and *C. tuberculata*.

PAYNE, J.—A photograph of *Coenonympha pamphilus* (L.) ab. *antiexessa* Leeds. An accompanying letter from Mr David Carter verified this extremely scarce form taken in Northants in 1960.

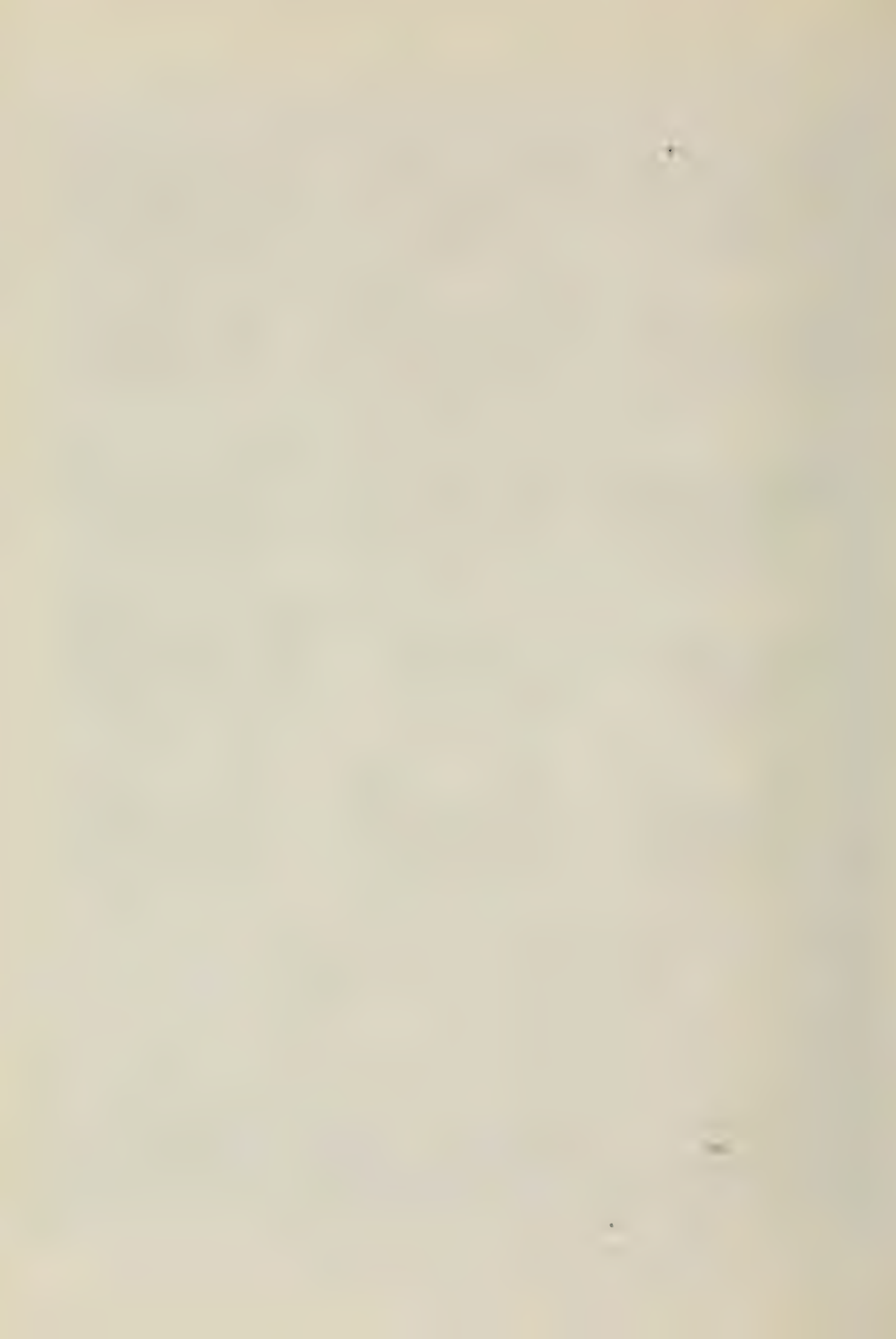
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PLATE IV. ANNUAL EXHIBITION 1995

- 1: *Spodoptera ciliium*, Lizard, Cornwall, 8.x.1995, D. C. G. Brown. 2: *Luperina dumerilii*, Lizard, Cornwall, 7.ix.1983, B. F. Skinner. 3: *Orthosia gothica*, Dungeness, Kent, 24.iii.1995, S. P. Clancy. 4: *Eilema deplana*, Windsor Forest, Berks., 28.vii.1995, B. F. Skinner. 5: *Noctua comes*, bred, 1994, D. Wedd. 6: *Herminia plumigeralis*, Greatstone, Kent, 12.x.1995, S. P. Clancy. 7: *Hadena albimacula*, Dungeness, Kent, 5.vi.1995, S. P. Clancy. 8: *Chrysodeixis acuta*, Lizard, Cornwall, 14.x.1995, D. C. G. Brown. 9: *Chrysodeixis chalcites*, Norfolk, bred 1992. 10: *Cryphia algae*, Southsea, Hants, 26.vii.1995, J. Langmaid. 11: *Trichoplusia vittata*, Rye Harbour, Sussex, 31.vii.1995, D. Funnell (S. P. Clancy). 12: *Trichoplusia vittata*, Tanzania, Pringle coll., BM(NH) (S. P. Clancy). 13: *Semiothisa liturata*, Windsor Forest, Berks., 28.vii.1995, B. Skinner. 14: *Peribatodes manuelaria*, bred, New Romney, Kent, 1994, B. F. Skinner and S. P. Clancy. 15: *Thera britannica*, Melvich, Sutherland, 2.viii.1995, D. Wedd. 16: *Cosmorhoe ocellata*, Chardstock, Devon, 24.viii.1995, A. E. Jenkins. 17: *Eupithecia ultimaria*, Hants, 30.vii.1995, J. Langmaid. 18: *Eucosma tripoliana*, Portsmouth, Hants, 10.viii.1995, J. Langmaid. 19: *Monopis fenestratella*, Richmond Park, Surrey, 20.vi.1995, M. S. Parsons. 20: *Eccopisa effractella*, Buckingham Palace, London, 13.vii.1995, D. Agassiz. 21: *Eccopisa effractella*, Continental specimen.



ANNUAL EXHIBITION 1995



REVELS, R.—Photographs of 24 species of British ladybird, including life cycles and parasites of some species. Also shown were birds, butterflies, dragonflies, hoverflies, spiders, wasps and other subjects from his extensive photo library of natural history subjects.

ROBERTS, S. P. M.—Maps of aculeate Hymenoptera for inclusion in the first provisional atlas. These were up-to-date drafts of the 55 distribution maps that are to be included in the BRC/BWARS provisional atlas due for publication early in 1996. The maps have been drawn using the DMAP mapping package.

THOMAS, R. C.—Entitled “Entomology and English Heritage”, the display consisted of a map showing locations of English Heritage properties, some photographs of selected sites, and an account of the work which English Heritage is doing to collate entomological information about its sites. They are keen for entomologists to visit and collect records on their sites. Please contact Dr R. C. Thomas, Senior Ecologist, English Heritage, 429 Oxford Street, London W1R 2HD to arrange visits.

WARING, P.—A photograph showing larvae of *Chloroclystis chloerata* (Mabille), feeding on Blackthorn blossom. This is one of the species dropped from the atlas of the rarer macro-moths because it is now known from more than 100 of the 10-km squares in Britain. The distribution map is the first to be prepared for this species and will be published in the entomological press, along with those of other species demoted from the atlas, so that the information is readily available.

Crimson underwing survey. A survey of the light and dark crimson underwings, *Catocala promissa* (D. & S.) and *C. sponsa* (L.) took place on 12.viii.1995 in the New Forest, Hampshire, as part of a joint field meeting between the British Entomological and Natural History Society and Butterfly Conservation. The exhibitor was delighted to find both species at five different places in the central and eastern parts of the Forest, and the light crimson underwing at a sixth. Previously there had been concerns that the dark crimson underwing in particular had become much more localized within the Forest. The meeting was filmed by a crew from the BBC and shown on 3 September as part of the “Nature Detectives” series.

Atlas of the scarce and threatened macro-moths of Great Britain. This project was started in the winter of 1992–93, following formation of a national recording network for the rarer moths in 1991. The first draft of maps was issued to all county recorders and record centres in 1992, since when many further records and much new information has been added. The text and maps are continually being updated on computer and accounts of individual species are frequently being sent to lepidopterists and conservation organizations. Editing for publication is due to take place during the winter of 1995/6 with publication by the Joint Nature Conservation Committee (JNCC) in 1996. The recording network will continue to be serviced and the computer data-base kept up to date as part of a joint project between BC and JNCC. Up-to-date national distribution maps of 14 species which have been demoted from the atlas because, fortunately, they have been found to be too widespread and common to qualify, are being submitted for publication in a paper for the *Entomologists' Record*. For some of these species, such as the sloe pug *Chloroclystis chloerata* (Mabille), there are no previous published maps. For others it is interesting to compare the results with previous versions. While recording has improved in some areas, it is clear that there have also been real changes in moth distribution in the last two decades, with increases as well as declines.

THE 1995 PRESIDENTIAL ADDRESS—PART 1 REPORT

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The British are well known both for their enthusiasm for natural history and their love of societies. It has been my great privilege for the last year to have been President of this long-established organization—one occupying a special niche in British natural history. Founded in 1872, as the South London Entomological and Natural History Society, the British Entomological and Natural History Society seems to be thriving by combining its great strength—an emphasis on practical entomology, field studies in particular—with a growing determination to use its collective knowledge in matters relating to invertebrate conservation. I shall have more to say about this latter issue in a moment.

I am a relative newcomer to Council, although I have been a member of the Society for 22 years. But from sitting around the Council table over the last two years, I have been struck greatly by the enormous level of experience that exists and that is put towards running the BENHS. The purpose of our Society is stated in the bye-laws to be the 'promotion and advancement of research in biology, especially entomology, and its diffusion. . .'. But to achieve that purpose involves organization: holding Council meetings; taking minutes; arranging and leading field meetings, lecture meetings, workshops and open days; curating the collections; managing the finances; dealing with the membership; handling sales of various goods produced by the Society; editing the journal; distributing the journal and other information about the Society; arranging the annual exhibition and dinner; and managing the Society's headquarters—the Pelham–Clinton Building at Dinton Pastures. It is the officers and ordinary members of Council on whom these tasks fall chiefly. You have just heard about some of their activities over the past 12 months from the reports. Previous Presidents have noted that while the incumbent of the office is required to chair meetings and act as a facilitator, most of the hard labour is shouldered by the officers and ordinary members of Council. I agree with that observation. So I am delighted to take this opportunity to thank formally all these people—they have made my presidential year interesting, and provided great support based on their extensive, collective experience.

Let me mention three of them. Our Sales Secretary, Roger Hawkins, retired from the position at the end of last year, as did the Assistant Treasurer, Mark Telfer, from his post. May I thank them, on behalf of Council and the membership, for their service to the Society in these important jobs. A long-standing member retiring from Council this year is John Muggleton. I make special mention of him, not just for his many years service to the Society, but also because of his invaluable ability to interpret proposals that arise in Council in the light of the bye-laws. I feel sure that the Society will benefit from his advice again in a formal capacity soon.

During the course of the year it has been my sorry duty to announce the deaths of 11 members, several who had been prominent in the Society.

Mr Stanley Maurice Hanson, from West Sussex, died on 18 March 1995. He had been a member of the Society since 1949 and was interested in Lepidoptera.

Dr Patrick J. L. Roche died in March 1995. He was a special life member having joined the Society in 1942. His special interest was in Hemiptera, in particular Pentatomidae. Patrick Roche was a medical doctor and pathologist whose career took him to Pentonville Prison, West Africa, Sabah, and the Seychelles. He retired to

Andorra where he was involved in preparing a list of Andorran insects. He made a representative collection of Andorran insects and a trust for the study of Andorran natural history was formed at his behest. He was a knight of St Sebastian.

Mr Horace Last died on 4 April aged 87. He was elected a special life member of the Society in 1991 having joined in 1941. By profession, he was a tea taster. His entomological interest was in the Coleoptera, particularly Staphylinidae. Horace Last published papers on British and Channel Island Staphylinidae, and also on tropical myrmecophilous staphylinids, particularly those of Africa.

Mr S. Maurice Jackson died in late May 1995. He had been a member since 1989 and was Yorkshire Macrolepidoptera Recorder for many years.

Mr Bruce Burns, who died on 1 June 1995, joined the Society in 1944, but was no longer a member at the time of his death. His main interest was in the Macrolepidoptera, particularly of Hampshire. Before his work took him to the North, he regularly exhibited specimens at the Annual Exhibition of the Society.

Mr Hugh N. Michaelis died on 29 July 1995. He joined the Society in 1951 and was interested in Lepidoptera, particularly Microlepidoptera, and also sawflies. Much of his work was carried out in Lancashire; he was a prominent member of the Lancashire and Cheshire Entomological Society. In later years he worked extensively on Microlepidoptera of north Wales and did much to encourage many collectors.

Mrs Frances Mary Murphy died on 20 July 1995. She joined the Society in 1962 and became an active member. She served as Secretary during the 1980s and became President in 1989—the first and, so far, only woman to occupy the position. She specialized in spiders and was known for her work on the group internationally. She travelled widely, collected specimens from many countries, and was a capable and enthusiastic photographer of these animals. Several of her many publications were printed in the Society's journal.

Mr Eric Bradford died, in a road accident, on 12 August 1995. He had been a member since 1960 and, in recognition of his work for the Society, was elected an honorary member in 1985. He served the Society in many ways behind the scenes, frequently using his professional graphics skills to produce signs and displays. That he was a talented illustrator is well known to all those familiar with his paintings of Microlepidoptera published in our journal. He was the Society's curator for 10 years. Although his special interests were in Microlepidoptera, he was involved in natural history broadly, even to the extent of buying two pieces of land on which he created nature reserves. His collections have been bequeathed to the Society.

Mr Howard G. Phelps died in the summer of 1995 while on holiday in Spain. He lived in Wiltshire and joined the Society in 1976 although he was no longer a member at the time of his death. He was respected as a good all round naturalist and had developed a special interest in Spanish butterflies, of which he had a collection.

Mr Humphrey W. Mackworth-Praed died on 13 September 1995. He had been a member since 1960 and had a special interest in Lepidoptera—particularly European butterflies—and was a general natural historian of note. His autobiography, entitled *Conservation pieces*, was published in 1991. He was an active member of the National Trust and the Surrey Wildlife Trust. His considerable collection, chiefly of butterflies and natural history books, was bequeathed to the Society.

Mr Leonard Francis Ferguson died on 19 November 1995. He had been a member since 1936 and would have become an Honorary Life Member this year. He was born in 1910 and developed an interest in natural history in childhood. He qualified as a dental surgeon, served in the Royal Dental Corps during the war and, subsequently, practised in Teddington, Middlesex. During his active retirement in Devon he was a keen observer of wildlife and an enthusiastic gardener.

We have stood already in memory of these members at previous meetings.

Over recent years, Council has been considering the future of the BENHS. This year there has been further discussion on developing the activities of the Society. In 1994, a paper was put before Council expressing some concern that the BENHS might to some extent lose its role and value if members were increasingly to see their interests being served principally by specialist groups outside the Society. The writers of this paper had in mind, particularly, special interest groups involving Diptera, Hymenoptera and Coleoptera.

By the spring of 1994, Council had agreed unanimously the affiliation with the BENHS of the Dipterists' Forum, a group founded in 1994. The mechanics of this process enabled the affiliation to take place in 1995. Discussions over affiliation of the Bees, Wasps and Ants Recording Scheme (BWARS) are still in progress. The idea of the BENHS acting as an umbrella organization to which such organizations are affiliated is surely a good one, although not without organizational implications.

Further development has occurred on the Society's role in invertebrate conservation. The idea of the BENHS having a greater impact in this field was suggested in 1993, and proposals were put in place later that year and in 1994. The aim of the initiative was to promote invertebrate conservation and to encourage members of the Society to apply their expertise to this end. Among the seven objectives of the proposal was one on promoting 'the validity of invertebrate collecting as a legitimate means of gaining knowledge for science and conservation'.

Members of the Society will be aware of a growing hostility towards collecting in certain quarters, much of it poorly considered. The BENHS is a Society that supports responsible collecting, and disassociates itself from irresponsible collecting. Plainly, what constitutes responsible and irresponsible collecting is a matter of judgement. But that the Society is open to discussion of collecting issues can be seen from the publication of recent articles on the subject in its journal (Miles, 1995; Stubbs, 1995). The matter was also considered in the 1988 Presidential Address (McLean, 1990). Debate about collecting insects is essential if prejudices and entrenched positions about the subject are to be avoided. What unquestionably is true, is that a great swathe of knowledge about natural history has resulted from collecting and the study of collections. Also, it is the case that collections have an enormous role yet to play in the study of natural history. The amount of revisionary taxonomy still needed on invertebrates, an undertaking based substantially on collections, is immense. And good revisions form, in my view, a critical basis for conservation biology, rich as the good ones are, in compilation and interpretation. I can vouch for the value of collections with some confidence after spending my entire research career to date working in three different natural history museums almost entirely on preserved material. Moreover, significant parts of these collections were built up by people who collected for a hobby; those who argue that collecting can be justified only for specific scientific or conservation purposes should consider this point carefully.

As with nearly all issues in a complex social setting, the answer lies in compromise and will be achieved best by careful thought. What increasingly is of concern is the effect of inadequately drafted legislation intended for environmental or species protection that threatens to restrict or ban collecting. Paradoxically, such an action may have the effect of restricting research of environmental value if sampling of organisms is required to achieve results.

The BENHS, as an important society for fieldwork in Britain, has much that it can do to help encourage a balanced approach to collecting, particularly in the context of the complex relationship that exists between collecting and conservation. Although a

natural history society exists primarily, and rightly, for the benefit of its members, the activities of our Society are likely to be scrutinized when activities have an effect within the public domain. The pressures on collecting are almost certain to increase and this Society, and other societies or institutions, can expect to have to deal increasingly with objections on moral and legal grounds. If some kind of co-ordinated effort is not made fairly soon by societies like the BENHS to address this issue, insect collecting may start to become viewed with the same general distaste as exists for birds' eggs collecting. The impact of amendments to the Lacey Act in the United States on collecting has been considerable. Collecting insects in certain countries of the European Union is becoming increasingly difficult. How long will it be before European Community legislation incorporates measures similar to those in the USA?

Although fieldwork by the BENHS is essentially British, I am delighted here to mention the recent expedition involving three members of the Society to Belize. Context in natural history studies adds a further dimension to interpretation, so it is surely a healthy sign for the Society to look beyond British shores. Paul Waring, who led the expedition, and his colleagues, should be congratulated for their initiative. With the threat to biodiversity in the tropics, collecting expertise can be put to use in such areas contributing to the pool of specimens on which taxonomic research can be undertaken. Besides this particular expedition by the Society, members have ever more connection with their Continental European colleagues. I sincerely hope that these associations will increase; it can only benefit entomology if we work together and so increase our effectiveness in the field of natural history.

Finally in this report, let me turn to the way in which I see the more general role of the BENHS. At times in which we are all exhorted to have mission statements, roles, aims and objectives, perhaps the first purpose of the BENHS is simply to have fun — to enjoy natural history. Enjoyment and enthusiasm for something are qualities prerequisite for real achievement.

That being said, perhaps the most important broader role of the BENHS is to contribute to knowledge of the natural history of invertebrates, particularly insects, of Britain in a Continental European context. By way of field meetings, indoor meetings and workshops in particular, experience is passed between members of different ages and different interests. This Society has a special role to play in acting as a conduit for the common stream of knowledge of insect natural history in Britain. This may not sound very dynamic; yet the effect of such a flow of information is enormous.

But while a sense of continuity is the background against which the lives and work of most of us are lived, evolution is also a part of any society. So in the late 20th century, what should be the orientation of the BENHS? I have no definite answers, but put forward three main areas on which members of the Society may care to reflect. Whatever the answers are, I think that at a time of considerable change, institutions that thrive are likely to be those with a keen sense of identity.

The first lies in the role of the Society in the field of invertebrate biodiversity. The word biodiversity is one that has become very much a part of the language of environmental politics. Members of the BENHS may feel, reasonably enough, that the study of biodiversity is precisely that in which the Society has been engaged since its very foundation. But although it is sometimes tempting to shrink from concepts that have become fashionable, the threat to biodiversity is also a threat to the purpose of any society involved in its study. Therefore, it can be no bad thing if we can have a role in its preservation.

What kind of role might the BENHS play in this area? Some societies are mainly pressure groups; some adopt a more fact-based, advisory role; others lie somewhere

between. The BENHS is quintessentially a factual/knowledge-based society, so the advisory end of the spectrum is, in my view, where it is likely to be most effective.

The second point is related to the one I made earlier about helping to maintain the common stream of natural history knowledge. It is important that we should be fully aware of this role, which, broadly speaking, is educational, and build on it. Field meetings, workshops, open days, indoor meetings and publications are the main practical ways in which this important role is fulfilled. The programme of activities over the last year is something of which the Society can be justly proud.

The third and final point concerns the relationship between the Society and other organizations, and the relationship between amateurs and professionals. The fact that so many members of the BENHS belong to other natural history or biological societies demonstrates that extensive contacts do exist. The seamless professional/amateur interaction that occurs within our Society is a great strength, for the knowledge of amateurs and professionals within the BENHS is of a highly complementary nature. Given the evident need for keys and guides to the British invertebrate fauna, there is much more that could be done if efforts were to be combined to specific ends. The Department of Entomology at The Natural History Museum is in the process of expanding its role in work on the British insect fauna, particularly in the fields of taxonomy, nomenclature and putting taxa in a broader geographical perspective—particularly Palaearctic. There are great opportunities for collaborative work between members of the BENHS and the Museum relating to this initiative.

The Society will gain a further opportunity in its broadly educational role through interested members becoming increasingly involved in collaboration to produce yet more publications on the British invertebrate fauna.

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THE 1995 PRESIDENTIAL ADDRESS—PART 2 NATURAL HISTORY: SOCIETIES AND MUSEUMS

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In Part 2 of this address I intend to expand on the relationship between natural history societies (especially the British Entomological and Natural History Society) and natural history museums, using illustrations from work on the Lepidoptera.

In my President's Report, emphasis was placed on the relevance of the Society's traditional type of knowledge and skills to natural history studies in the modern world. The setting is ideal for these words given that the society I address (the BENHS), the society in the rooms of which this meeting is being held (the Royal Entomological Society), and the Natural History Museum, from which I have just come, were all established through Victorian energy and vision and are bound by the concept of natural history.

Yet, despite their similarities, each of these organizations has a different character. Go to their meetings, and while one will find overlap among them, one will also experience somewhat different flavours. This observation underlines the point that natural history is many sided—a pluralistic concept finding its way, to a greater or lesser extent, into many organizations. There are natural history museums, national natural history societies (here and abroad), local natural history societies, and even government departments with some element of natural history as part of their brief (for example, the Department of the Environment and its Darwin Initiative).

This pluralism makes natural history difficult to define. Perhaps the enduring characteristic of the very best natural history is that it involves using detail and information from particular disciplines to tell bigger stories. Probably, natural history is better described by examining the temperaments or types of people associated with the subject. I have identified three or four key types or temperaments involved in natural history. These categories are by no means mutually exclusive: they may be visualized as a series of overlapping sets (Fig. 1), for there exist many examples of people who fall into more than one of these categories. There are various ways of arranging the circles in the figure.

The first category is the naturalist—exemplified by Charles Darwin and Alfred Russell Wallace. Naturalists exhibit the capacity to make a wide variety of detailed observations. Admittedly, some, notably Darwin and Wallace, have had the ability to make quite exceptional connections between their observations and to perceive process behind pattern with an impact probably never equalled by other naturalists—at least in terms of social and scientific effects. But this spirit of observation and recording is typical of members of natural history societies now and in the past.

The second type is the natural philosopher/synthesizer—the scientist interested in broad phylogenetic patterns, groundplans and the like. Typically, such individuals observe more at the museum or laboratory bench by dissecting specimens from the collections and looking down the microscope than from tramping the field. A classic British example of the synthesizer is T. H. Huxley. (There have been more from continental Europe—Ernst Haeckel and Karl Ernst von Baer, for example.) While natural historians are often naturalists *and* synthesizers, there is a tendency for individuals to exhibit the temperament of one more than the other. The examples I have chosen to illustrate the naturalist and the synthesizer throw the categories into

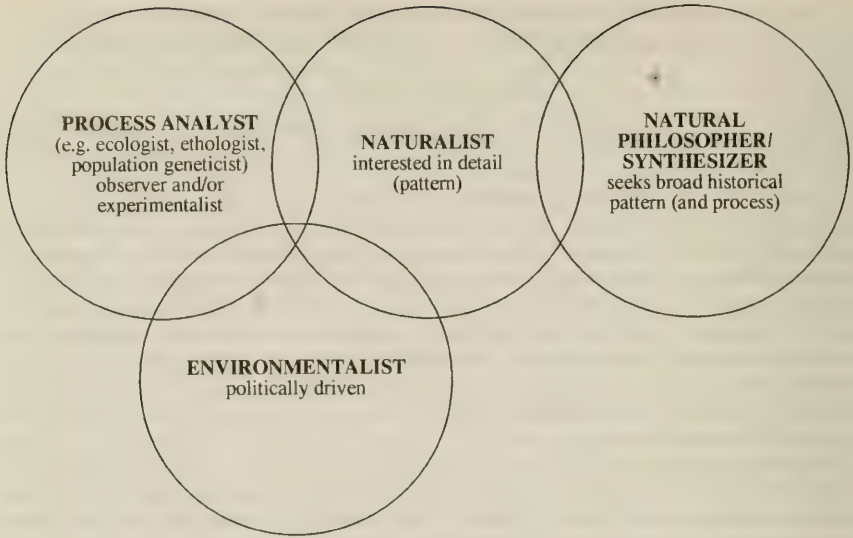


Fig. 1. A concept of natural history defined by different kinds of contributors to the subject.

sharp perspective. The differences in approach between Darwin and Huxley are brilliantly portrayed in two recent biographies of the two men (Desmond & Moore, 1991; Desmond, 1994). But Huxley's own words, written in 1889 for his autobiography, sum up the position of the synthesizer perfectly:

... I am afraid there is very little of the genuine naturalist in me ... species work was always a burden to me; what I cared for was the architecture and engineering part of the business, the working out of the wonderful unity of plan in the thousands and thousands of diverse living constructions, and the modifications of similar apparatuses to serve diverse ends. (Huxley *in de Beer*, 1983)

While museum systematists are, of course, very often concerned with species work, it is in museums that the natural history synthesizers tend to be found. They occur also in research institutes and universities, but there are many fewer involved with species taxonomy or higher classification in the universities now than in the past (at least in Britain).

My third type of natural historian, the process analyst, who is involved more with studying natural process than pattern, is usually found in a university or applied research institute. The discipline involved primarily is ecology, but behaviour and population genetics fall into this grouping. Ecologists have a profound influence in the way we view processes in the natural world. Like many other fields of research there is considerable subdivision within the subject and much overlap with other subdisciplines of biology.

Experimental approaches to ecology, and mathematical modelling of interactions between natural processes, are in the ascendant today. Rather less evident, although still very important, is field-based, observational ecology. Within natural history, experimentalists have had considerable impact in the fields of population genetics, embryology and speciation mechanisms. Molecular techniques are becoming

increasingly important in all these fields. Experimentation facilitates manipulation of the environment so that the role of particular natural processes can be understood better.

I am doubtful that environmentalists should be included in natural history as a fourth type. They are often more part of politics, so perhaps it is best to say that the results of work in the arena of natural history should find their way into environmentalism rather than the other way around.

This scheme is a broad one; but the method of perceiving the subject of natural history in such a way seems preferable to my attempting a strict definition. Natural history attracts such a variety of temperaments and working styles—naturalists, scholars, scientists of various disciplines, archaeologists, historians interested in man and the natural world, and, these days, economists (who are trying to value the environment) and lawyers (who write and interpret legislation as it affects nature).

The purpose of this preamble is to make the point that societies such as the BENHS are likely to flourish by being conscious of their identity but, at the same time, sensitive to the complex situation in which they exist in the general biological arena of today.

For the entomological substance of this address I will illustrate the sort of work that has been carried out typically in natural history museums—mainly because it lends itself to facilities uniquely available in these institutions: namely collections of specimens, libraries (collections of literature), and facilities for studying anatomy. I hasten to add that this is not the only research undertaken at museums; much else is done. But it is the kind of work that provides a platform for discussing the second of the types of natural historian—the synthesizer.

Professional taxonomists spend some of their research time investigating the systematic relationships of particular taxa. These days, for taxonomic papers to be acceptable to most journals, providing taxonomic context is very important—and rightly so. Over several years, I have worked on certain species of Lepidoptera, or groups of species, that affect our understanding of phylogenetic relationships within particular areas of the lepidopteran phylogenetic tree. The species in question are not British; but because so many families of this order of insects are distributed globally, or across more than one zoogeographical region, the implications for our understanding of the groups in question apply to higher taxa found in Britain.

The general point I hope to illustrate is that the study of a relatively few species can alter our perceptions about areas of higher classification. The preliminary stage of such a research process is actually finding the species that provide this kind of added value.

The Lepidoptera fall into a number of broad groupings—not necessarily monophyletic. These are: primitive Lepidoptera; lower Ditryisia; and higher Ditryisia (mainly macrolepidopterans).

The most striking anatomical variation in adult Lepidoptera occurs within just 1% of all species (e.g. Kristensen, 1984). For example, within the primitive Lepidoptera there occurs a change from moths with chewing mandibles to those with a sucking proboscis formed from the galeae of the maxillae. The earliest proboscis is moved by extrinsic muscles and lacks intrinsic musculature—that is, musculature within the lumen of the proboscis. But even among this primitive 1% of the order, intrinsic musculature, which occurs throughout the rest of the order, has developed. The larvae of Micropterigidae, arguably the most primitive family of Lepidoptera, are free-living and the cuticle is highly modified. They differ markedly from the larvae of the next most primitive family, Heterobathmiidae, from tropical South America, which are leaf-miners and lack the modified cuticle.

NEPTICULIDAE: PYGMY MOTHS

Among the primitive Lepidoptera belongs a family of very small moths (with a wing-span sometimes under 6 mm) belonging to the family Nepticulidae—pygmy moths. The larvae of most species are leaf-miners; some tunnel in thin bark, others in the petioles and midribs of leaves, and a few in the seed capsule or wings of winged seeds of *Acer*. Nepticulids are predominantly temperate, but many subtropical and tropical species exist. There are about 600 described species and many still to be described. For example, only a few of the many Australian species already collected have been named.

Some years ago, I worked on the Nepticulidae in South Africa. Given the widespread distribution of the family, it was necessary to examine examples from as wide a geographical range as possible (globally in this case) to examine critically the higher classification of the family (that is, from the genus upwards). Material was borrowed, virtually all of it unstudied, from the Australian National Insect Collection in Canberra.

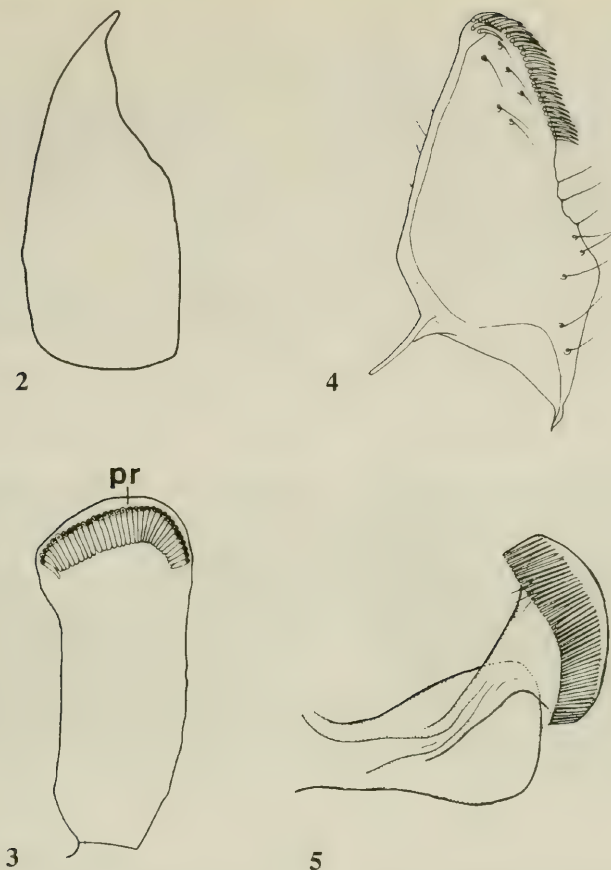
The male genitalia of all Nepticulidae examined to that time had a valva of the kind illustrated in Fig. 2. Although there is some variation in shape, most nepticulid valvae are approximately triangular. Modifications exist in some species, but this shape is widespread. By contrast, in Opostegidae (see Davis, 1989), the family considered to be the closest relatives of Nepticulidae, a more strongly modified valva occurs (e.g. as in Fig. 5). In particular, opostegids have on the valva a series of peg-like sensilla termed a 'pectinifer'. The opostegid pectinifer occurs on a stalk. Among the Australian nepticulid material were many species with peg-like sensilla on their valvae (Scoble, 1982), as in Figs 3 and 4. Although not borne on a stalk, these sensilla occur in the usual comb-like arrangement. In species with a rounded apex to the valva (e.g. Fig. 3), they are positioned around the apex.

Pectinifers are found in other monotrysian Lepidoptera. Indeed, Janse coined the term pectinifer for the comb-teeth in certain Incurvarioidea and restricted its use to the situation where it was borne on a stalk. The structure of these sensilla is similar under the light microscope. The presence of comb-teeth in Opostegidae and Incurvarioidea led Kristensen and Nielsen (1980) to suggest that, although there was evidence that Nepticulidae and Opostegidae were sister-groups (closest relatives to each other) because of the presence of 'eye-caps' (expanded antennal scapes), that observation should be weighed against the possible sister-group relationship between Opostegidae and Incurvarioidea as a result of their sharing the presence of pectinifers.

The discovery of these unusual pectinifers in Nepticulidae removes the argument for treating Opostegidae as the closest relatives of Incurvarioidea. Indeed, given the similarities between the two families, one wonders if there is anything useful to be served by treating Nepticulidae and Opostegidae as separate families rather than as subfamilies Nepticulinae and Oposteginae of the family Nepticulidae.

BUCCULATRIX (LEUCOEDEMIA) INGENS

My second example (Scoble & Scholtz, 1984) falls within the lower Ditrysia. (The Ditrysia are those Lepidoptera in which the female has two reproductive pores—one for egg laying and the other for mating. They contrast with those monotrysian species, relatively few in number, in which there is a single pore. This division is a fundamental one in lepidopteran classification and was adopted by Börner in 1925.)



Figs 2-5. Valvae of male genitalia of Nepticuloidea. 2, *Stigmella* (Nepticulidae); 3, 4, *Pectinivalva* (Nepticulidae); 5, *Notiopostega* (Opostegidae) (after Davis, 1989). pr, pectinifer.

The genera *Bucculatrix* and *Leucoptera* will be known to all British lepidopterists, especially those interested in leaf-miners. Until fairly recently, both genera were placed in the Lyonetiidae but in separate subfamilies—Bucculatricinae and Cemiostominae respectively. Externally, the wing colour and pattern of these small moths look very different.

From galls on the stems of *Ozoroa paniculosa* (Anacardiaceae) from South Africa emerged a series of moths that looked like a large species of *Leucoptera* (Plate V, Fig. 1). The wings are glossy white with darker markings near and at their tips. Moreover, the scape of the antenna is expanded into an 'eye-cap', and the scales are appressed to the head (smooth-scaled condition). Certainly the moth hardly resembles typical *Bucculatrix* species with their rather drab wings.

The habit of living in galls is not typical either of *Bucculatrix* or of *Leucoptera* species. What was peculiar was the appearance of the cocoon, which was ribbed and

strong, resembling the typical *Bucculatrix* cocoon rather than the delicate, white fusiform cocoon spun by larvae of *Leucoptera*.

A study of the literature revealed that there is a group of species in North America with their larvae living in stem galls or simply stems of Compositae (Braun, 1963). So stem/gall feeding in *Bucculatrix* does exist. Also, examination of the larvae showed that setae L1 and L2 on abdominal segments 1–8 were well separated, unlike the situation in Cemiostominae. Although scales are frequently appressed to the head in Cemiostominae, this is by no means always the case. An expanded scape is perhaps more visible in the Cemiostominae, but it occurs also in *Bucculatrix*. Even the glossy white of the wings is not universal in Cemiostominae. The apparent similarities between *ingens* and Cemiostominae are not demonstrably shared specializations.

The suggestion that *ingens* should be assigned to *Bucculatrix* rather than Cemiostominae was the presence of its ribbed cocoon and of a pupa with appendages free from, not fused to, the body. In the Cemiostominae, the appendages of the pupa are firmly fixed to the body. This latter pupal condition is almost certainly the specialized state, so while its absence in *ingens* does not indicate a relationship with *Bucculatrix*, it is a reason for excluding the species from Cemiostominae.

The discovery of *ingens* adds another dimension to the genus *Bucculatrix*, for it now includes a species of moth with glossy white wings and prominent 'eye-caps'. An important point to note is that without a study of the immature stages, *ingens* would probably have been assigned to the Cemiostominae.

Differences obviously exist between most species of *Bucculatrix* and *ingens*. For this reason, a new subgenus was created for *ingens*. The South African species was deliberately kept within *Bucculatrix* to emphasize the similarities rather than the differences.

The phylogenetic distinction between Lyonetiidae and Bucculatricidae is, it would appear, far greater than expected for it was argued by Kyrki (1984) that the groups actually belong to separate superfamilies.

BUTTERFLIES

What talk on Lepidoptera could possibly fail to mention the butterflies—the honorary birds of the insect world. Fortunately I have an illustration in connection with butterfly taxonomy for my third example. The eminent Japanese lepidopterist Professor Hiroshi Inoue was once asked by the late Emperor of Japan, who was greatly interested in natural history, a question that probably everyone in this room has been confronted with at one time or another. That is: what is the difference between butterflies and moths? Professor Inoue answered that the difference exists only in our minds.

Among the Geometridae (the moths with 'looper' caterpillars), in the subfamily Oenochrominae, were placed a series of rather delicate-winged, slender-bodied species from tropical America (Plate V, Figs 2–4) (Scoble, 1986; Scoble & Aiello, 1990). The oldest available generic name was *Macrosoma*. At first glance, these insects do indeed look like Geometridae. However, they lack abdominal tympanal

Plate V. 1, *Bucculatrix* (*Leucoedemia*) *ingens* Scoble & Scholtz (Bucculatricidae); 2–4, *Macrosoma* species (Hedylidae) 2, *M. semiermis* (Prout); 3, *M. subornata* (Warren); 4, *M. lucivittata* (Walker); 5–6, *Hypsidia* (Drepanidae)—5, *H. erythropsalis* Rothschild; 6, *H. niphosema* (Lower). (1,5,6 prepared by Phil Hurst of The Natural History Museum Photographic Unit.)



1. *Bucculatrix (Leucoedemia) ingens*



2. *Macrosoma semierris*



3. *Macrosoma subornata*



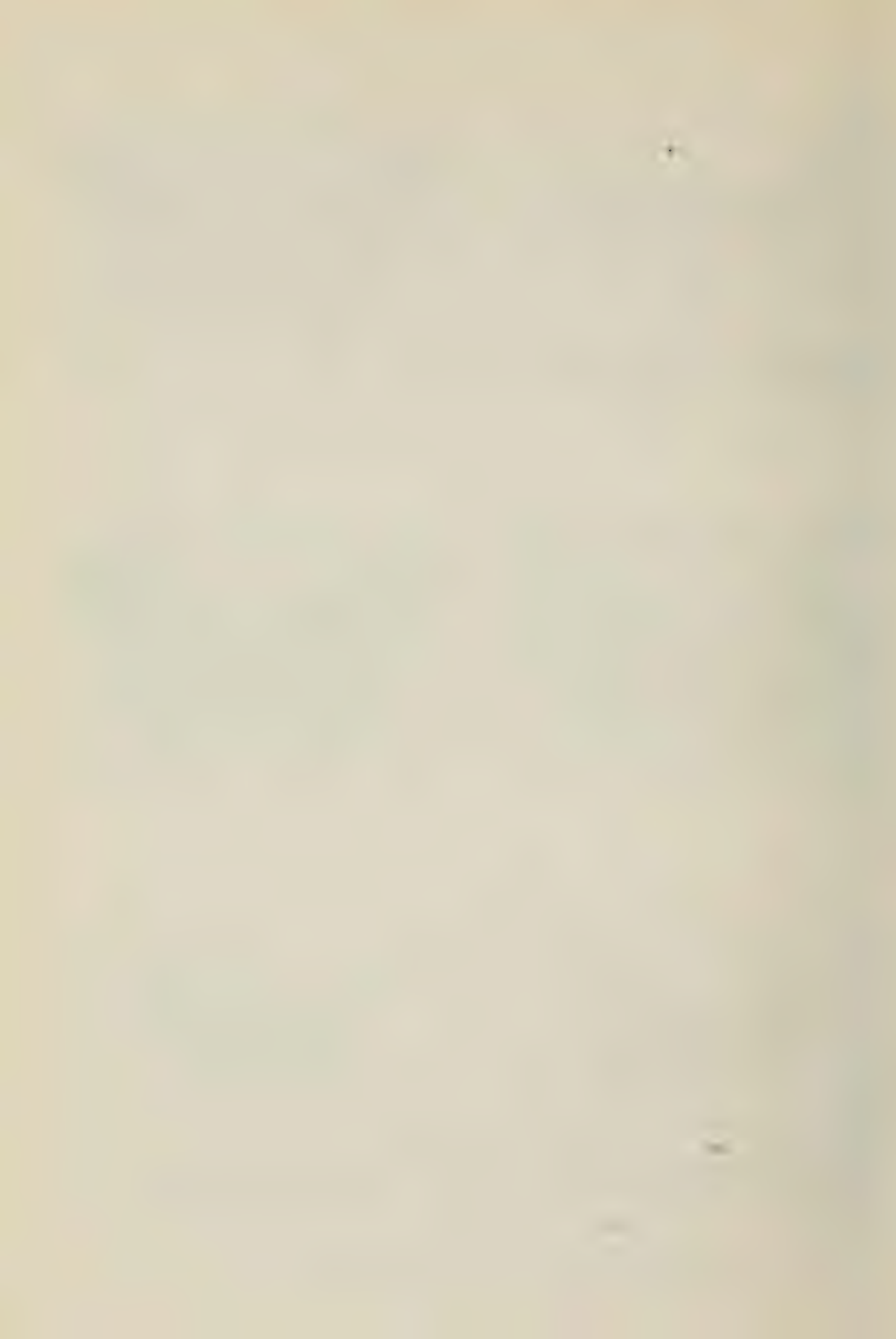
4. *Macrosoma lucivittata*



5. *Hypsidia erythrospalis*



6. *Hypsidia niphosema*



organs. Apart from females of wingless or wing-reduced Geometridae, all geometrids have tympanal hearing organs located at the base of the abdomen. Although just a small proportion of lepidopteran families have tympanal organs (although not always located in the base of the abdomen), those families that do have these structures include those with very high numbers of species—Pyrallidae, Geometridae, Noctuidae (and all the other noctuoid families). This means that most species of Lepidoptera do have tympanal organs.

The structure of lepidopteran tympanal organs varies in structure and position. In the Geometridae their anatomy is unique. In particular, there is a sclerite that curves over the tympanum and it is from this sclerite that the receptor is attached to the tympanic membrane. This sclerite is called the ansa, or tympanic handle. *Macrosoma* and its relatives lack any sign of an abdominal tympanal organ. Nor were some other features of *Macrosoma* adults typical of Geometridae. The wing venation is unlike that in Geometridae: the veins in the forewing are not fused in *Macrosoma*, but appear more simple than in Geometridae. Another peculiarity was the reduction (by fusion) in the number of the tarsomeres in the foreleg of males from five to two. The overall length of the foretarsi is not reduced—in fact the forelegs are sometimes very long. In addition, the pretarsus is reduced. A further character not shared by *Macrosoma* and Geometridae is the pouched condition in *Macrosoma* of the first abdominal tergum.

While examining the accessions, I came across a specimen with pupal exuviae attached to the pin. This remarkable specimen showed the presence of a silken girdle across the base of the abdomen (the first abdominal segment). It was after examining adult material, and the pupal shell just mentioned, that a last instar larva was received from Mr Roy Kendall, who had collected specimens feeding on *Byttneria aculata* (Steruliaceae) in Mexico (Kendall, 1976).

A prominent feature in the larva of all of the few species of *Macrosoma* for which material is available, is the presence of a full set of prolegs. In Geometridae, typically, the larval prolegs are reduced in number to a pair on abdominal segment 6 and a pair on segment 10. In *Macrosoma*, as in macrolepidopterans generally, there is a pair on each of abdominal segments 3–6 and a pair on segment 10. In some geometers, additional prolegs are present in, for example, Archiarinae, some true Oenochrominae and some Ennominae. But usually these are reduced in number or in size. Prominent among the other features of the larva is the pair of cephalic processes ('horns') and the extension of the anal plate into a pair of furcae.

After receiving larval material, eggs of the same species were supplied by Dr Annette Aiello, from the Smithsonian Tropical Research Institute on Barro Colorado Island in Panama. These eggs resemble in general shape and, to a lesser extent, ribbing, those found in the butterfly family Pieridae and certain Nymphalidae. Since the study of these eggs, those of the type species of *Macrosoma* (*M. tipulata*) have been examined. Although not as elongated, they are of the same general shape and also are ribbed in the same way.

To which group of Lepidoptera is *Macrosoma* related? For the reasons discussed it is not a geometrid. Neither does it belong to any of the other families of macrolepidopterans with abdominal tympanal organs: Pyraloidea, Uraniidae, Drepanidae, Thyatiridae. The genus lacks thoracic tympanal organs, structures that delimit the Noctuoidea (e.g. Noctuidae, Lymantridae, Arctiidae).

Although *Macrosoma* looks moth-like in general appearance (filiform or even bipectinate antennae; drab wings; typically with a frenulum/retinaculum wing-coupling apparatus; and collected mainly at night at light), some features are

extremely similar to those found within butterflies. Some are fairly easily visible: the girdled pupa; the 'pouched' condition of the base of the abdomen in the adult insect; the downcurved state of the abdomen, particularly in males; the upright, fusiform egg; the fusion of most of the tarsomeres and the reduced pretarsus. Other features include: the close resemblance of the male genitalia to those of some Pieridae; the absence of fusion of the R veins in the forewing; the presence of small chambers, almost certainly tympanal organs, at the base of the forewing, and the appearance of the horned larva, which resembles those of apaturine nymphalid butterflies.

L. B. Prout noted the similarity of certain species of Hedyllidae (what he called 'Hedylicae') with some butterflies. But he considered the butterfly-like characters as convergent and never really questioned that these Lepidoptera belonged to the Geometridae.

The problem with accepting many of these butterfly-like characters as evidence for a close relationship between *Macrosoma* and butterflies, is that some of them occur only in particular subgroups of butterflies. There is no acceptable reason to assume that some of the characters in question (e.g. the alar tympanal organs, horned condition of the larva, reduced forelegs) are shared by *Macrosoma* and the most primitive butterflies. We simply do not know if there existed an ancestor of *Macrosoma* and the butterflies that shared these characters. There is, however, one character that possibly is shared uniquely between *Macrosoma* and the butterflies in general. This is the pouching of the first abdominal tergum. A girdled pupa is a feature shared by *Macrosoma* and true butterflies, but not skipper butterflies.

The first suggestion of the butterfly affinity of *Macrosoma* made in 1986 (Scoble, 1986) resulted in considerable interest. The eggs of *Macrosoma* were studied later (Scoble & Aiello, 1990). Recently, two papers dealing with, amongst other issues, the relationship between *Macrosoma* and butterflies have been written. One of these involved the cladistic analysis of a large dataset of morphological characters (de Jong *et al.*, 1996). The other (Weller & Pashley, 1995), although making use of morphological characters, has been innovative by applying molecular techniques in the search for butterfly origins.

The methods of both studies will doubtless be examined critically. But the results of the studies, with regard to the relationships of *Macrosoma*, leave us little closer to determining the exact relationship of *Macrosoma* to the butterflies. The study using morphological data suggested that *Macrosoma* and *Urania* (Uraniiidae) vie for being the closest relatives of the butterflies. The study involving a combination of morphological and molecular data lent added support to the close association of *Macrosoma* with Hesperioidea and Papilionoidea.

One message I gain from this interesting episode, as it relates to natural history, is that often high levels of taxonomic resolution can be achieved with a good collection, a microscope and carefully planned fieldwork. My impression is that substantially greater resolution is by no means certain in analyses with large morphological datasets or with molecular data. This comment should not be taken as a general attack on these procedures, for they are useful in refining classifications or providing confirmation. Rather, my aim is to emphasize the value of what can be achieved using well tried techniques.

DREPANIDAE

The final example involves three superfamilies: Pyraloidea, Noctuoidea and Drepanoidea but just six species of moths. All the species are from Australia, but, again, all three superfamilies are represented in Britain.

The study was carried out in collaboration with Mr Ted Edwards at the Australian National Insect Collection in Canberra (Scoble & Edwards, 1988). The genus *Hypsidia* was originally described for a single species as a pyralid by Lord Rothschild (Rothschild, 1896). More recently, another species was described. Both species are brightly coloured moths (Plate V, Figs 5 & 6) that live in the rainforest of northeastern Australia.

In a review of pyralid classification, Dr Eugene Munroe had noted (Munroe, 1972) that *Hypsidia* lacked a scaled base to the proboscis. In fact, the true relationship of the species is clear if the tympanal organs are studied. *Hypsidia*, like many other moths, has abdominal tympanal organs. But, as I mentioned before, the anatomy of abdominal tympanal organs differs between different families. In *Hypsidia*, the tympanal organs are typical of those of the families Drepanidae (the hooktips) and Thyatiridae (in Britain represented by the peach-blossom moth, *Thyatira batis*). The characteristics of the drepanid/thyatirid tympanal organs were first described in detail by Kennel & Eggers (1933). These structures include components from both sternal and pleural regions. Each tympanal organ is composed of two interconnecting chambers—a small one and a large one. The tympanic membrane is unique in being situated within the sternal component of the organ between the small and large chambers. The pleural element includes a distinctive three-armed sclerite.

This story has another element of interest. The male and female genitalia of these species are distinctive. In the male a pair of comb-bearing arms arise from the gnathos region, and in the female the ductus bursae takes the form of a spiral—in some species with a sclerite running through it. The Australian lepidopterist A. J. Turner described a genus *Baryphanes* for a greyish species of moth from southwestern Australia and placed it in the Noctuidae. Although it was later realized that *Baryphanes* was not a noctuid (Common, 1969), no other family was found for it. Actually, as a result of a study of its tympanal organs, the German entomologist Sick (1938) had already placed a related species in the drepanid complex (as *Cymatophorinae*), but under a different generic name.

During the course of his work on checklisting the Australian Lepidoptera, Ted Edwards came across four other species with genitalia similar to those structures in this group. All were collected from the sclerophyll forests of southwestern Australia. The typical comb-bearing arms in the male and the spiral ductus in the female show that these moths are closely related to the two brightly coloured species from the rain forest in northeastern Australia. Because the species all shared these characters, we included them in *Hypsidia*.

The first point to arise from this study is that the English-speaking world did not seem to be aware of the implications of the anatomical work on tympanal organs by the German morphologists. The relationships of *Hypsidia*, and indeed the delimitation of several families of Lepidoptera, are revealed by the structure of these organs. Second, and as with Hedyllidae, structural study reveals relationship much better than more superficial examination.

CONCLUDING THOUGHTS

The studies described above were selected to illustrate a synthetic approach to systematics. There are many other examples that could have been selected. The first point to emphasize in the context of this address is that the studies in question, and any general results derived from them, depended particularly on access to carefully curated collections. The second is that in two of the four studies explored, crucial material and information was received from the amateur community.

My final thought is that most systematists today would consider that their work should make some contribution towards the great biodiversity debate. Much of this effort is put into studying species richness. Our understanding of biological diversity is enhanced, however, by appreciating the breadth of structural diversity that exists, and the phylogenetic context into which it fits.

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EDITORIAL

NEW EDITOR SOUGHT

Having edited this journal for 10 years, I am now seeking to hand over the post of Honorary Editor to someone else. I give the position its full title because it has been an honour to do the work, continuing a publishing tradition which the Society has carried on for more than a century. I have learned a great deal of entomology and of entomologists during those years and have enjoyed every minute of it.

What then are the qualifications for a successor? A certain level of entomological knowledge is an advantage, but with the help of an editorial board, one does not need to be a specialist in every (or indeed in any) particular insect group. Any knowledge of typesetting or printing is useful, but the journal more or less runs itself when it comes to the technicalities of applying ink to paper. More important is the enthusiasm and orderliness to co-ordinate the various routines of acknowledging receipt of papers, getting them refereed, sending them for typesetting and then for proof-reading and finally constructing an issue and getting it off to the printers. This does take a bit of time, but the rewards are worth it. The satisfaction of seeing an issue, individually crafted and moulded, produced four times a year, offers a real sense of creativity and achievement.

I do not want to drop a new-comer straight into the middle of what might be seen by some as a daunting office, and I will be available to assist with a smooth transition and on hand to advise for as long as is necessary for the take-over to be complete. If anyone out there thinks that they could offer the Society the time and energy to take its journal into the twenty-first century, please contact me and I will be happy to fill in the details of exactly what is entailed.

RICHARD A. JONES

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