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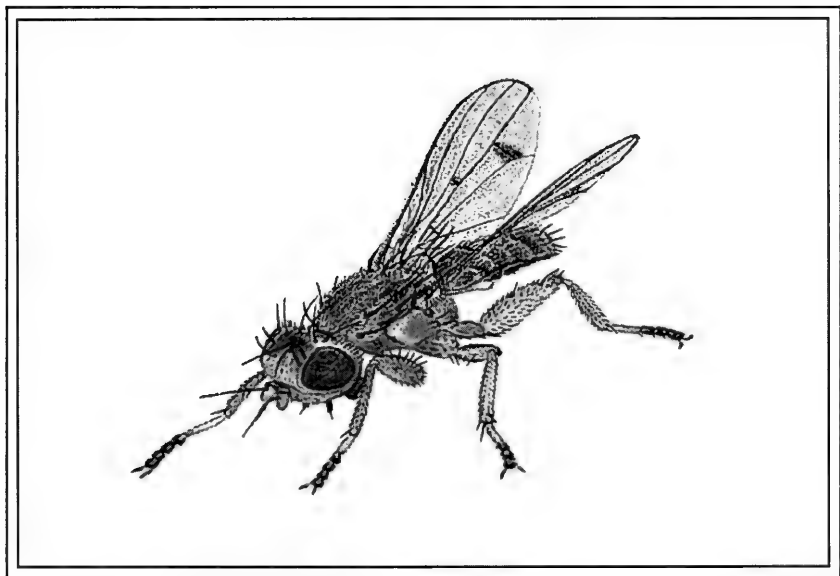
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**THE ACULEATE WASPS AND BEES (HYMENOPTERA:
ACULEATA) OF THE AINSDALE-FORMBY SAND DUNES
ON THE LANCASHIRE COAST COMPARED WITH OTHER
NORTHERN SITES**

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The main aims of this paper are, firstly, to give an account of the aculeate wasps and bees of the sand dunes of Ainsdale-Formby on the Lancashire coast, secondly, determine if the species list of the Ainsdale-Formby sand dunes is sufficiently complete to make comparisons with other sites, and thirdly, having shown the species list is sufficiently complete, to carry out comparisons at the community level with other north and north midland English sites.

The Ainsdale-Formby sand dunes are situated to the west of Ainsdale and Formby. Within the Ainsdale-Formby sand dunes the following sites have been sampled for aculeate wasps and bees: Birkdale Sandhills LNR (SD3013); Ainsdale Sandhills LNR (SD2912); Ainsdale Sand Dunes NNR (SD2911); National Trust Formby Point (SD2707); Lifeboat Road Formby Point (SD2706); Ravenmoels LNR (SD2706). These sites cover an area of about 940 ha, about 45% of the 2100 ha of the Sefton sand dunes (Atkinson & Houston, 1993).

The Ainsdale-Formby sand dunes consist of fore, yellow and grey dunes with wet and dry slacks and a small amount of salt marsh. Dune heath, shrubs (including sea-buckthorn), pine and deciduous trees are also present. Many of the pines on the seaward side are dead and, with extensive bramble patches, provide aerial nesting sites for aculeates. The bordering habitats are urban.

SOURCES OF RECORDS

The earliest records are given by Gardiner (1907), probably produced by B. Cooke, from the latter part of the nineteenth century. Although detailed localities are not given, ten species of solitary wasps and five species of solitary bees are from the Ainsdale-Formby sand dunes. All these species have been found subsequently.

Records have been obtained from specimens at the museums of Liverpool, Leeds and Manchester. Records from Liverpool museum were supplied by T. Mawdsley and C. Clee. The records are from 20 collectors (1930-1988) of whom H. Britten (1930-1964), C. M. Jones (1950-1969) and C. O'Toole (1962-1969) are the most important. Other specimens were examined by me at the museums of Leeds (A. Norris) and University of Manchester (C. Johnson). Relatively few records (from five collectors, 1907-1951) were found at Leeds. At Manchester, records from eight collectors (1906-1959) were found. The most important were those of H. Britten (1921-1947). Most museum records were derived from the following sites: National Trust Formby Point; Ainsdale NNR; probably Ainsdale LNR; and a few records from Birkdale LNR.

Kenneth-Booker (no date) produced a list of 60 aculeate wasp and bee species recorded during 1976 at Ainsdale NNR. This list was extended by five species in a letter sent to G. R. Else during 1981. Another listing of 79 aculeate wasp and bee species, covering the years 1975-1980, was sent to me by W. Kenneth-Booker (*pers. comm.*, 1989). C. O'Toole sent a list of 73 aculeate wasp and bee species recorded from Ainsdale NNR (*pers. comm.*, 1988).

I visited the Ainsdale–Formby sand dunes on eleven days during 1983–1989. My visits were mainly to Ainsdale LNR, Ravenmoels LNR, Lifeboat Road Formby Point and National Trust Formby Point. I also have identified specimens collected by A. Godfrey from a visit to Ainsdale NNR during 1990.

In summary, 31 collectors have provided records from the Ainsdale–Formby sand dunes from 1906 until 1990, with a few records from the latter part of the nineteenth century. Most records were made from April until September with a few records from February, March and October.

Names and the ordering of species in Appendix 1 are according to Kloet & Hincks (1978). However, where there have been name changes since Kloet & Hincks the new species names are used but the old species are indicated in brackets.

SPECIES PRESENT

A total of 110 species (94 solitary and 16 social species) has been recorded (Appendix 1). Since 1970, 19 of these species have not been recorded (Appendix 1). Most of these 19 species probably are still present, but the following species, with appropriate reference in brackets, almost certainly will have been lost: *Ancistrocerus nigricornis* (Curtis) (Archer, 1988), *Oxybelus mandibularis* Dahlbom (Edwards, 1977), *Lasioglossum laevigatum* (Kirby) and *Coelioxys quadridentata* (L.) (Else, in prep.).

SPECIES–AREA RELATIONSHIP

One of the problems in the study of any site is the difficulty of knowing when the species list is sufficiently complete so that comparisons with other sites may reasonably be carried out. One way to resolve this is the use of the species–area relationship, where the number of species and the area of sites, both expressed as natural logarithms (\ln), can show a positive linear relationship (Usher, 1986). If the number of species in relation to the area of a site falls within the range of other sites which show a statistically significant species–area relationship, then the site may reasonably be compared with other sites. If the number of species in relation to the area of a site falls below the values of the other sites then this could indicate either many more species could be found at that site, or that the site consists of habitats which are particularly unfavourable for aculeate wasps and bees.

As an example of a favourable site where the species list is not sufficiently complete, Archer (1996c) found that the number of species of solitary aculeate wasps and bees from Sark fell well below the species–area relationship shown by the other Channel Islands. He suggested that about a further 35 species could be found on Sark to bring its number of species relative to its area to the level of species–area relationship of the other islands. I. C. Beavis (*pers. comm.*, 1997) has subsequently succeeded in finding 29 of the estimated 35 species on Sark.

Bog and closed woodland may be unfavourable habitats for aculeate wasps and bees and would be expected to have fewer species than the area of a site would indicate. For example, Askham Bog with an area of 49 ha should have about 71 species of solitary wasps and bees as calculated from the species–area relationship indicated in Fig. 1. Archer (1987) found that only 31 species have been recorded from this site, which is only about 44% of the number of species expected. Much of Askham Bog consists of bog and closed woodland.

The species–area relationship will be investigated with data from 18 sites from the north and north midlands of England (Table 1). Restriction of the comparison sites to north and north midlands sites is necessary because it is known that species–area

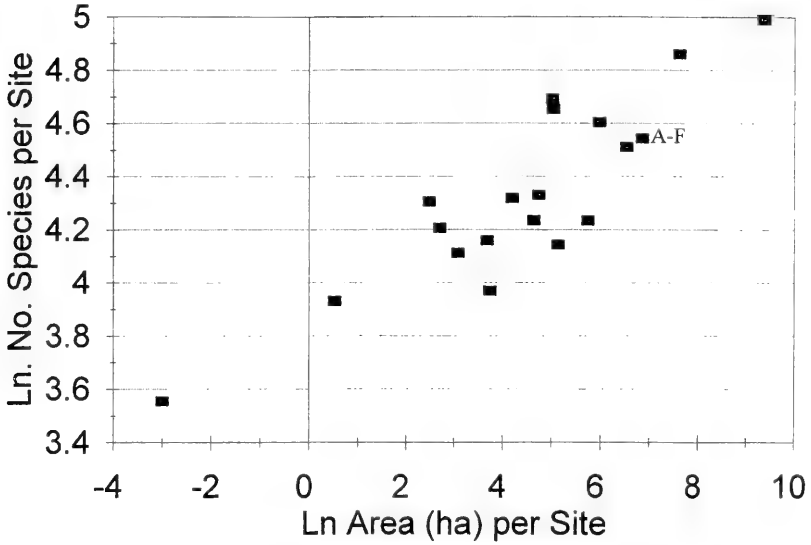


Fig. 1. A species–area relationship plot of 19 sites from the north and north midlands of England. A-F, Ainsdale–Formby sand dunes.

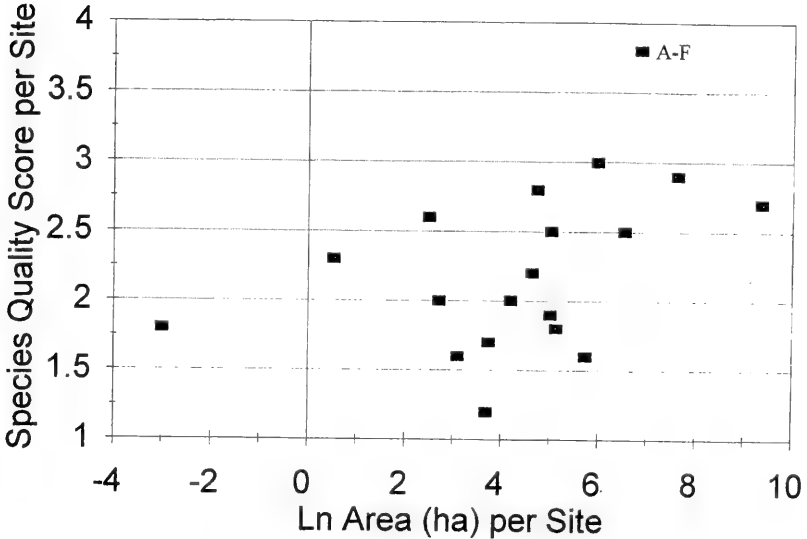


Fig. 2. A species quality score–area relationship plot of 19 sites from the north and north midlands of England. A-F, Ainsdale–Formby sand dunes.

Table 1. Grid references (G.R.), habitat characteristics*, cleptoparasitic loads (CL) and aerial nester frequencies (AF) of the solitary species, of 18 north and north midland English sites

Site name	G.R.	Habitat	CL		AF		Reference to Archer
			Wasps	Bees	Wasps	Bees	
Allerthorpe Common (pre-coniferized)	SE74	S	16.9	32.8	45.3	16.3	1989
Blaxton Common	SE60	S	15.0	26.5	43.1	13.9	1995
Burton Leonard Lime Quarries	SE36	Ca	16.7	25.8	68.0	13.0	1997
Charnwood Forest	SK41, SK51, SK50	S	18.1	27.0	71.2	22.2	1992b
Cave Wold	SE93	Ca	16.7	32.4	56.0	13.0	1997
Cornelian Bay	TA08	Cl	16.7	21.7	56.0	11.1	Unpub.
Crow Wood	SK69	S	16.9	28.9	20.4	9.4	1995
Duncombe Park	SE68	Ca	20.0	17.2	84.4	16.7	1993
Holmehouse Wood	SE04	Cl	10.3	31.6	53.8	7.7	Unpub.
Keswick Fitts	SE34	Si	22.2	30.0	67.9	21.4	Unpub.
Pompocali	SE34	S	20.0	36.6	20.0	8.0	1985
Risby Warren	SE91	S	17.2	29.4	12.5	8.3	1994
Sherwood Forest	SK66	S	17.6	25.0	47.6	19.4	1996e
Shipley Glen	SE13	S	15.6	34.9	56.6	7.1	1996d
Skipwith Common	SE63	S	13.2	35.5	42.4	30.0	1992a
Spurn Point	TA41	S	16.2	25.6	38.7	17.2	Unpub.
Strensall Common	SE65	S	18.0	35.0	41.5	8.0	1988
Swincarr Plantation	SE65	S	16.7	34.8	0.0	6.7	1984

*S sandy, Ca calcareous, Cl clay, Si silty.

relationship varies with latitude (Archer & Burn, 1995, Archer, 1996c). The species-area relationships are based on the species of solitary wasps and bees.

The species-area relationship of the 19 sites, including the Ainsdale-Formby sand dunes, is shown in Fig. 1. The dot for the Ainsdale-Formby sand dunes falls within the range of the 18 sites, and so the species list from the Ainsdale-Formby sand dunes can be considered sufficiently complete to make valid comparisons with other sites.

The correlation coefficient of the species-area relationship of the 19 sites indicates a highly significant linear relationship ($r = 0.88$, $p < 0.001$) with 77% of the variation of the number of species between sites being explained by the variation in the area of the sites. The species-area regression equation is: \ln number of species = $3.84 + 0.11 * \ln$ area (ha). Two other statistics from this regression equation are: 1. the number of species of solitary aculeate wasps and bees expected to be found on one ha is 47 (anti- \ln 3.84) and, 2. to double the number of solitary species of aculeate wasps and bees the area would need to be increased about 475-fold (2 raised to the power of $1/0.11$).

Possible reasons why the number of species should increase with increase in area are discussed by Archer & Burn (1995).

The 19 sites used for Fig. 1 are mainly sandy sites but also include calcareous sites: Burton Leonard Lime Quarries and Cave Wold, Duncombe Park; clay sites: Holmehouse Wood and Cornelian Bay; and silty river margin sites; Keswick Fitts (Table 1). Clearly the traditional belief that sandy sites have a higher species richness than non-sandy sites is not upheld. Probably what is more important is for a site to

have the particular resources needed by aculeate species. Morris (1997) gave a list of such resources: bare, dry and friable soil in sunny situations for subterranean nesters; dead plant stems or dead wood in sunny situations for aerial nesters; and ruderal plant communities and particular flower species as a source of pollen for oligolectic bees. To this list may be added other specific nesting sites, such as snail shells, rock surfaces in sunny situations, crevices in walls or other bare surfaces; specific nest building materials needed by some species, e.g. resin, cottony down of leaves, petals, clay; specific types of prey for the larvae of species of solitary wasps; and sources of nectar, either floral or extra-floral. It is possible for non-sandy, as well as sandy sites to contain these resources.

SPECIES QUALITY

Information about the status and quality scoring (Archer, 1996a) of aculeate wasps and bees is given in Shirt (1987), Falk (1991), and Archer (1996b, 1997a, 1997b, 1998a). Archer's national statuses (Appendix 2) will be used since these statuses use the new information from the *Newsletters* of the Bees, Wasps and Ants Recording Society (BWARS) and consider all species, not just the RDB and nationally scarce species. Caution must be exercised in the use of quality scoring since the status of a species is not fixed and needs to be kept under constant review.

The very rare, rare and scarce species are the high quality species. Seventeen high quality species have been recorded from the Ainsdale-Formby sand dunes, although only 14 species have been recorded from 1970 onwards (Appendix 1).

Each solitary species can be given a status value, so that a quality score for the Ainsdale-Formby sand dunes can be calculated (Table 2). Dividing the quality score by the number of species gives the species quality score. The species quality score for both All Records and 1970 Records Onwards is the same (3.8, Table 2).

How does this species quality score compare with those from the other 18 sites?

SPECIES QUALITY SCORE-AREA RELATIONSHIPS

A plot of species quality scores versus the area (in natural logarithms) for the 19 sites from the north and north midlands of England, including the Ainsdale-Formby sand dunes, is shown in Fig. 2. The correlation coefficient is not significant ($r=0.45$, $p>0.05$), and only 20% of the variation of species quality scores between sites is

Table 2. The Archer national quality scores of the species of solitary wasps and bees recorded from the Ainsdale-Formby sand dunes, for All Records (AR) and 1970 Onwards Records (OR) (Species quality score 3.8 for All Records and 1970 Onwards Records)

Status	Status Value (A)	No. species (B)		Quality Scores (A*B)	
		AR	OR	AR	OR
Universal	1	51	44	51	44
Widespread	2	25	19	50	38
Restricted	4	1	0	4	0
Scarce	8	8	6	64	48
Rare	16	6	6	96	96
Very Rare	32	3	2	96	64
Total		94	77	361	290

explained by the variation in the area of sites. These observations would seem to indicate that species quality scores are relatively independent of site area. Nevertheless, within the geographical area of the north and north midlands of England, the species quality score for the Ainsdale-Formby sand dunes is the highest yet recorded (Fig. 2). The reason for this high score, at present, is unknown.

CLEPTOPARASITIC LOAD

The cleptoparasitic load (CL) is the percentage of aculeate species that are cleptoparasites (or parasitoids) on other host aculeates. Wcislo (1987) showed that parasite behaviour among aculeate Hymenoptera correlated with geographical latitude. Thus the parasitic rates are higher in temperate regions as host populations are more synchronized in their life-history characteristics. From a review of the literature Wcislo (1987) found the CLs in Europe for bees varied between 16% and 33%, a range of 17%.

The CLs for the solitary bees from north and north midlands sites vary between 22% and 37% (Table 1) (except for Duncombe Park), a range of 15%. The range of values of CL for the English sites is similar to the wider European sites (Wcislo, 1987). The low CL for Duncombe Park is due to the loss of all *Sphecodes* species from this site (Archer, 1993). The CL for the solitary species of bees from the Ainsdale-Formby sand dunes (Table 3) falls within this range.

Wcislo (1987) gives no CL values for wasps. However, for the north and north midland sites, CL values for the solitary wasps have been found to vary between 10% and 22% (Table 1). The narrow range of this variation indicates that the argument Wcislo (1987) developed for the bees also applies to the solitary wasps. The CL for the solitary species of wasps from the Ainsdale-Formby sand dunes (Table 3) falls within this range.

Archer & Burn (1995) discussed why the CLs for the solitary bees are higher than the CLs for the solitary wasps. They argue that it is probably a consequence of food-chain relationships.

AERIAL NESTER FREQUENCY

The aerial nester frequency (AF) is the percentage of host aculeate species that have aerial nest sites. Aerial nesters used old beetle burrows in dead wood, central stem cavities, e.g. bramble, old snail shells, or crevices in cob walls, old mortar or exposed on the surface of rock or other hard material. Subterranean nesters nest in the soil, usually in burrows dug by themselves, but sometimes holes and crevices are used after being altered.

Table 3. The relative frequency of the cleptoparasitic (or parasitoid) species among the species of solitary wasps and bees recorded from Ainsdale-Formby sand dunes

	No. hosts (H)	No. cleptoparasites (C)	Cleptoparasitic Load CL = 100*C/(H + C)
Solitary wasps*	45	8	15.1
Solitary bees	30	10	25.0

**Cleptes nitidulus* excluded as not a parasitoid of an aculeate.

Table 4. The nesting habits of the host species of solitary wasps and bees recorded from Ainsdale-Formby sand dunes

	No. aerial nesters (A)	No. subterranean nesters (S)	Aerial nester frequency AF = 100*A/(A + S)
Solitary wasps	18	27	40.0
Solitary bees	7	23	23.3

The AFs for the solitary wasps from the north and north midlands sites vary between 0% and 84%, and for the solitary bees between 7% and 22% (Table 1). For the Ainsdale-Formby sand dunes the AF for the solitary wasps falls into the middle of the range of the English sites, but for the solitary bees the range is extended slightly upwards (Table 4). The Ainsdale-Formby sand dunes are relatively richer in aerial-nesting solitary bees. An investigation of why this should be so remains to be done.

The AF for the solitary wasps is higher than the AF for the solitary bees (Table 4). Why should this be so?

Archer (1990) found that the summer abundance of solitary wasps was more sensitive to summer weather conditions than solitary bees. Solitary wasp abundance was positively related to higher mean temperature and hours of sunshine and decreases in rainfall. Lomholdt (1975) showed that aerial nester frequency increased with increasing latitude for the solitary wasps (Sphecidae, 28% in France and 79% in northern Norway) along a decreasing warmth gradient. Perhaps the species of solitary wasps in order to take advantage of any warmth tend to have aerial nesting sites, since such sites are likely to warm up earlier in the day and stay warmer for a longer period of time than subterranean nesters? No investigation of this hypothesis has taken place.

SUMMARY

In comparison with the other sites from the north and north midlands the community of species of solitary wasps and bees from the Ainsdale-Formby sand dunes:

- Has the expected number of species for the area of the site, and so can properly be compared with the other sites.
- Has a higher species quality score than the other sites.
- Has similar cleptoparasitic load to those of other sites as predicted by Weislo (1987).
- Has an average aerial nester frequency (AF) for the solitary wasps and a higher AF for the solitary bees.

REFERENCES

- Archer, M. E. 1984. The solitary bees and wasps (Hymenoptera: Aculeata) of a sand-pit at Swincarr Plantation, near York. *Naturalist* **109**: 23-25.
- Archer, M. E. 1985. The wasps and bees (Hymenoptera: Aculeata) of Pompcali, near Leeds: The first 27 visits. *Naturalist* **110**: 49-51.
- Archer, M. E. 1987. The aculeate wasps and bees (Hymenoptera: Aculeata) of Askham Bog. *Bull. Yorkshire Naturalists' Union* **8**: 22-23.
- Archer, M. E. 1988. The aculeate wasps and bees (Hymenoptera: Aculeata) of my local patch: Strensall Common, the first 70 visits. *Naturalist* **113**: 25-30.

- Archer, M. E. 1989. The wasps and bees (Hymenoptera: Aculeata) of Allerthorpe Common before and after coniferisation. *Naturalist* **114**: 129–136.
- Archer, M. E. 1990. The solitary aculeate wasps and bees (Hymenoptera, Aculeata) of an English suburban garden. *Entomologist's Gaz.* **41**: 129–142.
- Archer, M. E. 1992a. Aculeate wasps and bees (Hymenoptera: Aculeata) of Skipwith Common and a comparison of Skipwith Common with Allerthorpe and Strensall Commons. *Naturalist* **117**: 19–25.
- Archer, M. E. 1992b. A comparison of the solitary wasps and bees (Hym., Aculeata) of Charnwood Forest, Leicestershire and Lydford Moorland, Devon. *Entomologist's mon. Mag.* **128**: 51–57.
- Archer, M. E. 1993. The aculeate wasps and bees (Hymenoptera: Aculeata) of Duncombe Park in Watsonian Yorkshire. *Naturalist* **118**: 37–44.
- Archer, M. E. 1994. The aculeate wasps and bees (Hymenoptera: Aculeata) of Risby Warren in Watsonian Lincolnshire. *Trans. Lincolnshire Naturalists' Union* **23**: 123–131.
- Archer, M. E. 1995. Aculeate wasps and bees (Hymenoptera: Aculeata) of Blaxton Common in Watsonian Yorkshire with the introduction of a new national quality scoring system. *Naturalist* **120**: 21–29.
- Archer, M. E. 1996a. The use of solitary wasps and bees in site assessment for wildlife conservation, in Eyre, M. B. (ed.). *Environmental Monitoring, Surveillance and Conservation using Invertebrates*. E.M.S. Publications: 14–17.
- Archer, M. E. 1996b. The status and quality coding of the species of mason wasps (Hymenoptera: Eumeninae). *BWARS Newsletter, Autumn 1996*: 4–5.
- Archer, M. E. 1996c. The aculeate wasps and bees (Hymenoptera: Aculeata) of Herm and Sark, Channel Islands. *Entomologist's Gaz.* **47**: 53–59.
- Archer, M. E. 1996d. The aculeate wasps and bees (Hymenoptera: Aculeata) of Shipley Glen in Watsonian Yorkshire with a “then” and “now” comparison. *Naturalist* **121**: 53–59.
- Archer, M. E. 1996e. The aculeate wasps and bees (Hym., Aculeata) of Sherwood Forest in Nottinghamshire and the development of a national quality assessment scheme. *Entomologist's mon. Mag.* **132**: 35–44.
- Archer, M. E. 1997a. Status and quality coding of species—Part 2. *BWARS Newsletter, Spring 1997*: 4–5.
- Archer, M. E. 1997b. Status and quality coding of species of Aculeate Hymenoptera—Part 3. *BWARS Newsletter, Autumn 1997*: 8.
- Archer, M. E. 1997c. The aculeate wasps and bees (Hymenoptera: Aculeata) of two calcareous localities in Watsonian Yorkshire: Burton Leonard Lime Quarries and Cave Wold. *Naturalist* **122**: 45–52.
- Archer, M. E. 1998a. Status and quality coding of species of aculeate Hymenoptera Part 4. *BWARS Newsletter, Spring 1998*: 9–10.
- Archer, M. E. 1998b. Species profile and map of British distribution of *Ancistrocerus nigricornis*. *BWARS Newsletter, Spring 1998*: 22–23, 34.
- Archer, M. E. and Burn, J. T. 1995. The aculeate wasps and bees of Crow Wood, Finningley in Watsonian Yorkshire, with the introduction of a new national quality scoring system. *Br. J. Ent. Nat. Hist.* **8**: 49–59.
- Atkinson, D. and Houston J. (eds.). 1992. *The sand dunes of the Sefton Coast*. National Museums and Galleries on Merseyside.
- Ball, S. 1996. Red Data Books. *ISR News* **5**: 2–5.
- Edwards, R. (ed.). 1998. *Provisional atlas of the aculeate Hymenoptera of Britain and Ireland. Part 1*. Biological Records Centre, Huntingdon.
- Else G. R. In prep. British Bees. Hymenoptera, Apoidea.
- Falk, S. 1991. *A review of the scarce and threatened bees, wasps and ants of Great Britain*. Nature Conservancy Council, Peterborough.
- Gardiner, W. 1901. A list of Hymenoptera Aculeata so far observed in the counties of Lancashire and Cheshire. *Trans. Liverpool Biol. Soc.* **15**: 363–423.
- IUCN Species Survival Commission. 1994. *IUCN Red List Categories*. IUCN Council, Gland, Switzerland.

- Kenneth-Booker, W. no date. A list of aculeate Hymenoptera (with notes on habitats and ecological relationships) observed in 1976, on the Ainsdale sand dunes National Nature Reserve, Lancashire. Unpublished report.
- Kloet, G. S. and Hincks, W. D. 1978. A check list of British Insects. part 4. Hymenoptera, revised by Fitton, M. G. *et al. Handbks Ident. Br. Insects* 11(4).
- Lomholdt, O. 1975. The Sphecidae (Hymenoptera) of Fennoscandia and Denmark. *Fauna Ent. Scand.* 4: 1–224.
- Morris, R. K. A. 1997. The fauna of a small London grass heath, with comments on the use of site quality scores for site evaluation. *London Naturalist* 76: 105–127.
- Pienkowski, M. W. (ed.). 1993. A contribution to development of a system to assess nature conservation quality and to set targets for the national action plan required by the Convention on Biological Diversity. *JNCC Report No. 163*. 1–216.
- Shirt, D. B. (ed.). 1987. British Red Data Books: 2. *Insects*. Nature Conservancy Council, Peterborough.
- Wcislo, W. T. 1987. The role of seasonality, host synchrony and behaviour in the evaluations and distributions of nest parasites in Hymenoptera (Insecta), with special reference to bees (Apoidea). *Biol. Rev.* 62: 515–543.
- Usher, M. B. 1986. *Wildlife Conservation Evaluation*. Chapman and Hall, London.

APPENDIX 1

A list of the aculeate Hymenoptera recorded from the Ainsdale-Formby sand dunes. V=very rare, R=rare, S=Scarce, RE=Restricted, W=Widespread, U=Universal species—see Appendix 2 for definitions. *Species not recorded from 1970 onwards.

Chrysididae—*Omalus auratus* (L.) (W), *Hedychridium ardens* (Latreille in Coquebert) (U), *H. cupreum* (Dahlbom) (= *integrum*) (S), *C. ignita* (L.) (U), *C. impressa* Schenck (U)*, *Cleptes nitidulus* (Fab.) (R).

Mutillidae—*Myrmosa atra* Panzer (W)*.

Pompilidae—*Priocnemis parvula* Dahlbom (U), *Pompilus cinereus* (Fab.) (U), *Arachnospila anceps* (Wesmael) (U), *A. trivialis* (Dahlbom) (W), *A. wesmaeli* (Thomson) (R), *Evagetes crassicornis* (Shuckard) (U), *Anoplius nigerrimus* (Scopoli) (U), *A. infuscatus* (Vander Linden) (W), *Episyron rufipes* (L.) (W), *Ceropaes maculata* (Fab.) (R).

Eumenidae—*Ancistrocerus nigricornis* (Curtis) (W)*, *A. parietinus* (L.) (U), *A. parietum* (L.) (U), *A. scoticus* (Curtis) (U)*, *Synmorphus bifasciatus* (L.) (= *mutinensis*) (U).

Vespidae—*Dolichovespula sylvestris* (Scopoli), *Vespula rufa* (L.), *V. germanica* (Fab.), *V. vulgaris* (L.).

Sphecidae—*Astata pinguis* (Dahlbom) (U), *Tachysphex pompiliformis* (Panzer) (U), *T. nitidus* (Vander Linden) (= *unicolor*) (S), *Crabro cribrarius* (L.) (U), *C. peltarius* (Schreber) (U), *Crossocerus tarsatus* (Shuckard) (U), *C. wesmaeli* (Vander Linden) (U), *C. annulipes* (Lepelletier & Brullé) (U), *C. megacephalus* (Rossius) (U), *C. quadrimaculatus* (Fab.) (W), *Ectemnius lapidarius* (Panzer) (U), *E. continuus* (Fab.) (U), *Oxybelus argentatus* Curtis (S)*, *O. mandibularis* Dahlbom (S)*, *O. unigumis* (L.) (U), *Psen littoralis* (Bondroit) (V), *P. bruxellensis* (Bondroit) (R), *P. equestris* (Fab.) (U), *Spilomena troglodytes* (Vander Linden) (W)*, *Pemphredon lugubris* (Fab.) (U), *P. inornatus* Say (U), *P. lethifer* (Shuckard) (U), *P. morio* Vander Linden (S), *Diodontus minutus* (Fab.) (U), *D. tristis* (Vander Linden) (W), *Passaloecus corniger* Shuckard (W), *P. gracilis* (Curtis) (W)*, *P. insignis* (Vander Linden) (W), *Ammophila sabulosa* (L.) (W), *Podalonia affinis* (Kirby) (R), *P. hirsuta* (Scopoli) (S), *Mellinus arvensis* (L.) (U).

Colletidae—*Colletes fodiens* (Geoffroy in Fourcroy) (W), *C. marginatus* Smith (S), *C. similis* Schenck (W)*, *C. succinctus* (L.) (U)*, *C. cunicularis* (L.) (V), *Hylaeus communis* Nylander (W), *H. brevicornis* Nylander (W), *H. hyalinatus* Smith (W)*.

Andrenidae—*Andrena clarkella* (Kirby) (U)*, *A. fulva* (Müller in Allioni) (U), *A. scotica* Perkins (U), *A. nigroaenea* (Kirby) (U), *A. denticulata* (Kirby) (U), *A. haemorrhoea* (Fab.) (U)*, *A. barbilabris* (Kirby) (U).

Halictidae *Halictus rubicundus* (Christ) (U), *Lasioglossum laevigatum* (Kirby) (RE)*, *L. albipes* (Fab.) (U), *L. calceatum* (Scopoli) (U)*, *L. nitidiusculum* (Kirby) (U), *L. punctatissimum* (Schenck) (W), *L. villosulum* (Kirby) (U), *Sphecodes ferruginatus* von Hagens (S), *S. geoffrellus* (Kirby) (= *fasciatus*) (U), *S. pellucidus* Smith (U).

Megachilidae *Stelis ornatula* (Klug) (R), *Osmia caerulea* (L.) (W), *O. leiana* (Kirby) (W), *O. aurulenta* (Panzer) (W), *Hoplitis claviventris* (Thomson) (W), *Megachile centuncularis* (L.) (U)*, *M. willughbiella* (Kirby) (U), *M. circumcincta* (Kirby) (U), *C. maritima* (Kirby) (W), *Coelioxys quadridentata* (L.) (V)*, *C. elongata* Lepeletier (U).

Anthophoridae—*Nomada marshamella* (Kirby) (U), *N. rufipes* Fab. (U), *Epeolus cruciger* (Panzer) (W), *E. variegatus* (L.) (U).

Apidae—*Bombus lucorum* (L.), *B. terrestris* (L.), *B. lapidarius* (L.), *B. pratorum* (L.), *B. hortorum* (L.), *B. pascuorum* (Scopoli), *Psithyrus barbutellus* (Kirby)*, *P. bohemicus* (Seidl), *P. campestris* (Panzer), *P. sylvestris* Lepeletier, *P. vestalis* (Geoffroy in Fourcroy)*, *Apis mellifera* L.

APPENDIX 2

The national statuses of species of solitary aculeate wasps and bees according to Archer, for England, Wales and Scotland, but excluding Ireland and the Channel Islands.

Very rare—Species found in 1–15 10 km squares, 1970 onwards.

Rare—Species found in 16–30 10 km squares, 1970 onwards.

Scarce—Species found in 31–70 10 km squares, 1970 onwards.

Restricted, Widespread and Universal species are found in more than 70 km squares, 1970 onwards.

Restricted—Species only found in the Institute of Terrestrial Ecology (I.T.E) Land Classification groups 1 and 2 (Pienkowski *et al.*, 1996)(Southern England, South-West and Southern Coasts). Roughly this is about half of England.

Widespread—Species found in I.T.E. Land Classification groups 3 and 4 (Midland Lowlands and Central Coasts) besides groups 1 and 2. Roughly this is about three-quarters of England, lowland Wales and south-west Scotland. Northumbria is excluded.

Strictly these definitions of restricted and widespread species are for southern restricted and widespread species. In practice northern restricted and widespread species can occur.

Universal—Species found throughout England, Wales and more extensively in Scotland, including further I.T.E. Land Classification groups 5 and 6 (Low Moorlands and Northern Uplands), but particularly groups 7 and 8 (Northern Lowlands and North-western Seaboard).

It is hoped that the statuses above, with those of Shirt (1987) and Falk (1991), and the IUCN statuses (IUCN Species Survival Commission 1994, Ball 1996) will be harmonized in the near future.

***OPHIOMYIA GNAPHALII* HERING (DIPTERA: AGROMYZIDAE)
IN *ANTENNARIA DIOICA* IN SCOTLAND**

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While collecting near the entrance to Gleann Mór (NO0076), Fealar, Perthshire (VC 89) on 25.ix.1997, a rosette of the plant *Antennaria dioica* was found, in which several of the leaves contained basal mines. Later careful dismantling of the rosette revealed that some 9 leaves were mined, apparently by a single larva moving from leaf to leaf. Each leaf had between 2 and 4 broad diverging feeding tracks extending from the petiolar up into the lamina of the leaf. These tracks rarely went more than two-thirds of the way up towards the leaf apex. The frass was concentrated in the petiolar part of the mine (Fig. 1). Positioned vertically at the centre of the rosette was a single vacated agromyzid puparium.

Two species of leaf-mining agromyzid are known from *Antennaria dioica* in Europe, namely:

Ophiomyia gnaphalii Hering, 1949

Phytomyza kyffhusana Hering, 1928

= *gnaphalii* Hering, 1963—for synonymy see Spencer (1990).

Both species also mine *Gnaphalium* sp.. The differences in the mines of the two species in *Gnaphalium* sp. are discussed by Hering (1949). However, Spencer (1972) describes the mine of *O. gnaphalii* in *Gnaphalium* as an "external stem mine" without any reference to the mine extending into several leaves. The mine of *O. gnaphalii* in *Antennaria dioica* was first described by Buhr (1960) and later by Spencer (1990). The mine of *P. kyffhusana* (under the name *P. gnaphalii*) in *A. dioica* is discussed by Hering (1963). On the basis of these descriptions and consultation of the appropriate mines in the Hering Herbarium (The Natural History Museum, London), the Fealar mines belonged to *Ophiomyia gnaphalii*. Furthermore Dr K. A. Spencer confirmed that the puparium was that of an *Ophiomyia* species. The eight lobed posterior spiracles of the puparium of *O. gnaphalii* (Fig. 2) have not previously been described or illustrated, but differ conspicuously from those of *P. kyffhusana* which have 16 18 lobes each (de Meijere, 1937; Hering, 1963). The mines and puparium are now in the collections of The National Museums of Scotland, Edinburgh.

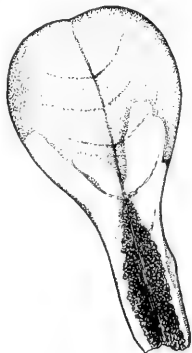


Fig. 1. Part of the mine of *Ophiomyia gnaphalii* in a leaf of *Antennaria dioica* from Fealar.

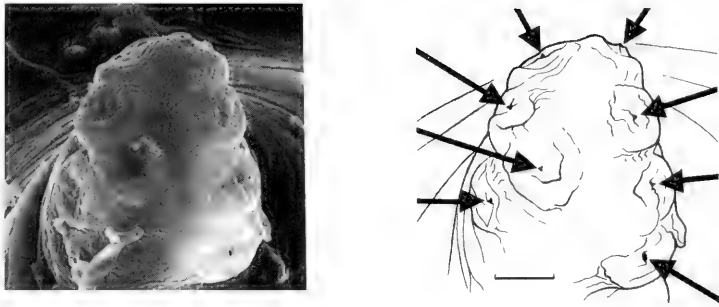


Fig. 2. (a) Scanning electron micrograph of a dorsal view of the right posterior spiracles of the puparium of *Ophiomyia gnaphalii*. (b) Diagram of the same posterior spiracles, to the same scale, with the eight individual spiracular openings indicated by arrows. The scale bar represents 10 μ m.

The present record of *O. gnaphalii* is the first record of the occurrence of this species in *Antemaria dioica* in Britain and only the second British record. It was first recorded in Britain from a single female fly taken on 18.vi.1902 at Ross, Herefordshire by Colonel Yerbury (Spencer, 1972). Abroad, the species seems to be known only from Germany.

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REFERENCES

- Buhr, H. 1960. Bemerkenswerte ober neue Gallen und Minen aus Thüringen. *Mitt. thüring.-bot. Ges.* **2**: 56–150.
- Hering, E. M. 1949. Neue Palaearktische Agromyziden. *Notul. ent.* **29**: 18–32.
- Hering, E. M. 1963. Neue Blattminen-Studien III. (Dipt., Lep.). *Deut. ent. Z. (N.F.)* **10**: 221–250.
- Meijere, J. C. H. de 1937. Die Larven der Agromyzinen. Dritter Nachtrag. *Tijdschr. Ent.* **80**: 167–243.
- Spencer, K. A. 1972. Diptera, Agromyzidae. *Handb. Ident. Br. Insects* **10** 5(g).
- Spencer, K. A. 1990. *Host specialisation in the World Agromyzidae (Diptera)*. Kluwer Academic Publishers, Dordrecht, Netherlands, 444 pp.

NEST DESERTION BY BLACKBIRDS FOLLOWING DEFOLIATION OF AN ASH TREE BY SAWFLY LARVAE

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In late May 1993, a pair of blackbirds *Turdus merula* L. built a nest, at a height of about 7 m, in an ash tree *Fraxinus excelsior* L. (Angiospermae: Oleaceae) in an urban garden at the rear of a block of flats in Tooting, south-west London. When nearing completion, the nest was almost invisible amongst the foliage. However, as had occurred during the early summer of 1992, the tree was attacked by innumerable sawfly larvae (Insecta: Hymenoptera), which proceeded to defoliate the tree from the ground upwards.

Although it was not possible to rear the larvae to adults, many were collected in 70% ethanol. With the aid of a key to larvae (Lorenz & Kraus, 1957) and comparisons with material in the Natural History Museum (NHM), London, they were identified as *Tomostethus nigrinus* (Fab.) (Hymenoptera: Tenthredinidae, Blennocampinae). Specimens and photographs of the larvae and the affected tree have been deposited at the NHM.

At first, both sexes of the blackbirds benefited from feeding on the larvae but, soon, they were overwhelmed and, by 4th June, the pair was defending a nest wholly exposed in an almost bare tree. Nevertheless, the female persevered and at 18.30 hours was sitting in the nest, presumably on eggs, but this could not be confirmed. At 09.30 on the following day the female was again sitting tight. At 10.50 the male was feeding on the larvae at the top of the tree and at 10.55 the female was observed pecking at larvae, whilst still in the nest. She then left the nest to feed in the bare branches before returning, activities repeated throughout the day, and was last seen on the nest at 17.00 that evening. The following day both birds were feeding in the tree and, at 13.15, the female inspected the nest but did not sit in it. The female was again present in the tree at 13.00 on 7 June but, thereafter, the site was abandoned. The birds appeared to have given up their nesting attempt, perhaps for fear of predation (principally by domestic cats) in their exposed position, but it was also possible that the nest had been visited by renowned egg thieves, such as jays *Garrulus glandarius* (L.), magpies *Pica pica* (L.) or carrion crows *Corvus corone* L., (all Passeriformes: Corvidae), all of which are common in the area. In 1997, the tree was felled, preventing further investigation.

T. nigrinus belongs in a small genus of Holarctic sawflies of about 12 species, placed in the tribe Tomostethini of the Blennocampinae (Benson, 1952), with their main region of diversity in eastern Asia (Smith, 1969). British species are keyed in Benson (1952) and those from the Nearctic in Smith (1969). *T. nigrinus* has a wide distribution throughout the Palaearctic, occurring from the British Isles (Eire and Northern Ireland excepted) (O'Connor *et al.*, 1997) in the west, to eastern Siberia, Kamchatka, Sakhalin, Korea and Japan (Honshu) in the east; and from Sweden and Finland in the north to North Africa and Turkey in the south (Tsinovskij, 1953; Benson, 1968; Novák, 1976; Zhelokhovtsev, 1988; Hirashima, 1989; Liston, 1995; Zhelokhovtsev & Zinovjev, 1997).

The known larvae of *Tomostethus* are associated with Oleaceae and Juglandaceae (Benson, 1952); those of *T. nigritus* have been recorded from *F. excelsior* L. (Benson, 1952) and from *F. mandschurica* Rupr. var. *japonica* Maxim. in northern Japan (Okutani, 1967), both species belonging to section *Fraxinus* sensu Vassilijev (Vassilijev, 1952, as 'sect. *Bumelioides*'). Zirngiebl's suggestion (cited in Hoop, 1983) that the larvae may feed on *Ligustrum* L. is unconfirmed. The distribution of *T. nigritus* considerably exceeds the natural range of these two species, but seems to fall within the present range of sect. *Fraxinus* as a whole, allowing for timber plantings beyond the natural range in Russia (L. Springate, *pers. comm.*), suggesting exploitation of a wider range of hosts but only within that section.

T. nigritus is univoltine, with adults active between April and June, often alighting on opening buds of ash (Benson, 1940, 1952). Eggs are laid in small, pocket-like, openings on the newly-developing leaves (Novák, 1976). Larvae are gregarious and early instars may be found from May to June (Lorenz & Kraus, 1957). These perforate the leaves and feed, leaving only a small area between the veins; later instar and mature larvae consume the entire leaf, apart from the mid-rib (Novák, 1976). Thus, its pattern of damage to leaves appears to be quite different from that of another defoliator of *Fraxinus* spp., *Macrophya punctumalbum* (L.) (Tenthredinidae: Tenthredininae) which is characterised by 'rasping' marks on the leaf's upper epidermis caused by the adult insect, and circular holes made by the larvae, when it attacks *Ligustrum ovalifolium* Hassk. (cited as *L. californicum* hort. ex Decn.), the common hedging privet, a native of Japan (Wheeler & Hoebeke, 1994). *T. nigritus* was, however, classified as a leaf-edge feeder in a recent study on the feeding activity of some European sawflies (Heitland & Pschorn-Walcher, 1993), but the reason for this placement is unclear. Four and five larval instars are recorded for the males and females, respectively (Mrkva, 1965; Novák, 1976). Mature larvae drop from the ash trees, spin a light green pupal case (darkening to black, subsequently) and overwinter in the soil, emerging the following spring. Adults and larva are illustrated and other aspects of the species' biology, including its behaviour and range of parasitoids, are discussed in detail by Mrkva (1965).

T. nigritus is renowned as a species which may occur as an outbreak, for example, at Shirley, near Southampton, Hampshire during 1937 (Benson, 1952). The destructive defoliation by its larvae has been known for more than a century (Kaltenbach, 1874) and, in many parts of its range, it was and is considered a serious pest, for example, in western Europe (Escherich, 1941; Francke-Grosmann, 1953; Klausnitzer, 1978), southern Russia (Sharov, 1956), Sakhalin and Korea (Novák, 1976). However, its outbreaks appear to be sporadic rather than regular, as are those of the related Nearctic species, *T. multinctus* (Rohwer), which was considered to have become a light-to-medium outbreak only thrice during 59 years in the states of Minnesota and Wisconsin (Haack & Mattson, 1993).

Although sawflies and other herbivorous insects can defoliate trees to the point of destruction (e.g., Berryman, 1987; Gauld & Bolton, 1988; Larsson *et al.*, 1993), it is unlikely that the defoliation *per se* enforced desertion by the nesting pair of blackbirds. No accounts of other birds abandoning their nests after having had them so completely exposed to predators and egg-thieves, following the actions of insect herbivores, have been traced. Given the widespread distributions of both *T. nigritus* and its hosts within *Fraxinus* noted above, it is surprising that such events have not been recorded, even more so when sawfly, tree and nesting bird are common in urban environments. However, it is possible that birds nesting in the upper crowns of coniferous trees may encounter similar defoliations by other species of gregarious sawflies (e.g., species of Pamphiliidae and Diprionidae) and Lepidoptera.

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REFERENCES

- Benson, R. B. 1940. Sawflies of the Berkhamsted district, with a list of the sawflies of Hertfordshire and Buckinghamshire, and a survey of the British species (Hymenoptera Symphyta). *Trans. Hertfordshire Nat. Hist. Soc. and Field Club*, **21**: 177–231.
- Benson, R. B. 1952. Hymenoptera, Symphyta, Section (b), *Handbks. Ident. Br. Insects*, **6**(2b): 51–137.
- Benson, R. B. 1968. Hymenoptera from Turkey: Symphyta, *Bull. Brit. Mus. (Nat. Hist.)*, Entomology, **22**: 1–207.
- Berryman, A. A. 1987. The theory and classification of outbreaks, in: P. Barbosa and J. C. Schultz (eds), *Insect Outbreaks* (San Diego: Academic Press), pp. 3–30.
- Escherich, K. 1941. *Die Forstinsekten Mitteleuropas*, **5**(2) [Hymenoptera (Hautflügler)], (Berlin: Paul Parey), pp. 209–416.
- Fabricius, K. 1804. *Systema Piezatorum, secundum ordines, genera, species, adiectas synonymis, locis, observationibus, descriptionibus* (Braunschweig: C. Reichard), 440 pp.
- Francke-Grosmann, H. 1953. Symphyta (Chalostogastra, Tenthredinoidea) Holz-, Halm- und Blattwespen (Sägewespen) in H. Blunck (ed.), *Handbuch der Pflanzenkrankheiten*, **5**(2/1) (Berlin: Paul Parey), pp. 166–216.
- Gauld, I. D. and Bolton, B. 1988. *The Hymenoptera*. [London/Oxford: British Museum (Natural History)/Oxford University Press], xii + 332 pp.
- Haack, R. A. & Mattson, W. J. 1993. Life history patterns of North American tree-feeding sawflies, in M. Wagner and K. F. Raffa (eds), *Sawfly life history adaptations to woody plants*. (San Diego: Academic Press), pp. 503–545.
- Heitland, W. and Pschorn-Walcher, H. 1993. Feeding strategies of sawflies, in M. Wagner and K. F. Raffa (eds), *Sawfly life history adaptations to woody plants*. (San Diego: Academic Press), pp. 93–118.
- Hirashima, Y. 1989 (ed.). [*A check list of Japanese insects*] (Fukuoka: Kyushu University, Faculty of Agriculture, Entomological Laboratory), 1767 pp. [In Japanese.]
- Hoop, M. 1983. Die Nahrungspflanzen der Pflanzenwespen (Symphyta, Hymenoptera) Schleswig-Holsteins, *Faunistisch-Ökologische Mitteilungen*, Supplement **4**: 1–52.
- Kaltenbach, J. H. 1874. *Die Pflanzenfeinde aus des Klasse der Insekten*. Stuttgart: Julius Hoffmann, viii + 874 pp.
- Klausnitzer, B. 1978. Häutflügler, in R. Fritzsche (ed.). *Pflanzenschädlinge*, **9** (Leipzig: Neumann Verlag), 212 pp.
- Larsson, S, Björkmann, C. and Kidd, N. A. C. 1993. Outbreaks in diprionid sawflies: why some species and not others?, in M. Wagner and K. F. Raffa (eds), *Sawfly life history adaptations to woody plants* (San Diego: Academic Press), pp. 453–483.
- Liston, A. D. 1995. *Compendium of European sawflies*. (Gottfrieding: Chalastos Forestry), 191 pp.
- Lorenz, K. and Kraus, M. 1957. Die Larvalsystematik der Blattwespen (Tenthredinoidea und Megalodontoidea), *Abhandlungen zur Larvalsystematik der Insekten* **1**: 1–339.
- Mrkva, R. 1965. Pripevek k morfologii, bionomii a poznání parazitu pilatky jasanové (*Tomostethus nigritus* [Fabr.]), *Práce výzkumných ústavů lesnických ČSSR*, **30**: 33–64.
- Novák, V. 1976. *Atlas of insects harmful to forest trees*, **1** (Amsterdam: Elsevier Publishing Company) 125 pp.
- O'Connor, J. P., Liston, A. D. and Speight, M. C. D., 1997. A review of the Irish sawflies (Hymenoptera: Symphyta) including a checklist of species, *Bulletin of the Irish Biogeographical Society*, **20**, 1–99.

- Okutani, T. 1967. Food-plants of Japanese Symphyta (II), *Japanese Journal of applied Entomology and Zoology* 11: 90–99. [In Japanese]
- Sharov, A. G. 1956. [The black ash sawfly (*Tomostethus nigritus* F.), a pest of ash in afforestations], *Zoologicheskij Zhurnal*, 35: 719–723. [In Russian]
- Smith D. R. 1969. Nearctic sawflies I. Blennocampinae: adults and larvae (Hymenoptera: Tenthredinidae), *Technical Bulletin, Agricultural Research Service, United States Department of Agriculture*, No. 1397, ii + 179 pp.
- Tsinovskij, Ya, P. 1953. *Nasekomye Latvvijskoj SSR: rogozhvosty I pilil'shchiki* (Riga: Izdatel'stvo Akademii Nauk Latvvijskoj SSR), 208 pp.
- Vassiljev, V. N. 1952. *Oleaceae*. In: B. K. Shishkin and E. G. Bobrov, (eds), [*Flora USSR*], 18, (Moscow & Leningrad: Izadatel'stvo Akademii Nauk SSSR), pp. 483–525. [In Russian] [English translation: 1967 (Jerusalem: Israel Program for Scientific Translations) pp. 356–387.]
- Wheeler, A. G. Jr. and Hoebeke, E. R. 1994. First records from the Canadian maritime provinces of three European insects injurious to ornamental plants, *Proc. Ent. Soc. of Wash.*, 96: 749–756.
- Zhelokhovstev, A. N. 1988. Podotryad Symphyta (Chalastogastra)-sidyachebryukhie, in G. S. Medvedev (ed.) *Opreditel' Nasekomykh Evropejskoj Chasti SSSR*, 3(6): 7–234.
- Zhelokhovtsev, A. N. and Zinovjev, A. G. 1997. [A list of sawflies and horntails (Hymenoptera, Symphyta) of the fauna of Russia and the adjacent territories. II], *Entomologicheskoye Obozreniye*, 75: 357–379. [In Russian]

SHORT COMMUNICATION

Observations of some uncommon Dung Beetles—*Geotrupes pyraneus* (Charpentier) (Geotrupidae) (Na) is locally abundant on Thursley NNR, Surrey (SU94), where it is regularly found near dog and horse dung along the bridleways and paths in late May and June. In 1998 a second emergence occurred in late August, when adults were again active and abundant on the 27th, and many dead and moribund individuals were picked up by Wendy Denton and Julia Fry on the 30th. This is the first time I have encountered this species in late summer, despite monthly visits to Thursley for over 10 years. It is intriguing that this should happen in a relatively poor summer, and not in any of the long series of warmer ones over the study period. A single specimen was picked up dead in the New Forest in August (Roger Booth, *pers. comm.*).

Aphodius porcus (Fab.) (Scarabaeidae) (Nb): I found a single female at Cholderton, N. Hants (SU2442) on 1.x.98. I excavated a *Geotrupes* burrow (probably made by *G. spiniger* (Marsham)) in an improved pasture field. The burrow went down at an angle of c.30° to a plug of moulded cow dung the size of a golf ball which was placed on the interface of the loose soil and hard chalk bedrock at c. 30 cm. On opening this dung I found a small round, pea-sized cavity in which was found the female *A. porcus* and the remains of a *Geotrupes* larva. This species has been reported as being a cuckoo parasite of *Geotrupes stercorarius* (L.) (Chapman, 1869, *Entomologist's Monthly Magazine*, 5: 273–6), and may also overwinter in the burrows. *Geotrupes spiniger* was exceedingly abundant on the Cholderton Estate, with adults under most large dung pats, and a female *G. mutator* (Marsham) (Nb) was also found under 'sloppy' sheep dung.

Fox (*Vulpes*) and Little Owl (*Athene noctua*) pellets in the vicinity appeared to be made up almost entirely of the remains of *Geotrupes* adults.

Thanks to Dr David Clements & Dr Martin Drake for organising this work, Countryside Council for Wales for funding the research into the Hornet Robberfly *Asilus crabroniformis*, and Henry Edmonds for allowing us to work at Cholderton.—Dr JONTY DENTON, 26 Bow St, Alton, Hants GU34 1NY.

OBSERVATIONS ON REARING *LUFFIA* SPP. (LEPIDOPTERA: PSYCHIDAE) UNDER CONTROLLED ENVIRONMENTAL CONDITIONS, WITH TAXONOMIC NOTES

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This note describes some observations made while rearing the two British "species" of moth belonging to the genus *Luffia* Tutt, namely *Luffia ferchaultella* (Stephens) and *L. lapidella* (Goeze). These observations were made during work to assess the suitability of *L. ferchaultella* for monitoring the toxicological effects of atmospheric pollution (Sims and Reynolds, 1999). They may contribute to the question of the uncertain taxonomic status of these moths.

The two moths shared many features of their life cycle, such as the numbers of ova laid and the duration to their hatching, the anatomical structure and behaviour of their larvae, pre-pupation behaviour, total duration of their life cycles, and the duration of life cycle stages. Furthermore, the number of larval instars was the same in both cases. These observations suggest that *L. ferchaultella* is a parthenogenetically reproducing form of *L. lapidella*.

However, differences between the two moths were noted. These included the size of ova, larvae, pupae and ovigerous females, the larval diets and sites chosen for pupation; and the mobility, "calling" behaviour and external anatomical structure of female moths. These observations support the argument that *L. ferchaultella* is a separate species from *L. lapidella*.

TAXONOMIC STATUS

Hättenschwiler (1985) states that it is unclear what status should be afforded *L. ferchaultella*: whether it should be regarded as a species distinct from *L. lapidella* or as a form of that species. The moth representing *L. ferchaultella* reproduces parthenogenetically, producing only apterous female imagos. *L. lapidella* reproduces sexually, producing both winged males and apterous females. McDonogh (1939) proposed that the British distribution of *L. ferchaultella* is dictated by altitude and climatic factors, but Narbel-Hofstetter (1964) showed that the European distributions of these moths overlap in several areas (Fig. 1). Meyrick (1928) believed that populations of the sexually reproducing *lapidella* occasionally produced parthenogenetic populations of *ferchaultella* which die out over time. Seiler (1929) studied parthenogenetic and bisexually reproducing psychid moth material described as *Solenobia triquetrella* (Hübner). This material is now recognised as the parthenogenetic *Dahlia triquetrella* (Hübner) and the bisexual *D. inconspicuella* (Stainton), moths whose taxonomic status was equally as uncertain as that under consideration here. Seiler suggested that the bisexual moth (*inconspicuella*) is being replaced by the parthenogenetic moth (*triquetrella*). Tutt (1899) believed that *L. ferchaultella* and *L. lapidella* are distinct species, the view held by McDonogh (1941) who summarised these various positions thus:

Meyrick Type:

- 1) There must be continuous structural variation from the bisexual form to the most extreme parthenogenetic form.
- 2) There may be differences in the geographic distributions of the two forms.
- 3) Parthenogenetic females are likely to breed with males of the parent stock.

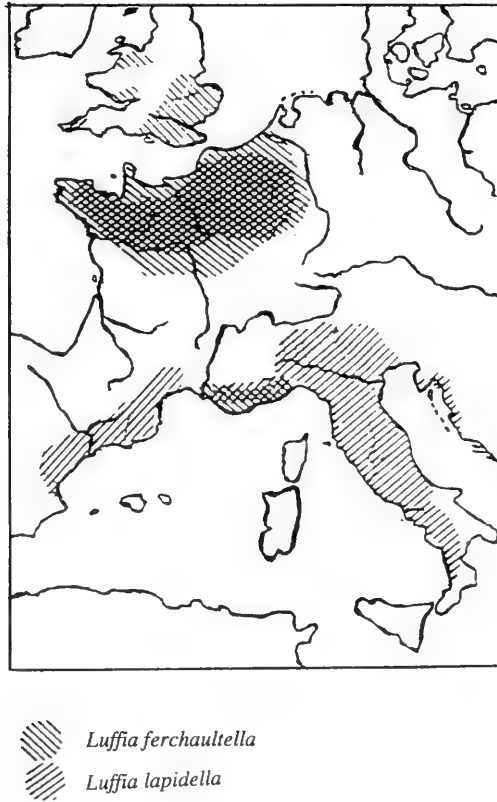


Fig. 1. The European distribution of *Luffia ferchaultella* and *L. lapidella* (adapted from Narbel-Hofstetter, 1964).

Seiler Type:

- 1) There should be no differences in structure between the two forms.
- 2) The geographic distributions will probably be identical.
- 3) Parthenogenetic females are likely to breed with males of the parent stock.

Tutt Type:

- 1) Structural variation between the two forms will almost certainly be discontinuous.
- 2) The geographic distributions will probably be different.
- 3) Parthenogenetic females may not be able to mate with males of the other form.

Henderickx (1987) describes finding pupal exuviae and winged male adults on the trunks of two oak trees near Mol, Belgium, in 1980 and 1986, among a parthenogenetic population of *L. ferchaultella*. He compared their genitalia with those of male *L. lapidella* from Switzerland and Spain and found minor differences in the degree of chitination. However, he was unable to decide if the specimens from Mol represented *L. lapidella* or male examples of *ferchaultella*.

REARING

Larvae of *L. ferchaultella* were collected from the trunks of deciduous trees, mostly oak and sycamore, in Oaken Grove near Henley-on-Thames, Buckinghamshire (SU769855) on 17.vii.1995. Larvae of *L. lapidella* were collected from lichens on rocks near Marazion, Cornwall (the UK locality where they were first discovered by Smith, 1983), on 21.ix.1995. Larvae of both moths were segregated and reared in transparent Perspex boxes under controlled conditions of temperature (mean 20.8, range 20.6 to 21.0°C) and photoperiod (14 hours light, 10 hours dark, no dawn/dusk period) using a Gallenkamp illuminated incubator.

ADULT EMERGENCE

Luffia ferchaultella and *L. lapidella* are stated to emerge from their pupae in the early morning in nature (Hättenschwiler, *loc. cit.*). With both *L. ferchaultella* and *lapidella*, all emergences (a total of over 100 *ferchaultella*, all females, and around 40 *lapidella*, evenly split between males and females) occurred within the first hour or two of the light cycle. Immediately following emergence, the *ferchaultella* females commenced oviposition in the old pupal exuviae within their larval cases. However, with female *lapidella*, pairing was found to be an essential prerequisite to oviposition. Prior to mating, virgin *lapidella* females were observed to "call" for a mate in the manner described by McDonogh (1941). On introduction of a male to a female, pairing occurred almost instantly and lasted from 30 seconds to one minute. Pairing one male with several females was not attempted. Spontaneous pairings were avoided as pupae were isolated prior to emergence and it was found that no eggs, fertile or otherwise, were laid by virgin females of *lapidella*. This calling behaviour was never seen with *ferchaultella*. Pairings between female *ferchaultella* and male *lapidella* were attempted on two occasions, without success. The female moths did not adopt calling postures and the males showed no interest in them. This observation supports the "Tutt Type" proposed by McDonogh (1941).

Newly emerged *lapidella* females were three or four times larger than fresh *ferchaultella* females. These comparisons were made immediately after eclosion, as once oviposition commenced the adults shrank rapidly as the ova left their abdomens. Females of both *lapidella* and *ferchaultella* did not voluntarily leave the surface of their larval cases after eclosion, and if physically removed to even a short distance were unable to return to them. However, *lapidella* females were more active than those of *ferchaultella*, spontaneously moving around on their cases while calling for a mate.

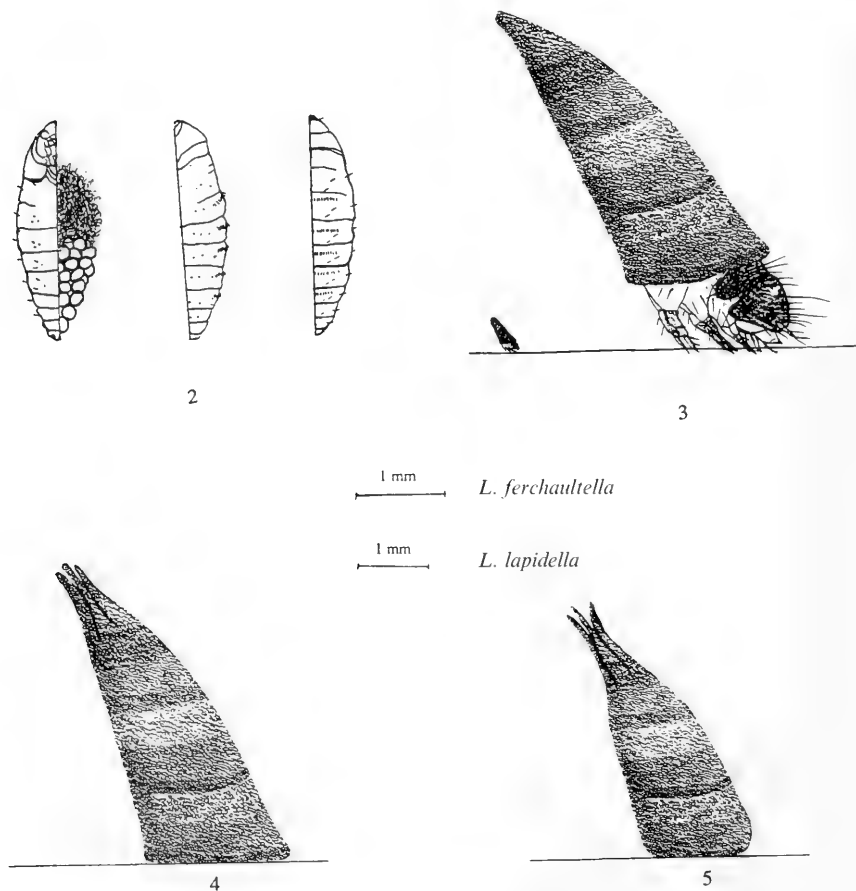
After oviposition, females of both "species" survived for two or three days, eventually shrivelling and remaining attached to their cases or falling from them. Male *lapidella* survived for a similar period.

The published descriptions of the external anatomy of female *lapidella* and *ferchaultella* differ in that female examples of *lapidella* have seven to nine antennal segments and three to four tarsal segments, while female *ferchaultella* have six to eight antennal segments and one to three tarsal segments (Hättenschwiler, *loc. cit.*). This was the case for females reared during this project, another point in favour of the "Tutt Type". However, McDonogh (1943) states that the adult morphology of *L. ferchaultella*, in terms of antennal and tarsal segment number, was influenced by the laboratory conditions under which he held larvae. By rearing larvae of both "species" under controlled environmental conditions, any environmentally induced morphological differences should be eliminated.

McDonogh (1941) illustrated the genitalia of female *L. lapidella* and *L. ferchaultella* and found no obvious differences. These structures were compared using material reared during this work, with the same outcome, except that *lapidella* material was somewhat larger than *ferchaultella*.

OVIPOSITION

With both "species", oviposition was completed within 24 hours and usually by the end of the light cycle. On average, between 30 and 40 ova were produced by females of each "species"; in each case the ovum had a soft chorion without obvious sculpturing and was of an opaque grey/yellow colour when first laid. The only



Figs 2–5. Early stages of *Luffia* spp. 2. Pupa showing position of ova and hair scales. 3. First instar and fully grown larva (fifth instar) showing banding on case due to different coloured lichens/algae. 4. Pre-pupation larval case with valves cut for eclosion of adult. 5. Larval case shrunken by contraction of reinforcing silk, to form a pupation chamber.

difference appeared to be one of size, *lapidella* ova being noticeably larger than those of *ferchaultella*.

For both "species", the ova were packed into the rear three-quarters of the pupal exuviae, the anterior portion of the exuvia being filled with hair scales from the female moths' anal tuft (Fig. 2). Batches of *ferchaultella* ova collected from the wild have been observed to be predated by thrips and mites, so the presence of these hair scales may afford the ova some protection by hindering the access of such predators.

With both "species", four or five days before eclosion of the larvae, their darkening head capsules became visible through the chorion and subsequently through the wall of the pupal exuviae. Hatching of the ova at this temperature (20°C) occurred at around 30 days for both "species", the young larvae immediately building silk-lined cases coated with lichen and algae.

LARVAE

The larvae of both "species" passed through five instars, separated on the basis of the widths of their head capsules, and were full grown by about 60 days (20°C). No diapause occurred, although with *ferchaultella* the third instar lasted approximately twice as long as any of the others. With larvae of *lapidella*, the third instar, although less protracted than that of *ferchaultella*, also lasted longer than any of the other four. This indicates that the third instar may be the stage at which overwintering occurs in the natural state.

The larvae of both moths enlarged their cases as they grew, preserving a record of the material they had been feeding on in the form of differently coloured bands of algae and lichen laid down on the exterior of their cases (Fig. 3). Larvae of both moths accepted algae (*Diplococcus* sp.) and lichen (*Lecanora conizaeoides*) growing on wood, and encrusting lichen (*Parmelia glabratula*) growing on rocks. However, rearing *lapidella* larvae was successful only if lichens from rocks were offered, while larvae of *ferchaultella* preferred lichens and algae growing on wood. First instar larvae of *lapidella* offered lichen and algae on wood failed to produce adults, most dying in their third instar. First instar larvae of *ferchaultella* offered rock lichen also died before reaching maturity. Both were successfully reared on their preferred diets, lichen and algae on wood for *ferchaultella*, and lichen on rocks for *lapidella*.

Larvae of both "species" were identical in colour and darkened noticeably on entering their third instar. Prior to this they were creamy white and opaque with a plain darkened prothoracic plate. On assuming their third instar the chitinised plate on the prothoracic segment acquired a pale grey triangular marking in the dorsal position. This marking and the plate were of similar colour and shape for both "species", and persisted to the end of the final instar. The structure of the larval head capsules and true walking legs was compared microscopically. There were no obvious differences in chaetotaxy or in the shape of the mandibles, antennae or other chitinised parts of comparable instars. The pale ocelli present on the sides of the head capsules were also identical. However, a major point of difference was that the cases of final instar *lapidella* larvae were approximately twice the size of those of full-grown *ferchaultella* larvae, and the larvae themselves were similarly larger.

The importance of moisture to the successful rearing of both "species" was realised at an early stage. Larval growth was maximised if the substrate was sprayed with a fine mist of distilled water twice a week. On spraying, the larvae became very active and were observed to search for droplets of water which they drank once located. Drinking proceeded as a series of ingestions rather than a steady intake,

characterised by a pulsed decrease in droplet size. Larvae imbibed several small droplets or part of a larger one, the amount ingested increasing as the larvae grew.

The literature suggests that larvae of both "species" may be found feeding on lichens and algae growing on rocks and wood in nature. As far as can be ascertained this is not the case: all adults resulting from larvae collected from lichen on sunny exposed rocks in Cornwall corresponded to *lapidella*, while larvae collected from shaded damper tree trunks in Buckinghamshire produced adults typical of *ferchaultella*. This distribution supports McDonoghs "Tutt Type". However, in culture the larvae of both moths behaved similarly, feeding exposed on their substrates but tending to shelter out of direct illumination when not feeding, indicating no preference for habitat type. *Luffia lapidella* is stated to prefer dry sunny habitats while *ferchaultella* favours shady situations with high humidity (Hättenschwiler, *loc. cit.*). This was the case with the pupation sites chosen by cultured larvae.

PRE-PUPATION BEHAVIOUR

Prior to pupation the larvae of both "species" loosely affixed their cases to the substrate before turning round within the case and using their mandibles to cut three or four evenly spaced longitudinal slits in its anal end (Fig. 4). This procedure commenced at the rear opening and the cut proceeded towards the fixed "head end" of the case. These cuts were around one fifth to one sixth of the length of the case and formed "valves" to facilitate the subsequent emergence of the imago. The larvae then reverted to their original head-down position, detached their cases from the substrate and wandered until they found suitable sites for pupation. Here their behaviour differed significantly. With *ferchaultella*, such sites were usually within a crevice or crack in the surface of tree bark and shaded from direct illumination. Larvae of *lapidella* affixed their cases prior to pupation in exposed situations in full illumination. Once the pupation site had been selected, the larvae of both "species" affixed their cases firmly to the substrate with white silk. They then inverted their position so that they were again facing the recently prepared exit at the free end of the case. The cases were then reinforced by an additional lining of white silk, forming a pupation chamber. Pupation occurred within these chambers, the additional silk lining having shrunk such that the cases became bottle-shaped (Fig. 5).

PUPAE

The pupal stage was of similar duration for both "species", eclosion of the adults occurring after about 20 days at this temperature. There appeared to be no visible differences in the structure of female pupae between the two "species", (but see Figs 28 and 29 in McDonogh, 1941). However, only pupal exuviae were examined, making comparison of the headplates and leg sheaths difficult as these were distorted or lost on eclosion of the adults.

DURATION OF THE LIFE CYCLES

In nature both *ferchaultella* and *lapidella* are univoltine, but under these environmental conditions their life cycles were reduced to four months, ova to ova (Fig. 6). In both cases the stages in the life cycles were of similar duration.

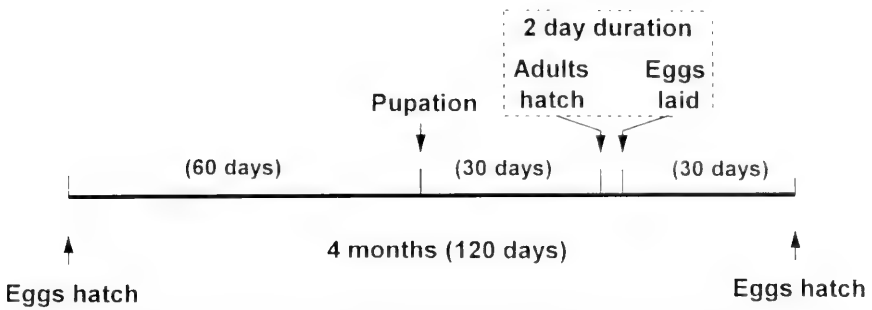


Fig. 6. Duration of life cycles for both moths under controlled environmental conditions.

DISTRIBUTION

As far as is known, in the UK *L. lapidella* is restricted to the area around Marazion in Cornwall (Smith, *loc. cit.*) and to the Channel Isles, where it occurs together with *L. ferchaultella* (McDonogh, 1941). The ability of *lapidella* to survive the rigours of winter away from the mild maritime climates of the Cornish coast and the Channel Isles was investigated by placing ten newly hatched (hence parasite free), first instar *lapidella* larvae on an isolated lichen-encrusted rock in Buckinghamshire in June 1995. Four of these survived the winter of 1995/96, an unusually long and cold one compared with those experienced previously in this area. These survivors were removed in April 1996 and subsequently reared under the controlled environmental conditions already described. From these, one male and one female duly emerged, both typical examples of *lapidella*. This 20% survival shows that climate may not be the controlling factor in the distribution of *lapidella*. This is supported by a male example, probably of *lapidella*, reared from a case found near Saffron Walden, Essex (Emmet, 1998).

PARASITISM

Many parasitic Hymenoptera were reared from larvae of both "species" collected from the wild. These have been examined by Dr M. R. Shaw at the National Museums of Scotland, Edinburgh. One species, *Lissonola luffiator* Aubert, appears to have an interesting biology. This solitary endoparasitic ichneumon was obtained only from larvae of *ferchaultella*, though this does not necessarily mean that *lapidella* larvae are immune from its attack. All of the 20 or so imagos of this parasite that emerged were females. Furthermore, an infected host larva appears to have its life cycle altered by the presence of the parasite in one of two ways. Either the growth of an affected larva is greatly accelerated when compared with that of its healthy peers, or pupation of the host in summer is prevented by the parasite, the host larva entering a second winter. Either of these strategies would account for the presence of abnormally large *ferchaultella* larvae overwintering on trees at the same time as smaller second or third instar larvae. If collected during November or December and kept indoors, these large, active and apparently healthy larvae, bearing a remarkable resemblance to larvae of *lapidella* due to their size, invariably produce females of this parasitic wasp. Many of these large overwintering larvae were collected in the hope of obtaining *lapidella* from areas outside its known UK distribution, but all produced parasitic wasps of this species.

DISCUSSION

This project has demonstrated that the "species" we know as *L. lapidella* can survive in areas of the UK outside its Cornish range, while the record of a male from Essex indicates that *L. lapidella* may either be extending its range in the UK or that it is present at a low density over a wider area than is currently known.

The observations made during the rearing of these moths may be summarised thus:

- No differences were observed between *lapidella* and *ferchaultella* as regards oviposition. The number of ova laid, their positioning within the pupal exuvia, surface structure, colour and period to hatching were the same for both "species".
- Anatomically, larvae of *lapidella* and *ferchaultella* appeared identical. Their chitinised structures and chaetotaxy were similar. Furthermore, they behaved similarly in the culture vessels and had the same number of instars, with the third instar being the point at which their colour darkened. This instar was protracted in both cases.
- The procedures for preparation of their cases prior to pupation were the same.
- Female pupal exuviae of both "species" appeared to have similar anatomical structures and eclosion of the adults occurred at the same point in the light cycle.
- The total duration of their artificially shortened life cycles was similar under these controlled conditions, as was the duration of the individual life cycle stages.

These observations suggest that *L. ferchaultella* is a form of *L. lapidella*.

Apart from the obvious difference in their modes of reproduction, the main differences between these "species" were the larger size of *lapidella* ova, larvae and pupae, their preferred larval diets, the different pupation sites chosen, the larger size of *lapidella* females, their greater mobility and calling behaviour, and differences in the external anatomy of female imagos. It is also possible that these "species" are host to different assemblages of parasites, but this may be due to the geographic ranges of the parasites and needs further investigation before any definitive statement can be made. These observations suggest that *L. ferchaultella* and *L. lapidella* are distinct species.

It is clear that the taxonomic status of these moths cannot be determined on the basis of these observations alone. Taken as a whole, the weight of evidence tends to support McDonogh's "Tutt Type", i.e. that *lapidella* and *ferchaultella* are distinct species. However, this question will probably only be resolved by the application of biochemical techniques as outlined by Cook (1996), for example gel electrophoresis and/or chromosomal studies.

Populations of these moths were not adversely affected by the removal of larvae for this work, as twice the number of larvae removed were returned (parasite and disease free as they had been reared under laboratory conditions) to their original localities during the winter of 1996. Great care was taken to avoid mixing the stocks prior to their release.

REFERENCES

- Cook, J. M. 1996. A beginner's guide to molecular markers for entomologists. *Antenna*, **20**: 53–62.
 Emmet, A. M. 1998. [A male *Luffia* from Saffron Walden, Essex. Exhibit at BENHS Annual Exhibition 1996] *Br. J. Ent. Nat. Hist.*, **10**: 156.

- Hättenschwiler, P. 1985. Psychidae. In Heath, J. and Emmet, A. M. (Eds), *The moths and butterflies of Great Britain and Ireland* 2. 460 pp., 123 text figs, 223 distr. maps, 16 pls. Colchester.
- Henderickx, H. 1987. Morphologie et discussion du statut de quelques spécimens mâles de *Luffia* au sein d'une population parthénogénétique (Lep., Psychidae). *Alexanor*, 15: 141–149.
- McDonogh, R. S. 1939. The habit, distribution and dispersal of the Psychid moth, *Luffia ferchaultella*, in England and Wales. *J. Anim. Ecol.*, 8: 10–28.
- McDonogh, R. S. 1941. The morphology of *Luffia ferchaultella* (Stephens) and a comparison with *Luffia lapidella* (Goeze) (Lep., Psychidae). *Trans. Soc. Br. Ent.*, 7: 191–209.
- McDonogh, R. S. 1943. The variation in adult structure of *Luffia ferchaultella* (Stephens) (Lepidopt., Psychidae). *Trans. R. Ent. Soc. Lond.*, 93: 149–172.
- Meyrick, E. 1928. *A revised handbook of British Lepidoptera*. vi, 914 pp. London.
- Narbel-Hofstetter, M. 1964. La répartition géographique des trois formes cytologiques de *Luffia*. *Mitt. schweiz. ent. Ges.*, 36: 275–288.
- Seiler, J. 1929. Ergebnisse aus der Kreuzung parthenogenetischer und zweigeschlechtlicher Schmetterlinge. I. Die Keimdrüsen der Intersexen F–Raupen. *Arch. Entwmech.*, 19: 543–576.
- Sims, I. R. and Reynolds, P. J. 1999. The effects of atmospheric pollution on a lichenophagous lepidopteran. *Ecotoxicology and Environmental Safety*, 42: 30–34.
- Smith, F. H. N. 1983. *Luffia lapidella* Goeze (Lep.: Psychidae) in Cornwall. *Entomologist's Rec. J. Var.*, 95: 53–57.
- Tutt, J. W. 1899. *Luffia lapidella*, Goeze, a British species—Notes on *Luffia pomonae*. *Entomologist's Rec. J. Var.*, 11: 207–208.

SHORT COMMUNICATION

***Crossocerus vagabundus* (Panzer) (Hymenoptera: Sphecidae) in Wales**—This is the rarest of our four black and yellow *Crossocerus* species, holding RDBI status. In the past this species was widespread, if local, in the south of England and had been recorded from 25 vice-counties (Falk, 1991). It has not been reported as occurring in Wales. In 1953 it was recorded from Parley Heath, Dorset and was not recorded again until recently, when the species was found at a number of sites in Hampshire. The species is associated with damp lushly vegetated areas where it preys upon craneflies. Nesting occurs in dead wood, often in the galleries of beetle larvae (Falk, 1991). On the 7.viii.1998, while collecting in birch scrub along the margins of Crymlyn Bog (SS687943), Glamorgan, specimens of *Crossocerus dimidiatus* (Fab.) and *C. quadrimaculatus* (Fab.) were collected. Whilst determining the specimens taken, a single male *C. vagabundus* (Panzer) was found amongst the *C. quadrimaculatus*. Superficially to the naked eye it looked very like *C. quadrimaculatus* and certainly was not noticed to be anything other than that species in the field.—P. M. PAVETT, Department of Biodiversity and Systematic Biology, National Museum and Galleries of Wales, Cathays Park, Cardiff CF1 3NP.

REFERENCE

- Falk, S. (1991) *A review of the scarce and threatened bees, wasps and ants of Great Britain*. JNCC, Peterborough.

ANNUAL UK DIPTERISTS MEETING, 14–15 NOVEMBER 1998, NATIONAL MUSEUMS AND GALLERIES OF WALES, CARDIFF

DAVID CLEMENTS

The 1998 meeting of UK Dipterists Forum, an organisation affiliated to the BENHS, was marked by two departures from those of previous years. For the first time since its inception in the early 1970s the meeting was held somewhere other than the Natural History Museum in London and, secondly, the meeting was spread over a whole weekend, rather than being a one-day event as in the past. The 1998 meeting was hosted by the entomology section of the National Museums and Galleries of Wales (NMGW) in Cardiff, and comprised a day of presentations, exhibitions and Forum business on the Saturday, followed by a series of workshops, informal meetings and access to the museum collections on the Sunday.

About 80 Forum members attended on the Saturday, which was held in the museum's recently-refurbished and well-equipped committee rooms. The morning commenced with a brief introduction and welcome to the museum by Dr Mike Wilson, Head of Entomology, who congratulated all those involved in the production of a new and state-of-the-art British Diptera checklist (Chandler 1998 (Ed.) *Handbk. Ident. Br. Insects* (NS) 12(1)), stocks of which were brought directly, if not actually hot, from the presses to the meeting by the editor that morning. Dr Liz Howe then took over proceedings as chairwoman for the morning session. These commenced with an overview by Dr Roger Morris of English Nature on the hoverflies of Surrey, in which he described the findings of a 15-year project to map the Surrey syrphid fauna. He went on to describe how the Surrey Wildlife Trust had managed to fund the publication of a series of fairly lavish county invertebrate atlases, by commencing firstly with the popular groups (i.e. butterflies, moths and dragonflies) for which outside sponsorship could be found comparatively easily, then using the profits from sales of these to fund the subsequent production of publications on the less-popular groups, the latest being the *Hoverflies of Surrey* (Morris 1998).

This was followed by a talk by Dr Mike Howe of the Countryside Council for Wales (CCW), who gave an introductory overview of Diptera in Wales describing the distributions and habits of a number of species which are of particular conservation concern. These included some that are in the UK Biodiversity Action Plan (UK BAP), such as *Asilus crabroniformis* L. (Asilidae), *Odontomyia hydroleon* (L.) (Stratiomyidae), *Lipsothrix nervosa* Edwards (Limoniidae), *Chlorismia rustica* (Panzer) and *Spiriverpa humulata* (Zett.) (Therevidae), and some which have the bulk of their UK distribution in Wales, such as *Stratiomys chamaeleon* (L.) (Stratiomyidae), *Acrometopia wahlbergi* (Zett.) (Chamaemyiidae), *Cosmetopus dentimanus* (Zett.) (Scathophagidae) and *Neoitamus cothurnatus* (Meigen) (Asilidae). He also gave a brief review of recent CCW-commissioned survey work relevant to Diptera, such as the Welsh Peatland Invertebrate Survey (originally undertaken in the 1980s under the direction of the then Nature Conservancy Council), the Welsh Parkland Survey (undertaken in conjunction with NMGW and Liverpool Museum), a survey of exposed riverine sediments (in conjunction with the Environment Agency and English Nature) and an on-going study to determine the coastal soft-cliff resource in Wales, an important habitat for many specialist Diptera.

A joint presentation was then given by Drs Geoff Hancock and Graham Rotheray of the Royal Museums in Scotland, describing the results of a recent expedition to study the dipterous fauna of water-holding bromeliads in Trinidad. The audience



Dr Lloyd Knutson (centre) and his wife, Mara, with John Deeming.

was treated to a mouth-watering slide show of exotic and spectacular species, especially of hoverflies, many of which were previously little-known or undescribed. The appearance of odd venomous spiders and snakes during the expedition evidently added further spice to proceedings.

The last presentation of the day was given by David Clements, who described an on-going project funded by the Countryside Council for Wales and English Nature to investigate the biology and breeding requirements of the hornet robberfly, *Asilus crabroniformis* L. This formerly widespread species has suffered a widespread and rapid decline over the whole of its European range, and is consequently a UK BAP 'Short List' species. Together with co-workers Drs Peter Skidmore and Jonty Denton, much work has been done in describing the early stages and oviposition behaviour, including close-up video recording of egg-laying, some of which was



The 1998 cake, prepared by Diane Henshaw.

shown. However, searches for mature larvae in the field, which are believed to be associated with geotrupine beetle larvae, have so far met with failure. The project will continue in 1999.

Saturday afternoon commenced with the AGM of the Forum and a discussion of the future for the various Diptera recording schemes, followed by informal discussions and examination of the many exhibits, full details of which will be published in a forthcoming issue of the Forum's 'house-magazine', *Dipterists Digest*. After much consideration, a prize for best exhibit was awarded by the Forum committee to Dr Malcolm Smart for his display of British and foreign Asilidae. The prize of a book was very kindly donated by Ian Johnson of Pemberley Books, who also attended the meeting with a large stand of new and second-hand Diptera literature for sale throughout the weekend.

Saturday's proceedings were rounded-off by the traditional Dipterists' Supper, which was held in the adjacent main building of the University of Wales. This excellent event was attended by over 60 Forum members, and graced as in previous years by a superbly-decorated cake prepared by Mrs Diane Henshaw. This year the cake honoured the work of Dr Lloyd Knutson, the distinguished Sciomyzidae specialist now happily retired to France after a long entomological career in various countries and dispositions. The Forum was delighted that Dr Knutson and his wife Mara were able to attend the event, and he was duly invited to cut the cake after first identifying its crowning decoration, a portrait of the sciomyzid *Pherbellia knutsoni* Verbeke, originally described from Wales.

On the Sunday, about 40 Forum members returned to the museum to attend workshops on the identification of British and European *Cheilosia* (Syrphidae), given by Steven Falk; the identification of British picture-winged flies (Ulidiidae and

Platystomatidae), given by David Clements, and on the preparation and examination of Diptera genitalia, given by Dr John Deeming. Dr Stuart Ball also gave a demonstration of the new 'Recorder' software package, and various computer developments including 'Syrph the Net', a hoverfly web-site run by Dr Martin Speight. The remainder of the day was taken up with informal discussion and identification of specimens, with many members making use of the large British and foreign Diptera collections held by the museum.

Altogether it was a very successful and well-attended event, made the more so by the excellent facilities provided by the museum and the university. Grateful thanks are extended to Mike Wilson, John Deeming and the staff of the museum, Dr Mark Jervis and the catering service at the University of Wales, Diane Henshaw, Ian and Julie Johnson and all of the presentation and workshop contributors. The event was organised by David Clements, and Anne Clements and Mark Pavett very kindly helped out on the day.

SHORT COMMUNICATION

Rearing *Dahlica triquetrella* (Hübner) (Lepidoptera: Psychidae).—On 18.iii.1997 Dennis O'Keeffe sent me some pupae of the local psychid *Dahlica triquetrella* from a site near Orpington in Kent. This moth has a very localised distribution in the British Isles, being known only from West Kent (VC 16) (where these pupae came from) and Westmorland and North Lancashire (VC 69) (*MBGBI* 2: 135). In the UK it reproduces parthenogenetically, only apterous females being known, although winged males occur in continental Europe. The larvae construct portable cases which they enlarge as they grow, camouflaging the exterior with sand, frass, dead insects and plant debris. Pupation occurs in the larval case and the female moths lay their ova in the old case beneath their pupal exuviae.

A total of 8 adult moths hatched between the 1 and 10.iv.1997, always very early in the morning. They immediately proceeded to lay ova in their old larval cases. Indeed it proved hard to prevent oviposition due to the early hour of their eclosion. I retained the ova but did not expect to be able to rear any resultant larvae past their first instar.

A total of 212 larvae (average approximately 26 per adult) hatched between 24 and 30.iv.1997. In an attempt to rear these I prepared two Perspex larval boxes with a 2 cm layer of finely sieved John Innes No. 3 potting compost and pieces of dead bark with a growth of the lichen *Lecanora conizaeoides* and terrestrial epiphytic algae of the genus *Diplococcus*. The larvae were placed on the bark but soon wandered off onto the sieved compost. Here they constructed miniature elongate silken cases, roughly triangular in cross section and coated externally with dusty soil particles.

Evidence of their feeding on the lichen and algae, in the form of faecal pellets, was hard to find. However, some green-coloured frass was eventually located but it soon became apparent that the larvae had little or no interest in the algae as a pabulum. Consequently I added some dead dried micromoths to their boxes and almost immediately the larvae began feeding on these. Before long, each piece of moth thorax and abdomen was ringed with larval cases, the minute larvae were evident protruding from these and struggling to attain a position from which to feed. To prevent desiccation I sprayed the larvae about every 10 to 15 days with a fine mist of water, but feeding them on freshly killed insects reduced the need for this and the subsequent risk of mould developing in the damp atmosphere.

I kept the larvae indoors all year in an unheated room with a natural photoperiod. However, the temperature of this room was considerably higher than environmental temperatures for at least seven or eight months of the year (October to May). They fed up slowly, enlarging their cases and decorating these with sand, peat, frass and parts of dead insects (mostly legs and elytra). The larvae showed a marked preference for Lepidoptera, Hemiptera (especially smelly shield bugs) and most Coleoptera with the exception of red and black ladybirds (7 spot) which they actively avoided. Diptera, in the form of crane flies, were also eaten, but not avidly.

The sieved peat was renewed in July 1997 as there was evidence of infestation by mites. New pieces of bark were included to provide a solid substrate for the larvae to crawl on. This procedure was repeated in December for the same reason.

Second instar larvae were seen on 26.v. third instars on 19.vii. and fourth instars on 5.viii. Final instar (fifth) larvae were evident on 26.viii.1997. These stages were separated on the basis of their head capsule sizes. Late in October the larvae began to climb the walls of their boxes and attach their cases loosely to the angles of the lids and to the walls. Others were found loosely attached and hanging from the undersides of pieces of bark. Once attached in this way they remained without feeding, despite fresh food being added periodically over the winter. In January the larvae began to perambulate and on the 12th of that month I opened five cases and found that all still contained larvae. By late February 1998 most larvae had attached their cases firmly with white silk to the wood and box lids and on opening one case I found it contained a pupa.

In an attempt to stimulate pupation and eclosion of the adults, about this time I left the boxes exposed to bright sunlight indoors. This was a mistake as many mortalities occurred due to over-heating. Despite this, adults began to emerge on 20.ii. and by 23.iii. 1998 a total of ten females had emerged.

Due to the females' urge to oviposit immediately post eclosion, and assuming an average brood size of 25 ova per female, I estimated that these ten adults would produce around 250 ova. Larvae began to hatch on 4.iv., and by 20.iv. a total of around 200 had emerged. It is interesting to note that the timing of the life cycle stages of this species were unaffected by the larvae being kept in captivity. Adults emerged from reared pupae at the same time of year as those from wild pupae. Oviposition and larval eclosion were similarly timed too, despite the temperature of the room the larvae were reared in being higher than environmental temperatures for most of the year. This indicates that the duration of these various stages in this species is probably influenced more strongly by photoperiod than by temperature.

I attempted to feed the F₂ larvae on dead insects as before but this time was unsuccessful. I found that all the larvae had died in their first instar, two or three days after I had fed them with two freshly killed adult green shield bugs *Palomena prasina* (L.) from my garden. I can only presume that the bugs contained some toxin that killed the larvae, as a killing agent had not been used. Fortunately I did not attempt to feed the F₁ larvae on this species of bug.—I. SIMS, 2 The Delph, Lower Earley, Reading, Berkshire RG6 3AN.

Call for Assistance with a New Survey of the Social Wasps of Britain and Ireland for 1999/2000

It has been 20 years since the last survey of social wasps was carried out by the Bees, Wasps and Ants Recording Scheme (BWARS) in conjunction with the Biological Records Centre at Monks Wood. Since then BWARS has become a formally constituted Society, i.e. the Bees, Wasps and Ants Recording Society (still referred to as BWARS) engaging in many important recording activities. Currently the society is working on a set of Provisional Atlases of all British aculeates, including the social wasps. Therefore, it is important to obtain updated information on the current status and distributions of British social wasps so they can be included in the new atlases. Some key reasons for this are that since the last survey, which recorded seven species, there have been 2 new additions to the list:

Original list

Hornet	<i>Vespa crabro</i> L.
Common wasp	<i>Vespula vulgaris</i> (L.)
German wasp	<i>V. germanica</i> (Fab.)
Red wasp	<i>V. rufa</i> (L.)
Cuckoo wasp	<i>V. austriaca</i> (Panzer) (brood parasite of <i>V. rufa</i>)
Tree wasp	<i>Dolichovespula sylvestris</i> (Scop.)
Norwegian wasp	<i>D. norwegica</i> (Fab.)

The 2 new additions

Median wasp	<i>D. media</i> (Retzius)
Saxon wasp	<i>D. saxonica</i> (Fab.)

It is possible that by now their brood parasites (*D. omissa* Bischoff, and *D. adulterina* du Buysson respectively) may have followed. In addition, some people are suggesting that the common wasp may be declining and that the Norwegian wasp is retreating northwards. Therefore, an extensive re-survey of Britain and Ireland is urgently needed to answer the following questions:

- Have any new species (*D. omissa* and *D. adulterina*) colonized?
- What is the current position of the median and Saxon wasps?
- Have either the median or Saxon wasps reached Ireland or Scotland?
- Is the common wasp actually declining? Is the Norwegian wasp retreating northwards?

HOW CAN YOU HELP?

If you find **any** dead wasps or kill one for any reason during the spring/summer of 1999 and 2000, could you please note when and where (as precisely as possible) it was found (see below) and then send the DEAD wasp (e.g. in a matchbox etc.), along with the other details, clearly marked WASP SURVEY to the appropriate co-ordinator. Alternatively, if you are 100% certain you can precisely identify social wasps, then send the record, however, if in any doubt whatsoever please send the dead wasp. To allow for easy processing of records please use the format outlined below. Please don't worry about the condition of the wasps—it should be possible to identify them even if they have been swatted, as long as all parts are kept together.

For an information pack on the present 9 species please send an A5 SAE (26p) enclosing two unused 1st class stamps (to cover printing costs) to Tom Ings (address below).

Please note that because of the large volume of specimens we expect to receive we will only be able to reply with information about the wasps and return specimens for those interested if a specific request is made and the appropriate postage and suitable packaging is included.

FORMAT FOR RECORDS

DATE: DD/MM/YYYY (e.g. 22/4/1998)

LOCALITY: Nearest town (please include street name/postcode) or village (e.g. Redlynch)

GRID REFERENCE: If possible give an Ordnance Survey 6 figure reference, (e.g. SU204205)

SPECIES NAME: Where relevant (NB only IF you can ACCURATELY identify (100% certainty) the wasp, but if you are in ANY doubt send the specimen)

NAME OF COLLECTOR: Who caught/found the wasp

NAME OF IDENTIFIER: Where relevant (e.g. Tom Ings)

OTHER INFORMATION: Other useful information (e.g. whether male/worker/queen (only needed if not supplying specimen), was it from a nest?, was it visiting flowers, catching prey? etc.)

REGIONAL CO-ORDINATORS

BRITAIN (England, Scotland and Wales):

Tom Ings, Department of Biological Sciences, Science Laboratories, South Road,
DURHAM, DH1 3LE

E-mail: [t.e.ings@durham.ac.uk]

NORTHERN IRELAND:

Brian Nelson, Ulster Museum, Botanic Gardens, BELFAST, BT9 5AB

E-mail: [brian.nelson.um@nics.gov.uk]

REPUBLIC OF IRELAND:

Colm Ronayne, 33 Dublin Road, SKERRIES, Co. Dublin, Ireland

E-mail: [colmronayne@tinet.ie]

This information can also be found on the internet at:

[Http://www.durham.ac.uk/~dbl3tci/waspsurv.html](http://www.durham.ac.uk/~dbl3tci/waspsurv.html)

SHORT COMMUNICATION

Pleurophorus caesus (Creutzer) (Col.: Scarabaeidae: Psammobiini) imported into Cambridgeshire.—On 10 March 1997, I found an elongate blackish-brown beetle, 3 mm long and about 1 mm wide, adhering to a stick of celery in my kitchen in Huntingdon, Cambridgeshire (VC31, Hunts.). To the naked eye, it resembled a scolytid or anobiid, and as my house is infected with a low density of *Ptilinus pectinicornis*, it might have been passed over as a female of that species. Closer inspection revealed that it was an unusually elongate scarabaeid, and it keyed readily in Jessop (1986) and Britton (1956) to *Pleurophorus caesus* (Creutzer). It appears even more elongate and parallel-sided than the illustrations in Harde (1981) or Jessop (1986) suggest; it is well portrayed in Reitter (1909). I am grateful to Darren Mann for confirming the identification.

P. caesus was recorded rarely but widely in Britain last century (Fowler, 1890). Jessop mentions records for Scilly, Cornwall, Bristol and Southport (Merseyside), to which Hyman (1992) adds Glamorgan. The Red Data Book (Shirt, 1987) lists it as a species not recorded since 1900, and the latest record of which I am aware is from the Isles of Scilly in 1890 (Hyman, 1992). The species is apparently common around the Mediterranean and the Black Sea (D. J. Mann, *pers. comm.*). Like most psammobiines, it feeds on decaying vegetation as well as on dry cow dung, and is probably associated with dry, sandy soils.

The celery in question was recently purchased from the local Tesco superstore. It had been imported from Torre Epachepo, Murcia, Spain, transported by refrigerated lorry. Examination of the remainder of the store's Spanish celery stocks on the evening of 10 March failed to produce any further specimens, and subsequent batches of celery were of Israeli origin, and devoid of Coleoptera.

As a casual importation, this record is probably of little consequence except to show that rare or, indeed, extinct native species are occasionally transported by commerce. This process is familiar among larger insects: for example, most recent records of the mole-cricket *Gryllotalpa gryllotalpa* L. are thought to be accidental imports (Marshall & Haes, 1988); but it is seldom reported for more cryptic species. The other purpose of this note is to remark that *P. caesus* looks superficially sufficiently unlike a dung-beetle to be passed over in the field—or the kitchen.—BRIAN C. EVERS HAM, Wildlife Trust for Beds, Cambs & Northants, Lings House, Billing Lings, Northampton NN3 8BE.

REFERENCES

- Britton, E. B. 1956. Coleoptera Scarabaeoidea. *Handbooks for the Identification of British Insects*, 5 (11).
- Fowler, F. W. 1890. *The Coleoptera of the British Islands, vol. 4*. London: Reeve.
- Jessop, L. 1986. Dung beetles and chafers. Coleoptera: Scarabaeoidea. New edition. *Handbooks for the Identification of British Insects*, 5 (11).
- Harde, K. W., ed. Hammond, P. M. 1981. *A field guide in colour to beetles*. London: Octopus.
- Hyman, P. S., revised Parsons, M. S. 1992. *A review of scarce and threatened Coleoptera in Britain, 1*. Peterborough: JNCC.
- Marshall, J. A. and Haes, E. C. M. 1988. *Grasshoppers and allied insects of Great Britain and Ireland*. Colchester: Harley.
- Reitter, E. 1909. *Fauna Germanica. Die Käfer des Deutschen Reiches. II*. Stuttgart: Lutz.
- Shirt, D. B. 1987. *British Red Data Books, 2: Insects*. Peterborough: NCC.

BENHS INDOOR MEETINGS

7 April 1998

Mr A. J. HALSTEAD showed a mass of silk tubes spun as a hibernaculum by larvae of the bee moth, *Aphomia sociella* (L.) (Lep: Pyralidae). The caterpillars feed during the summer in the nests of social wasps or bumblebees. The specimens were found in a shed at Speen, near Newbury, Berks., with the remains of a bumblebee nest nearby.

Mr R. D. HAWKINS showed three insects that he had collected as road casualties at Horley, Surrey. These were queen bumblebees, *Bombus terrestris* (L.) and *B. pascuorum* (Scop.), and a mining bee, *Andrena scotica* Perkins. He noted that car kills were likely to have a greater effect on insect populations than the activities of insect collectors. This may be particularly true in areas of intense agriculture where the roadside verges may be the main source of flowers for foraging bees.

Dr J. MUGGLETON recorded either a very late or a very early emergence of a fresh brick red form of the lime hawk moth, *Mimas tiliae* L., at a light trap in his garden in Staines, Middx., on 17.xi.97.

Mr I. D. FERGUSON reported he had taken a male green form of this moth at a light on 30.iii.98 in his garden at Orpington, Kent.

Dr M. HARPER spoke on the management of woods for Lepidoptera. When he moved from London to Ledbury, Glos. he became interested in Haugh Wood which is an outlying part of the Forest of Dean. It is an SSSI that is owned by Forest Enterprise and has largely been planted with conifers. Dr Harper has been able to persuade Forest Enterprise to open up some parts of the wood and restore them to a coppice cycle with broad-leaved trees and shrubs. Eight areas of about 1 ha have now been cleared of conifers and the subsequent flora and fauna has been recorded. The floral composition varies according to the soil conditions but in some areas up to 26 species of woody plants have been recorded two years after clearance. When an area is felled the wood is stacked in wig wams to leave the ground clear for plant recolonization. These stacks provide an important habitat for fungi and insects. Tree stumps also have their associated invertebrate fauna. Coppicing increases the floral diversity and also creates sheltered open spaces within the wood where the warmer microclimate encourages insect activity.

Dr Harper showed slides of the plants, butterflies, moths and other insects that have been recorded in the coppiced areas. His talk was an excellent example of the significant habitat improvements that can be brought about through the cooperation of a knowledgeable entomologist and a sympathetic landowner.

12 May 1998

The President, Mr B. C. EVERSHAM, announced the death of the butterfly illustrator, Gordon Beningfield.

Mr A. J. HALSTEAD showed some live geometrid moths, *Idaea inquinata* (Scop.), found emerging in a house at Stoke D'Abernon, Surrey. The larvae had been feeding on dried flowers, including sunflowers, which had been grown in the householder's garden the previous summer.

Dr D. J. L. AGASSIZ showed some cocoons of *Argyresthia cupressella* Walsingham (Lep: Yponomeutidae) and larval feeding damage on cypress shoots. Most *Argyresthia* spp. spin their cocoons on the ground; *A. cupressella* presumably

often does so but many larvae coming down from high branches construct cocoons among the foliage, usually against a stem where a shoot branches away from it. *A. cupressella* is a North American species first recorded in Britain in 1997. It is found commonly at Kessingland near the Suffolk coast and northwards towards the Norfolk border, but apparently not yet in Norfolk.

Mr R. SOFTLY showed two examples of predatory bugs *Aptus mirmicoides* (Costa) (identification by R. D. Hawkins) found in an actinic light trap a few nights previously.

Mr R. D. HAWKINS showed a specimen of the coreid bug *Gonocerus acuteangulatus* (Goeze) found on 8.v.98 on a roadside verge at Horley, Surrey. This scarce bug was restricted to the Box Hill area but seems to be spreading. Horley is a new site record and is 12 km south-east of those previously known.

Mr B. C. EVERS HAM showed a live specimen of a predatory slug, *Testacella haliotidea* Draparnaud. This infrequently seen subterranean slug was found in the garden of Mr Ian Dawson at Little Paxton, Cambs., on 12.iv.98.

The following persons have been approved by Council as members: Dr Alan Butler, Ms Debbie Evans, Mr Iain Gillespie, Mr Malcolm Lee, Mr Kevin McGee, Mr Simon Miles, Mr Steve Preddy and Mr Bull.

Mr R. W. J. UFFEN reported that he had seen the bumblebee mimic hoverfly *Pocota personata* (Harris) near some 150-year-old trees in parkland at Welwyn, Herts., that has recently been declared a Local Nature Reserve.

Dr I. F. G. MCLEAN outlined recent changes made to the Wildlife and Countryside Act. Details will be given in an article in the Journal.

Dr ADRIAN PONT gave a talk entitled 'Reflections on the history of Dipterology'. The modern classification system was devised by Linnaeus in the 18th century but his studies were based on the work of earlier naturalists. Aristotle in the 4th century BC recognized flies as a distinct group in the animal kingdom and divided them into biting and non-biting types. His writings remained influential for nearly 2000 years and the study of flies did not really begin until the 17th century. This was helped by inventions such as the printing press and microscopes. Seventeenth century entomologists, such as Francesco Redi, Johannis Swammerdam, Anton Leeuwenhoek and Robert Hook made studies of life cycles, dipteran anatomy and illustrated flies. The Aristotelian theory of spontaneous generation of fly maggots was disproved. John Ray developed the concept of arranging flies into genera of species. Other early dipterists included Johan Goedart and René Réaumur. Linnaeus published the first edition of his *Systema Naturae* in 1735. He gradually refined his naming system, arriving at the binomial system in the eleventh edition. Christian Fabricius adopted the Linnaean system and, like Aristotle, used mouthparts as the basis for his classification. Other workers who made contributions to the study of flies in the 18th and 19th centuries were Baron Charles De Geer, Prof. Wiedeman, Hoffmannsegg, Illiger, Zetterstedt, Macquart and Meigen. The last mentioned is the founder of modern European dipterology. He began studying flies in 1790 and by 1818 had written a seven-volume work on European Diptera.

9 June 1998

Mr A. J. HALSTEAD showed a live specimen of the two-spot ladybird, *Adalia bipunctata* (L.), which had the red of both elytra darkened almost to the point of being entirely black. It is uncertain whether this is a melanic form or the result of

some injury. The ladybird was found on the flower of angelica (*Angelica archangelica* L.) in a garden at Knaphill, Surrey. The insignificant flowers of this umbellifer also attracted large numbers of museum beetle, *Anthrenus verbasci* (L.), when the plants came into flower in May.

Dr J. Muggleton noted that Dr M. MAJERUS has recently described a melanic form of the two-spot ladybird, f. *purpurea*, which was of a dark purplish black colour. This might be similar to the specimen exhibited.

Mr R. D. HAWKINS showed three species of click beetles of the *Ampedus* genus which have red and black elytra. These were *Ampedus balteatus* (L.) and *A. elongantulus* (F.), both from Bagmoor Common, Surrey, and *A. sanguinolentus* (Schränk) from Cobbett Hill, Surrey, all taken in May 1998.

Dr J. MUGGLETON showed a small caterpillar with yellow and black markings living in a silk tunnel spun amongst the flowers of water dropwort, *Oenanthe crocata* L., growing on the bank of the River Thames at Staines, Middx. Mr Hawkins thought the caterpillar to be a *Depressaria* sp. (Lep.: Oecophoridae).

Dr J. MUGGLETON distributed some leaflets and survey forms published by the People's Trust for Endangered Species in connection with their survey into the distribution and abundance of the stag beetle, *Lucanus cervus* (L.).

Mr A. J. HALSTEAD spoke on "Mining the Society's Archives" in which he showed a selection of transparencies from the Society's extensive photographic collection. This is in the process of being reorganized to make it more accessible. The collection has been accumulated over the years as a result of legacies and donations and was housed in a variety of boxes, trays and folders. While there is some order and cataloguing of some of the Lepidoptera slides this was conspicuously absent from the other orders. Some sorting of the Lepidoptera slides remains to be done but most of the Hemiptera, Neuroptera, Odonata, Orthoptera, Coleoptera, Diptera and Hymenoptera have been sorted and transferred to transparent polypropylene hanging files. These have been arranged in taxonomic order in a four-drawer filing cabinet in the library section of the Pelham-Clinton building at Dinton Pastures. The collection is available to members who need slides to illustrate lectures. Mr Halstead, who has spent many hours sorting out the collection, urged anyone who borrowed slides to return them promptly and put them back in their correct places. There are certain types of picture that are poorly represented in the collection: these include slides of habitats, host plants and BENHS members engaged in entomological activities. Further donations of this type of material would be most welcome.

14 July 1998

Mr R. D. HAWKINS showed two beetle larvae. The first was a larva of a species of *Scymnus* (Coccinellidae), possibly *S. frontalis* F., found by Mrs G. Jeffcoate on 13.vii.1998 in a clay pit at Holmwood, Surrey. The second was an unknown red-brown larva with spines and hairs. It was found crawling over chalk grassland at Park Downs, Banstead, Surrey on 7.vii.1998.

Mr B. C. EVERSHAM showed some scarce wetland ground beetles (Carabidae) found at Pitsford Reservoir, north of Northampton. The reservoir was created in the 1950s, and is now owned by Anglian Water plc. Its margins are managed as a Wildlife Trust reserve. On three visits this year, with a local coleopterist Mr Peter Sharpe, 53 species of ground beetle have been recorded, including 10 wetland species which are classed as Notable B, some of which are likely to prove new to the county.

Five species were exhibited: *Blethisa multipunctata* L., a large and distinctive species with a brassy sheen and dimpled elytra. This species is usually found among rich, fen vegetation including marshes and lake shores; it was frequent among *Glyceria* and *Phragmites* litter just below the strandline. *Bembidion quadripustulatum* Serville, which occurred in small numbers in shallow, temporary pools on clay soil in a woodland ride. A very local species with a south-eastern distribution, which appears to be new to Northants. *Pterostichus gracilis* Dejean, one of many species of black *Pterostichus* found in wetlands; this is local but widespread, and usually found on clay soils. *Agonum piceum* L., although not classed as nationally scarce, this species is local and widely scattered. It was by far the most abundant *Agonum* among *Glyceria maxima* adjacent to willow carr beside the reservoir. *Badister unipustulatus* Bonelli, a striking red and black wetland beetle, was unusually abundant in the rich vegetation of the reservoir shore, probably the most abundant larger ground-beetle. A species apparently new to Northants. It is somewhat puzzling that a man-made wetland should support so many scarce species. The answer seems to be that several small streams with marshy margins fed the valley in which Pitsford Reservoir lies, and the surrounding grassland had never been subject to fertilizer or pesticide applications.

Mr R. W. J. UFFEN showed a live *Lytta vesicatoria* (L.) (Spanish Fly) (Coleoptera, Meloidae) found in a shallow sandpit near Bovingdon, Dorset on 4 July 1998. There was no nearby source of the adult beetle's preferred food of ash or privet. The site had been praised for its aculeate fauna on a visit the previous day by members of the Dipterists Forum and Bees Wasps and Ants Recording Society, but Messrs Halstead, Perry and Uffen, visiting the pit on their way home, were frustrated by indifferent weather.

Dr D. S. HACKETT showed specimens of three beetles from Millwards Park, Hertfordshire, all taken on 5 July 1998. These were *Epiphaniis cornutus* Eschscholtz (Eucnemidae), originally from the USA but now widespread in Britain and found on poplar and sycamore, *Ampedus cardinalis* (Schiödte) (Elateridae) found on an oak trunk and the first record from Hertfordshire, and *Mycetochara humeralis* F. (Cistelidae), beaten from beech foliage.

The following persons have been approved as members by Council: Mr Lawrence Brown, Miss Jenni Johnstone, Mr Paul Lee, Mr John D Stanney and Mrs Carol A. Williams.

Dr MARTIN LUFF spoke on "British Ground Beetles—Facts and Fancies". There are currently 349 species of Ground Beetles (Carabidae) found in Britain, but there is a constant turnover of species with seven species lost and nine gained since 1970. The carabids range in size from 1 mm to 25 mm and with a few exceptions, such as those belonging to the genus *Notiophilus*, have a very similar body plan. Dr Luff then continued by describing the biology of the species, most of which feed on other insects and invertebrates. There are exceptions with some plant-feeding species such as *Harpalus rufipes* DeGeer which feeds on seeds. The adults may be present throughout the year or may show marked seasonality with, for example, *H. affinis* Schrank having a bimodal activity pattern, *Amara apricaria* Paykull appearing in the autumn and *Pterostichus madidus* F. peaking in mid-year. The great majority of species are nocturnal. The eggs are often enclosed in soil capsules which seem to protect them from fungal attack. The larvae are soil dwelling. The carabids are useful for environmental monitoring and a standard protocol for carabid trapping has been devised. This uses polypropylene pots, containing blue antifreeze as a preservative, for pitfall traps. Nine traps are used per site and are placed, in a row, two metres apart. Sampling is carried out continuously from April to October and the traps examined at two to four week intervals. The catch from all the traps at one site is

pooled. Dr Luff gave some examples to illustrate the usefulness of the trapping protocol. One example was that of *Nebria brevicollis* F. and *N. salina* Fairmaire which are difficult to separate morphologically but which occupy different habitats with *N. salina* being found at higher altitudes. A trapping exercise in a river valley on the Scottish border demonstrated the habitat separation of the two species. Data from the Carabid Mapping Scheme suggested a decline in many species. For only 96 species was their occurrence greater post-1970 compared with pre-1970. The occurrence of 239 species was greater pre-1970 than post-1970. One site which has been monitored for eleven years has shown a decline in species from 45 at the start of the period to 30 at the end. Maps showing various distribution patterns were shown. *Abax parallelepipedus* Piller & Mitterpacher is unusual in that it is found everywhere except the extreme north-east. *Badister bipustulatus* Fab. has a common type of distribution in that it is widespread in the south but is restricted to coastal habitats in Scotland. There are also a few species that are coastal in the western part of their range. In contrast *Broschus cephalotes* L. is almost exclusively coastal and only occurs inland in hot, dry summers. Some species have a northern distribution, *Nebria gyllenhali* Schönherr is a north and north-western species and another northern species, *Pterostichus cristatus* Dufour, is restricted largely to the north-east. *Leistus rufomarginatus* Duftschmid is an example of a species which has spread rapidly from a few southern sites in the 1960s to Cumbria and the Isle of Man in 1998. Distribution patterns in Britain often do not agree with continental distribution patterns but it is not known why this should be.

8 September 1998

Dr D. S. HACKETT exhibited a specimen of the Cetoniine beetle *Oxythrea funesta* (Poda) (Col.: Scarabaeidae) found on a nature reserve at Chalk Farm, north London. According to Jessop (*Handbooks for the Identification of British Insects*, 5(11), 1986) the species is doubtfully British. The most recent records are from Lancashire. This specimen was found feeding on a thistle flower and was the only one seen. It is not known whether it was a vagrant or is breeding in the area. The larvae would be in plant roots or dead wood like other Cetoniines. The adult can be recognized by its black non-metallic (slightly metallic in this case) colour and white pubescent markings, including those on the pygidium, and its smaller size than *Cetonia aurata* L. The elytra are notched for elytra-down flight.

Mr R. D. Hawkins wondered whether, at a time of climatic warming, the cetoniid exhibited by Dr Hackett could be an example of a continental European species colonizing warmer London habitats first.

Mr I. D. FERGUSON exhibited a live full grown caterpillar of what appeared to be *Semiaspilates ochrearia* (Rossi), the Yellow Belle. This is normally a double brooded species occurring in the larval state in June and July and again from September through to the following April. It was swept from the dunes at Sandwich Bay, Kent on 2.ix.1998. Adult females were seen the same day thus larvae should have been, at best, recently hatched. The larva was a Geometrid, colour pale straw with black speckles, with prominent anal points and measuring 38 mm, thus matching the description of *S. ochrearia*. Further, when disturbed, it curled its head under its body to form a figure "2", a feature of this species. This could be evidence of an attempted third brood. Two other examples were found but had been "stung" by a parasitoid; one was sent to Dr Mark Shaw in Edinburgh.

Dr I. F. G. MCLEAN exhibited two specimens of *Aphrosylus* (Diptera: Dolichopodidae) from groynes at Cromer, Norfolk on the 9.viii.1998. These were

Aphrosylus raptor Haliday and *A. ferox* Haliday. On the first day of a family holiday based in North Norfolk, an excursion to the beach at Cromer at low tide revealed some characteristic predatory Diptera on groynes covered with barnacles and seaweeds. Males of the genus *Aphrosylus* have flattened, spatulate palpi which are 'silvered' on one face. These palpi catch the light and flash brightly as the flies scurry across exposed intertidal substrates. The role of these visual signals, whether in courtship or some other behavioural interaction is not yet known. Most *Aphrosylus* species are typically found on rocky coasts, but on the sandy beaches of North Norfolk they can evidently survive on the artificial hard exposures provided by wooden groynes, which have been erected here as coastal defences.

It was announced that Mr Brian Nelson of Belfast had been elected an Ordinary Member and that the Invertebrate Conservation Centre of the Zoological Society of London had been elected a Corporate Member of the BENHS.

On behalf of the LNHS, Miss Ruth Day reported on the planning application by the London Borough of Havering for development of part of the Inner Thames Marshes SSSI including part of Rainham Marshes. The London Wildlife Trust was putting in a counter planning application for a nature reserve and the RSPB was applying for Heritage Lottery funding to buy the land for the nature reserve. The LNHS and BENHS had written to the RSPB in support of their bid for funds.

Mr R. K. MERRIFIELD reported that he had found a larva of the Elephant Hawk-moth (*Deilephila elpenor* L.) feeding on Himalayan Balsam (*Impatiens glandulifera* Royle).

Mr R. D. HAWKINS said that the beetle larvae he had exhibited at the previous meeting had been provisionally identified by Dr R. G. Booth as *Drilus flavescens* Geoffr. (Coleoptera: Drilidae). The larva had now eaten a snail, which appeared to confirm the identification. Remarking on a poor season for Lepidoptera, Mr Hawkins said that there had not even been any codling moth (*Cydia pomonella* L.) larvae in his apples.

Dr J. MUGGLETON reported seeing at least two specimens of the clouded yellow butterfly (*Colias croceus* Geoffr.) flying on the abandoned route of the Winchester by-pass at Bar End, Winchester on 22.viii.1998. In what seemed to have been a poor year for migrant butterflies the only other migrant he had seen had been a very worn specimen of the Painted Lady butterfly (*Cynthia cardui* L.) in central Manchester on 19.vi.1998.

Dr TOM BRERETON gave the *Brad Ashby Memorial Lecture* on "New aspects of conserving the pearl-bordered fritillary", work carried out by Butterfly Conservation and funded by a grant from ICI.

The work involved a national review of the status of the pearl-bordered fritillary butterfly (*Boloria euphrosyne* L.) and an investigation of its population structure and habitat requirements. A survey had been carried out by Butterfly Conservation local branch recorders with help from other conservation bodies, and over 700 sites had been visited. In the past the butterfly had been recorded from 850 10 km squares but today it was found in less than 200 10 km squares. It had disappeared from at least half of these squares in the past fifteen years. There were now around 350 colonies at 250 sites. The habitat of one-third of the colonies was a mosaic of bracken, grass and scrub; one-half of the colonies were in woodland clearings and the remainder were in open woodland.

The breeding sites typically have a dry, short, sparse vegetation with plenty of *Viola* and leaf or bracken litter. In the past coppice clearings were an important habitat but now the clearings formed by rides, pylon lines and young conifer plantations are important. There are three types of open woodland habitat: birch,

oak and woodland characterized by the presence of ash, rowan and dogs mercury, the latter being a newly discovered habitat type.

The pearl-bordered fritillary is a species of traditionally managed countryside and cannot compete with intensive cultivation or the improvement of marginal hill land. The abandonment of hill grazing is another factor in its decline but in some places over-grazing can be a problem. Its decline from woodland clearings follows them becoming too shaded as the result of a lack of coppicing, the maturing of conifer woodland and rides becoming overgrown. The rate of decline appears to be less in Scotland where more traditional land management prevails but proposed schemes to encourage the natural regeneration of woodland in Scotland may pose a new threat. The second phase of the programme will be to make progress with conservation work. Immediate action is needed at sites where the butterfly is about to become extinct. This may involve leaving, rather than removing, bracken and the continuation of grazing regimes or their replacement by cutting and burning. Incentives can be offered to farmers via the countryside stewardship initiative, which can give financial support to help maintain sites. In woodland fresh clearings need to be created, but a long term future in woodland can only be assured if regular coppicing is reintroduced. In this respect it is worth noting that the Forest Authority has a scheme for encouraging coppicing, whereas for other sites grants may be available from the Forest Authority for woodland improvement which could include the removal of conifers.

13 October 1998

Mr R. D. HAWKINS showed an unnamed geometrid caterpillar that he had swept from blackthorn suckers growing out of grass (later named by G. A. Collins as the broken-barred carpet *Electrophaes corylata* Thunb).

The following persons have been approved by Council as members: Miss Helen Ball, Mr Lee Bullough, Mr Mark Gardener, Dr Aubrey Jones, Capt. Francis Lowe, Mr Peter Maton, Mr Steven Nash and Dr Raymond Wilson.

Mr S. R. MILES showed a copy of a report produced by English Nature of a symposium held on veteran trees entitled "Parkland the way forward". Copies can be obtained by telephoning 01733 455101.

Mr R. SOFTLY noted that there seemed to be few orb-web spiders compared with the same time last year. Dr J. Muggleton confirmed this, saying that this year he had received no phone calls on this subject, whereas last year he had had as many as seven a day. Mr A. Halstead noted that the green shield bug *Palomena prasina* (L.) was also less abundant this year.

Dr RICHARD LINDSAY spoke on "Bogs, bugs and battles". In particular he talked about the Flow Country area of north Scotland and the battle to change people's perception of the value of this extensive blanket bog, which covers much of Caithness and Sutherland. Small areas were protected as nature reserves but the rest was widely regarded as a wasteland of no particular value. The speaker was part of a team which in the 1980s began surveying the whole area to assess its conservation value. As there are few roads in the area this involved spending many days camping out with rain expected two days out of three. While the survey was taking place, large areas of bog were being drained by deep ploughing for planting with conifers. Tax benefits for forestry at that time made this a profitable venture for people paying the top rates of tax. Some pop stars and other show business personalities were prominent investors in these new plantations. The wettest areas were being left unplanted but their ecology was being changed by drainage of the surrounding land.

In order to survey the blanket bog, it was necessary to produce new descriptive terms to define the micro-habitats, such as hummocks, sphagnum hollows, ridges and pools, both temporary and permanent. The distribution of *Sphagnum* species and other plants in these habitat types was recorded. Blanket bog is a globally rare habitat and the Flow Country has unique features that make it different from blanket bog elsewhere in Europe. Peat bogs elsewhere in Europe often have trees and are fed by snow-melt water. The Flow Country is virtually without trees, except where planted, and is kept wet by high rainfall. A party of experts from the International Mire Conservation Group was invited to visit the Flow Country. They agreed that the area was of great conservation importance.

This view was put to the Prime Minister and the Department of the Environment, urging a change in policy for the area. This was picked up by the press and other media, and it was also discussed in the House of Lords. The government responded by asking the Nature Conservancy Council to prove that the whole 400,000 hectare area was of global importance and gave them a year to do so. The team made use of the then new technology of computer mapping to present their information. This was used to show the distribution of rare plants and animals, and the effects that forestry and other land uses was having. The system was also able to produce models of likely future effects if drainage and forestry was allowed to continue. A well-produced case won the argument and the threat of more forestry effectively came to an end when Nigel Lawson withdrew the forestry tax benefits in his 1988 budget. The Flow Country is currently being proposed as a World Heritage Site.

SHORT COMMUNICATIONS

Agrilus sinuatus (Olivier) (Col., Buprestidae) new to Wales.—An exploration of the ancient parkland of The Hendre (SO463135), a few miles to the west of Monmouth in VC35 (Monmouthshire), 10.iv.1998, resulted in the discovery of the characteristic D-shaped exit holes of *Agrilus sinuatus* in a mature hawthorn. This is an addition to the Welsh list. Other wood decay Coleoptera noted during the visit include *Ctesias serra* (Fab.) (Dermestidae), *Xestobium rufovillosum* (Degeer) (Anobiidae), *Prionychus ater* (Fab.) (Tenebrionidae) and *Phymatodes testaceus* (L.) (Cerambycidae), all from ancient oaks and all of very localised occurrence in Wales.

My thanks to The Rolls of Monmouth golf club for permission to enter the site.—KEITH N. A. ALEXANDER, 14 Partridge Way, Cirencester, Gloucestershire GL7 1BQ.

Hypulus quercinus (Quensel) (Col., Melandryidae) new to Gloucestershire.—Amongst the invertebrates found by the Gloucestershire Invertebrate Group in Pinbury Park (SO952052), near Edgeworth in E. Gloucestershire, 21.vi.1998, was a single specimen of *Hypulus quercinus*. It was found in a large decaying oak snag by John Harper. Pinbury Park includes a large concentration of ancient parkland oaks, plus a few ashes and field maples, all currently enveloped within mixed secondary woodland. This find represents the first wood decay species of any particular note from the site.—KEITH N. A. ALEXANDER, 14 Partridge Way, Cirencester, Gloucestershire GL7 1BQ.

BENHS FIELD MEETINGS

California Country Park, 16 June 1996

Leader: **Peter Chandler**. After a series of field meetings, workshops and numerous other recording visits to Dinton Pastures since the Society became established there in 1992 it was decided to investigate its sister Park, also operated by Wokingham District Council.

This is a very different area. It includes Longmoor Lake, a water body of longer standing than the gravel pits at Dinton Pastures, which provides a focus for the recreational areas of the Park. The lake occupies a central position in the Park, which is otherwise extensively wooded. To the east there is higher ground with drier woods but this meeting was confined to the areas to the north-west of the lake, which is a low lying wetter area dominated by alderwoods. It includes the permanently wet alder swamp area termed the "Everglades", which is traversed by boardwalks. There is also an enclosed area of heathland, adjoining these woods, which is being actively managed to restore it and is lightly cattle grazed to limit regrowth of scrub. These areas constitute Longmoor Bog, which is an SSSI and local nature reserve.

The day of the meeting itself was marked by excessively high temperature and humidity, which limited activity both of insects and the six members who attended. We initially found that the day had fortuitously coincided with a BBONT event, resulting in a chance encounter with Brian Baker by the Lake. We then proceeded through the narrow belt of woodland separating the lake from the heathland. Much of the morning was spent in this area, from which we took the boardwalk winding through the alder swamp to emerge in one of the drier grassy glades on the east side of the woods. Here there is a small artificial pond, by which we broke for a much needed lunch stop. Four of the party proved refreshed enough to proceed further in the afternoon, when we investigated the more mixed drier woods adjacent to the stream before it enters the swamp, crossing two scrubby rides (one of them with pylons) and a recent clearing, finally reaching another area of alderwoods at the north end of the site. We then returned more directly through the glades to the lake.

At the time of the visit the heathland had recently been cleared of pines and appeared overgrazed; there was concern expressed that pollution of the surface waters might become a problem. Subsequent visits have tended to suggest that this was a temporary phenomenon and grazing pressure does not seem to have had any obvious adverse effects. There is a dead standing pine trunk in the area which is a focus for wood nesting aculeates. *Pemphredon lugubris* (Fab.), *Crossocerus megacephalus* (Sphecidae) and *Trichrysis cyanea* (L.) (Chrysididae) were recorded.

The cattle were considered beneficial by Roger Hawkins, who was surprised to find four species of dung beetles (Scarabaeidae), *Aphodius equestris* (Panz.), *A. granarius* (L.), *A. rufipes* (L.) and *Colobopterus haemorrhoidalis* (L.), in their dung. He also recorded *Anisodactylus binotatus* (F.) (Carabidae) both on the heathland and in leaf and twig litter in the northern clearing.

About 45 species of Coleoptera were recorded on the day, including five species each of Elateridae (among them *Ampedus balteatus* (L.) on the heathland) and Cantharidae. Other finds included *Grypus equiseti* (Fab.) on horsetails (Roger Hawkins) and *Linnobaris pilistriata* (Steph.) (Malcolm Storey) (Curculionidae) in the swamp and fresh emergence holes of *Agrilus pannonicus* (Piller & Mitterpacher) (Buprestidae) in a fallen oak trunk in the northern woods (Andrew Halstead). *Halyzia 16-guttata* (L.) (Coccinellidae) was beaten from an oak by the car park and in the woodland glades.

The boggy pools on the open heathland were attracting both *Sericomyia* species (Syrphidae). Other hoverflies noted in this area included *Chrysogaster virescens* Loew. *Sphegina elegans* Schummel was present in the woods. The hoverfly *Chalcosyrphus nemorum* (Fab.), which develops in dead wood, was observed by the pond where we had lunch. The sphecid wasp *Crabro scutellatus* (Scheven) (Sphecidae) was also seen in flight by this pond.

This is a particularly good site for craneflies. Both *Pseudolimnophila* species (Limoniidae) and *Ptychoptera minuta* Tonn. (Ptychopteridae) were present in numbers in the swamp areas where *Tipula maxima* Poda (Tipulidae) was an obvious inhabitant. *T. yerburyi* Edw. and *Dicranomyia lucida* de Meij. (Limoniidae) were also recorded by John Dobson. Other alderwood species found were *Euphyllidorea aperta* (Verr.) and *Pilaria fuscipennis* (Mg.).

Eustalomyia hiliaris Fall. (Anthomyiidae), a cleptoparasite of dead wood nesting solitary wasps, was observed ovipositing in a pine log in the northern clearing by Andrew Halstead, where he also swept the bee *Chelostoma florissomme* (L.) (Megachilidae). On the return walk through the grassy glades, which are managed for marsh orchids, *Rivellia syngenesiae* (F.) (Platystomatidae) was found to be present in numbers. The asilids *Dioctria baumbaueri* Mg. and *D. rufipes* (De Geer) were about on the heathland and *Neoitamus cyanurus* (Loew) was seen in the woods.

Ten species of Heteroptera recorded by Roger Hawkins included the predatory shieldbug *Rhacognathus punctatus* (L.), which was swept by Andrew Halstead in the pylon ride.

The heathland pools were attracting dragonflies; *Pyrhosoma nymphula* (Sulzer), *Coenagrion puella* (L.) and *Libellula depressa* L. were observed. Sixteen species of sawflies were recorded on the day and in addition leaf rolls of *Blennoxocampa phyllocolpa* Vikasaari & Vikberg were found on wild *Rosa*. Among other miscellaneous records were two species of snakeflies (Raphidioptera), *Raphidia notata* F. recorded in the swamp by Malcolm Storey and *R. maculicollis* (Steph.) noted by Andrew Halstead.

Being previously unfamiliar with the site, I had made three reconnaissance visits earlier in June 1996, when some interesting species had been found and since this meeting I made three further visits in 1996 and another three in 1997 so the Diptera are now becoming well known with a rather different range of species to Dinton Pastures. Future visits to improve knowledge of other orders in this interesting area would be valuable.

Dinton Pastures, 17 May 1997

Leader: Peter Chandler. This meeting was arranged to investigate the areas newly added to Dinton Pastures Country Park, to the west of Bader Way. This area is divided into seven compartments for the purposes of the Management Plan and recording was based on these areas. The Society had been asked to advise the Country Park on the conservation of one small part of this area defined as a relict wet meadow (compartment 2). With this in mind, the meeting was attended by two representatives of the Society's conservation advisory committee, Stephen Miles and Raymond Uffen. Altogether nine members were present and records were gathered of all the major orders.

The day was mainly fine with some bright periods. The itinerary began at the northern end, starting from the car park adjacent to the Aviation Museum. In the morning the first three compartments were covered. At the northern end is an extension of Sandford Mill Copse (otherwise known as Bader Copse) (compartment 1). This is mainly dense dry oak and hazel woodland, but the northern

part has recently been coppiced and is now quite open; to the south it slopes down to an alderwood and stream which borders the "grassland" site (compartment 2), which is sandwiched between the copse and the Northern Lake, otherwise known as Redwood Lake (compartment 3). This lake has a dense wooded margin and a narrow area of scrubby ground between this and the road. Lunch was had at the south end of this lake at the edge of a wider area of scrub and grassland (compartment 4). The afternoon took us rapidly through this and past a small copse (compartment 5) into an area of "relict ancient grassland" (compartment 6), a generally lush area but with apparently poor flora of which grazing following annual cutting in July is proposed. More time was spent on the margin of the Southern Lake (compartment 7), which has a fringe of high woodland and a margin of carr and marsh vegetation.

Having completed the tour of the new areas, the party reached the bank of the River Loddon at the point opposite the newly constructed "park and ride" area, which has replaced an interesting area of marginal vegetation just outside the park limits. A more rapid return journey followed the west bank of the Loddon past the varied grassland and fen areas of Mortimer's Meadows. This enabled those members not already familiar with the Park to compare some of the other habitats with the new areas.

The species found in area 2, including some widespread species which are already known from other parts of the Park, are particularly noted below. This area was evidently originally part of the water meadows and retained some *Glyceria* and other marsh vegetation around the fringes. However, it had evidently been subject to spoil dumping, perhaps when the adjacent road was built. This had resulted in the greater part of the area now being covered with ruderal weed species, especially comfrey (*Symphytum* sp.), nettles (*Urtica dioica*), cleavers (*Galium aparine*), rosebay (*Chamerion angustifolium*) and docks (*Rumex* sp.). The value of this flora for common Lepidoptera species was noted and it was considered that restoration of marsh conditions to benefit plants other than *Glyceria* would be difficult with the low water table now prevailing. It was concluded that a minimum of management involving maintaining the area free of scrub encroachment would be the most appropriate solution for this area.

The 33 species of Lepidoptera recorded by Gavin Boyd included 10 additions to the list for the Park, mostly "micros". Among these *Alabonia geoffrella* (L.) (Oecophoridae), which is a dead wood feeder, was recorded in Sandford Mill Copse. In the same area *Adela reaumurilla* (L.) and *Nematopogon swammerdamella* (L.) (Incurvariidae) were on the wing. Eight species of common butterflies were observed during the day and *Euclidia glyphica* (L.) (Noctuidae), also known from Mortimer's Meadows, was about in areas 4 and 6.

Coleoptera were well recorded, 74 species being noted. A "Notable A" click beetle *Ampedus elongantulus* (F.) (Elateridae), associated with dead wood, was recorded by Andrew Halstead. It was sitting on a grass stem near the concrete drainage channel by the road at the junction of areas 2 and 3. Two "Notable B" ground beetles, *Badister dilatatus* Chaudoir and *Oodes helopioides* (Fab.) (Carabidae) were found by Ian Hoare at the margin of the Southern Lake. The water ladybird *Anisosticta 19-punctata* (L.) (Coccinellidae) was found by both Lakes.

Eight species of water beetles were recorded from the Southern Lake, a useful addition to the range of insects recorded in the Park. These included the "Notable B" *Helochares lividus* (Forster) (Hydrophilidae) recorded by Matthew Smith and several local species, among them *Cymbiodyta marginella* (Fab.) (Hydrophilidae), *Coelambus impressopunctatus* (Schaffer) and *Copelatus haemorrhoidalis* (Fab.) (Dytiscidae). Three further species were found in a water trough for cattle in the enclosed part of Mortimer's Meadows.

Other beetles found included the brightly marked *Endomychus coccineus* (L.) (Endomychidae) by both Lakes and the cerambycid *Agapanthia villosoviridescens* (De Geer) from the longer vegetation at the edge of area 4 bordering the copse of area 5; this develops in stems of umbelliferous plants like another species previously recorded in the Park. *Phytoecia cylindrica* (L.) but is an interesting addition to the Dinton list, which is known to have been spreading to new areas in recent years. Among a good list of species for area 2 were two species of *Paederus* (Staphylinidae), found in other fenny parts of the Park, *Silpha atrata* L. (Silphidae), *Cidnopus minutus* (L.) (Elateridae), *Oedemera lurida* (Marsham) (Oedemeridae), *Bruchus rufipes* Herbst (Bruchidae), *Chrysolina polita* (L.), *Cassida vibex* L. and *Plagioderia ruficollis* (Laicharting) (Chrysomelidae), *Rhynchites aequatus* (L.) (Attelabidae) and the "Notable B" weevil *Ceuthorrhynchus rapae* Gyll. (Curculionidae).

Seventeen species of sawflies were recorded by Andrew Halstead. Those in area 2 were *Aglaostigma fulvipes* (Scop.), *Loderus evermanni* (Kirby), *Macrophya duodecimpunctata* (L.) and *Nematus oligospilus* Foerster (Tenthredinidae). South of Redwood Lake, *Loderus vestigialis* (Klug) and *Dolerus germanicus* F. were present. *Macrophya annulata* (Geoff.) was found in Sandford Copse and *M. montana* (Scop.) in area 6.

Matthew Smith recorded the six common *Bombus* and two *Psithyrus* species (Apidae). Solitary species were few but *Andrena scotica* Perkins (Andrenidae) was recorded in areas 1 and 4. *Prionemis perturbator* (Harris) (Pompilidae) was recorded by Gavin Boyd, who noted that the left forewing venation was aberrant in that the third submarginal cell was divided in two by an extra horizontal vein, the right wing being normal.

Few Hemiptera were recorded but *Aelia acuminata* (L.) (Pentatomidae), which is common in the Park, was noted in area 2 and *Centrotus cornutus* (L.) (Membracidae) in area 4.

Nothing unusual was found among the Diptera recorded. The few hoverflies included both species of *Xanthogramma* and the bulb fly *Merodon equestris* (Fab.) in areas 2 and 3; *Parhelophilus versicolor* (Fab.) was present in area 6, suggesting that it had developed in the Southern Lake. The asilid *Dioctria atricapilla* Mg. was about in the longer grassy parts of area 6 and the cranefly *Tipula vernalis* Mg. (Tipulidae) was numerous in area 4. Andrew Halstead drew attention to galled fruitlets caused by *Contarinia pyrivora* (Riley) (Cecidomyiidae) on an isolated pear (*Pyrus*) in area 4. Flies found in the wetter parts of area 2 included *Calamoncosis glyceriae* Nartshuk (also in area 7), which develops in *Glyceria* (Chloropidae), *Cleigastra apicalis* (Mg.) (Scathophagidae) and *Trigonometopus frontalis* (Mg.) (Lauxaniidae), both associated with *Carex*.

A report including the recommendations mentioned above regarding the conservation of area 2, together with comments on the management of some of the other compartments, was submitted to the Country Park by Stephen Miles and produced a positive response from the park management.

Prescombe Down National Nature Reserve, Wiltshire, and Melbury Down, Dorset 21 June 1997

Leader: **Stephen Miles**.—This Conservation Working Group meeting was proposed by the leader to assist in record gathering for an area that appears to be poorly recorded on most dot maps of species. Additionally, as a double site meeting,

it gave the opportunity to contrast the management regimes operating at the two sites in terms of the entomologist's point of view.

Prescombe Down

Six members including the leader assembled at Prescombe Farm to be met by our guide, Linda Smith, from the local English Nature office. On entry to the start of the reserve, we were immediately alarmed by what appeared to be overgrazing, and the low height (2.5 to 5 cm) of the grazed sward and absence of chalk downland flowers, the sheer uniformity of the site. I think this site did not conform to our visions of what a National Nature Reserve should be! Probably at least 120 head of cattle of all ages were present on the 167 acres. The striking thing was that they appeared to have access to the whole site with no areas demarcated as off-limits by temporary electric fencing, thus preserving some longer grass roosting sites and flowers for nectar seeking insects.

At least the sward was a little longer when we reached the south west facing scarp slopes. Here the first interesting insects were seen, two worn adonis blues, *Lysandra bellargus* Rott., which in fact do require a rather low sward. Maximum numbers of eggs have been found, according to past research, where the turf height was between one and three centimetres high, (BUTT, 1986). However, even this publication recommends rotational grazing of compartments to achieve this.

Two examples of the spider parasite, the fly *Ogcodes pallipes* Latreille (Acroceridae), were taken by different members, one of whom remarked that he had taken it from a swarm flying around a hawthorn branch of a tree growing in an isolated clump. This is a notable species which when all conditions are favourable sometimes occurs following mass emergences, (Oldroyd, 1969).

There were three dipterists, two coleopterists and one hymenopterist present; however, the site and the wet weather precluded any solitary bees and wasps from being found. Further interesting Diptera found were the lauxaniid, *Sapromyza opaca* Becker, taken by Adrian Plant, the conopid, *Thecophora atra* (Fab.) by Mick Parker and the tachinids, *Exorista tubulosa* Herting and *Prosema siberita* (Fab.), the last of which according to Peter Chandler, their captor, is more usually associated with heathland situations.

Ian Hoare remarked in his notes for the day that half the species he had taken were coprophilic, so that the cattle, by their dung, were adding to the diversity of species! The more interesting beetles were *Onthophagus coenobita* (Herbst), *O. joannae* Goljan (Scarabaeidae), *Cryptocephalus hypochaeridis* (L.) (Chrysomelidae) and *Larimus planus* (Fab.) (Curculionidae).

The early gentian *Gentiana anglica* (Pugsley) was readily seen on the thin soils of the steeper slopes of this unimproved grassland. Corn buntings were also seen by Adrian Plant.

Thanks are due to English Nature's Central Wiltshire Branch staff members, David Burton for making the arrangements and especially to Linda Smith for her guidance on the site on the day, and to the landowner.

Melbury Down

Several heavy showers were experienced during the afternoon and these probably adversely influenced the species seen and collected. One member observed a specimen of the wood tiger moth *Parasemia plantaginis* (L.) which is a fairly typical denizen of this type of site, though more scarce nowadays. This site was richer in numbers of Lepidoptera than Prescombe Down due, presumably, to the lack of summer grazing.

This was exemplified by the species composition of tachinid flies, which included species more characteristic of chalk grassland. These included the local species, *Eriothrix prolixa* (Mg.) and *Demoticus plebejus* (Fall.), the latter being scarce and confined to downland, both are parasites of Lepidoptera.

Several dark green fritillary *Argynnis aglaja* L. butterflies were seen to emerge from the adjacent northerly beech plantations and to fly into the lower slopes of the chalk grassland. Even after recent rain they could be seen perching on grass stems. The food-plants of a number of typical chalk downland butterflies could be readily found, such as horseshoe vetch *Hippocrepis comosa* L., but the grassland was probably too long for the adonis blue, none of which were seen.

One experienced member felt that in spite of the steepness of the site there was a surprising lack of bare ground that might normally be expected to result from this type of slope. As a consequence of this and the perceived limited grazing it was felt that the site was in danger of invasion by coarse grasses. Indeed two such grasses were present. Upright brome *Bromus erectus* Hudson occurs throughout the site at worrying densities. Tor grass *Brachypodium pinnatum* (L.), however, was fortunately limited to the level areas at the top of the slope adjacent to the road.

Of course the longer grassland is valuable in providing shelter and roosting sites for the insects of short turf. We do not really know what this site is being managed for. It may be that the limited grazing is being used to preserve the special interest alluded to in the National Trust handbook, where the site is described as botanically rich. Further to the west there was evidence of good quality chalk grassland with patches of horseshoe vetch *Hippocrepis comosa* L. and large anthills with coverings of thyme (*Thymus* sp.). The flowerheads of some large patches of kidney vetch *Anthyllis vulneraria* L. were searched for the eggs of the small blue butterfly, but none were found. One specimen of the fragrant orchid *Gymnadenia conopsea* (L.) was seen in the grid square ST8919.

It had been hoped to attract lepidopterists to the site for an evening meeting of light-trapping but owing to the adverse weather—heavy squally showers, strong westerly wind and cold temperatures—no lepidopterists arrived.

Thanks are due to Graham Heard for giving permission for the meeting to go ahead, and also to Simon Evans, both of The National Trust.

REFERENCES

- Butterflies Under Threat Team (BUTT). *Focus on Nature Conservation No. 17. The Management of Chalk Grassland for Butterflies*. Peterborough: Nature Conservancy Council 1986.
 Oldroyd, H. *Handbooks for the Identification of British Insects. Diptera Brachycera. Section (a) Tabanoidea and Asiloidea*. London: Royal Entomological Society 1969.

Marks Hall Estate, Essex, 2 August 1997

(Joint Colchester Natural History Society/British Entomological Society Meeting)

Leaders: **Joe Firmin & Jerry Bowdrey**. The Estate, situated near Coggeshall (TL82) in north Essex (VC19) comprises an interesting mosaic of deciduous woodland, some partly conifer plantation, interspersed with areas of acid grassland and wetland areas with alder carr, several ponds and a large ornamental lake. Part of the area is being developed as an arboretum and the whole is managed by the Phillips Trust.

Three members of BENHS and six from CNHS attended the daytime session which was conducted in bright sunshine. It was intended to visit Grange Wood but

the attractions of Alder Carr (TL8325) which we passed en route to the wood, were too much to resist. The alders had recently been coppiced and the ground flora had responded to increased light levels. Insects were abundant but hoverflies, particularly *Episyrphus balteatus* (Deg.), *Metasyrphus corollae* (F.) and *Syrphus ribesii* (L.) predominated, swarming at every flower and making other species difficult to pick out, although Gavin Boyd was able to find *Chrysogaster solstitialis* (Fallén). Jonathan Cole also took the Notable lauxaniid *Sapromyza bipunctata* Meigen at this site. Amongst the butterflies was *Aricia agestis* (D.&S.) (brown argus), a species which has made a dramatic come-back in Essex in recent years.

Moving on to Lily Wood (TL8326) for lunch, *Tetrix undulata* (Sowerby) (common groundhopper) was found beside a small pond. Nigel Cuming and Dan Hackett beat the buprestid *Trachys minutus* (L.) from *Tilia* and vacuum sampling of a dry sparsely vegetated area produced the Notable planthopper *Asiraca clavicornis* (Fab.).

After lunch, three of us stopped to examine a stack of logs cut for charcoal burning. A sycamore log infested with sooty bark disease produced *Cicones undatus* Guérin-Meneville, believed to be new to the County. After enjoying refreshments at the visitor centre some of the group returned to examine one of the last surviving ancient oaks where *Vespa crabro* L. (Hornet) were seen at a sap run, whilst in the arboretum Jonathan Cole took the nationally Notable conopid *Conops strigatus* Wiedemann.

Daytime recording ended with a look at a different log pile where another buprestid, *Agrilus angustulus* (Illiger) and the clerid *Thanasimus formicarius* (L.) were found. The sandy soil around the log pile had nests of the sphechids *Ammophila sabulosa* (L.) and *Cerceris arenaria* (L.). The evening moth session, held in woodland at TL8325 attracted 17 observers and recorded a total of 87 species. *Cyclophora punctaria* (L.) (maiden's blush) and *Eilema deplana* (Esper) (buff footman) were among the 21 species new to the site.

Colaton Raleigh Common, 20 June 1998

Leader: Roy McCormick.—This two-part meeting started fine with very little wind. While I was waiting for the rest of the people to arrive, I spent time looking for seed heads of *Cerastium holosteoides* Fr. (common mouse-ear chickweed) for the larvae of *Panemeria tenebrata* (small yellow underwing) but I was too early. By the time I returned to the car park, people had started to arrive. We finished up with twelve of which six were Butterfly Conservation (B.C.), three BENHS and two Devon Moth Group members plus the Warden, Doug Cullen. We all got into convoy behind Doug and we were led onto the site; as the year had been so wet we were advised to put our wellies on. Doug and the B.C. members wanted to have a look at the site where *Plebejus argus* (L.) (silver-studded blue) breeds and they also wanted to do a count of specimens seen; we saw the species in good numbers and they were reasonably fresh with males and females flying. We made our way to a swampy heathland area so that Doug could show us the successful management for a rare species of dragonfly that had been discovered, *Coenagrion mercuriale* (Charp.) (Southern damselfly), which was seen in good numbers; Doug tells me that the species is now to be seen on four sites in Devon. While we were on the swampy heath, Bob Heckford, Tony Pickles and I looked for signs of larvae of *Buckleria paludum* on *Drosera rotundifolia* L. (sundew). Several signs of eating were found, along with a larva of something else (the larva was in a poor condition and died), but no *paludum*. Other interesting species seen included one *Colias croceus* (Geoffr.) (clouded yellow)

and a few *Callophrys rubi* (L.) (green hairstreak). The session finished around 5.30 pm with the people who came having had a good afternoon. Those of us who needed a meal made our way to Otterton, which is a couple of miles away.

The night part of the meeting started with a new batch of people plus a few of the afternoon ones turning up at the same car park so that we could be led again onto the site by Doug Cullen. This time we had three B.C., five BENHS and five DMG members; some of these belonged to the other organisations attending. We were led back to the site and traps were placed in the woodland and heath areas with one trap being placed next to the patch of woundwort that was seen last year; this was to try and find *Phlyctaenia stachydalis* (Germar) but without success. There were around a dozen traps operating but because the night was clear the going was slow, but temperatures remained at around 15°C with a dew coming down early. Despite the conditions we managed to record 130 species, including the few daytime ones. Bob Heckford identified most of the Microlepidoptera, which came to 45 species including the pyralid and plume moths; there were only 3 species of butterflies with 82 macromoths. The more interesting of the total were one *Buckleria paludum* (Zeller) adult on damp heath, one *Capperia britanniodactyla* (Gregson) seen in the woodland, two *Cyclophora albipunctata* (Hufnagel) (birch mocha) on the edge of the heath, several *Idaea sylvestriaria* (Hübner) (dotted border wave) on the heath, one *Rhodometra sacraria* (L.) (vestal) on the heath, several *Euphyia biangulata* (Haworth) (cloaked carpet) in both types, a few *Perconia strigillaria* (Hübner) (grass wave) on the heath, several *Diacrisia sannio* (L.) (clouded buff) on the heath, several *Lacanobia contigua* (D.&S.) (beautiful brocade) on the heath, several *Mythimna pudorina* (D.&S.) (striped wainscot) on the damp heath and one *Schrankia costaestrigalis* (Stephens) (pinion-streaked snout) on the heath. By around 01.30 there was little coming in so we set about packing up and we were ready to depart by around 02.30; Tony Pickles opted to stay for the rest of the night; he was in the woodland and added a few species to the list for his trouble.

Denbies Hillside & Ranmore Common, Surrey, 20 June 1998

Leader: **Mark Parsons**. Sunny, but breezy, conditions welcomed the five members and two friends who attended the afternoon part of the meeting at this classic site, which is also known as Westcott Downs. A range of Orders was observed during the afternoon with records including species of Hemiptera, Orthoptera, Diptera, Coleoptera, Hymenoptera and Lepidoptera, along with a single Mollusc species (the Roman snail *Helix pomatia*, live and empty shells being found). Amongst the Coleoptera, perhaps the longhorn *Molochus umbellatarum* (Notable A) was the most interesting. The leaf beetle *Cryptocephalus aureolus* (Notable B) and the mordellid *Variimorda villosa* (Notable B) were recorded, with at least eight examples of the latter species seen on hogweed flowers. The larva of the glow-worm *Lampyrus noctiluca* was also recorded. Amongst the Hymenoptera, *Osmia bicolor* (Notable B) was observed visiting the flowers of creeping cinquefoil and wild privet. Rather surprisingly the solitary-wasp *Oxybelus uniglumis* and the sand-wasp *Ammophila sabulosa* were recorded, although both species are more usually associated with sandy substrates as opposed to chalk downland. Of the moths, a number of examples of the lace border *Scopula ornata* (Scopoli) (Notable A) were put up during the afternoon. Several species of plume moth were also seen, including *Merrifieldia baliodactylus* (Zeller) (larvae and a single adult), *M. leucodactyla* (D.&S.) and *Oxyptilus parvidactylus* (Haworth), with both the last species flying in numbers. In

the evening four members and two friends attended, giving a total of six members and two friends attending over the day. Six mercury vapour light-traps and two actinic light-traps were operated on what was a starlit night, but with a gentle warm breeze. A very respectable total of 109 species of macrolepidoptera were recorded over the evening (with an additional three species seen only during the afternoon session bringing the total to 112 species). Additionally about 70 species of microlepidoptera were noted over the day as a whole. Amongst the species seen in the evening session were several that are considered nationally scarce or are scarce in Surrey. These included *Coleophora lixella* (Zeller); the tortricid *Pelochrista caecimaculana* (Hübner) (Notable); further examples of the lace border *Scopula ornata*; a single ruddy carpet *Catarhoe rubidata* (D.&S.) (Notable B) (Collins G. A. (1997) *The Larger Moths of Surrey*, Surrey Wildlife Trust) states that this moth "is only known from 14 examples in the last 20 years" in Surrey); several royal mantle *C. cuculata* (Hufnagel); a single brown scallop *Philereme vetulata* (D.&S.); a single dark umber *P. transversata* (Hufnagel); the satyr pug *Eupithecia satyrata* (Hübner); the shaded pug *E. subumbrata* (D.&S.); a single alder kitten *Furcula bicuspis* (Borkhausen) (Notable B); the triple-spotted clay *Xestia ditrapezium* (D.&S.); several reddish light arches *Apamea sublustris* (Esper); and about six rosy marbled *Elaphria venustula* (Hübner). However, the highlight of the evening was a single example of the dew moth *Setina irrorella* (L.) (Notable A), a species which had not been seen in Surrey since 1987 (Collins, 1997) and one of the target species for the field meeting. As a consequence of this record a further trip was made to the site, on the 4th July 1998, when over 30 examples were seen, suggesting the presence of a healthy colony.

This proved to be a very productive and enjoyable field meeting to a site which does not appear to have been recorded particularly well in recent years. It is good to know that many of the species which were known from the site historically are still present. I would like to take this opportunity to thank David Kennington and John Cranham of the National Trust for permission to hold this field meeting and for allowing vehicular access to the site. All records from the meeting have been forwarded to the N. T. Biological Survey Team and to David Kennington.

Roborough Wood, Great Torrington, 4 July 1998

Leader: **Roy McCormick**.—The evening was dry and reasonably warm and by the appointed hour we had ten people, eight of these being Devon Moth Group (DMG) members with five belonging to BENHS as well; there were also two Butterfly Conservation members with one of these belonging to DMG. We made our way to the wood, suggesting trapping sites to those who had equipment. Adrian Henderson decided that there were too many traps, including his own, so he suggested that he find somewhere else, other than Roborough Wood, to run his traps; this turned out to be very fortuitous as he discovered where *Moma alpium* (Osbeck) (scarce merveille du jour) was in Devon; he saw three that night near to Great Torrington. [I went back the following night to the same locality but at a different site nearby and found another three. This find brought in as many specimens in the two nights as had been seen previously from 1865 to 1956; a further two were seen in 1984 and 1994.] Back in Roborough Wood, the trap sites were well spread out so a lot of walking was done between traps but the list expanded rapidly as it was a pleasant night with a minimum temperature of around 14°C; specimen numbers were low as in the last year but some interesting species were seen, the best of these being: one *Phlyctaenia*

stachydalis (Germer), one *Cyclophora linearia* (Hübner) (clay triple-lines), two *Orthonama obstipata* (Fab.) (gem), two *Euphyia biangulata* (Haworth) (cloaked carpet), several *Chloroclystis debiliata* (Hübner) (bilberry pug), around twenty *Hydrelia sylvata* (D.&S.) (waved carpet), one *Apeira syringaria* (L.) (lilac beauty), two *Cleorodes lichenaria* (Hufnagel) (brussels lace), one *Paractropis similaria* (Hufnagel) (brindled white-spot), four *Craniophora ligustri* (D.&S) (coronet), one *Laspeyria flexula* (D.&S) (beautiful hook-tip) and several *Hypena crassalis* (Fab.) (beautiful snout). However, there was no sign of our target species, *Moma alpium* (scarce merveille du jour) in Roborough Wood. At around 01.30 and with very little coming in it was decided to call it a night, so we upped sticks and left around 02.30 after a final check round the other traps, the others had all come to the same conclusion as they too were packing up. The final tally was 120 species (with 28 of these being micromoths). The full list has been lodged at Dinton Pastures.

Flanders Moss NNR, Perthshire, 1 August 1998

Leader: **Keith Bland**. The venue of this field meeting was the large area of lowland raised peatmoss called Flanders Moss (NS6397), just west of Stirling. The weather was almost ideal with plenty of sunshine but with only sufficient breeze to curtail midge activity. Unfortunately only four intrepid entomologists, namely Mike and Betty Clementson, David Horsfield and the leader were available to enjoy these conditions. The day was spent in good, old-fashioned, net-in-hand recording. Then, after a break for evening nourishment, two generator-operated M.V. lights were run over sheets.

Some 40 species of lepidoptera were noted by day with a similar additional number being recorded at light. A total of 80 species of lepidoptera is a very respectable count for a habitat dominated by heather, sphagnum and birch. On the open moss the pyralid, *Catoptria margaritella* (D.&S.) was the commonest lepidopteran, with the bilberry tortrix *Aphelia viburnana* (D.&S.) and the manchester treble-bar *Carsia sororiata* (Hübner) also tiresomely abundant. Closer to the birches the tortricids *Epinotia brunnichana* (L.) and *Apotomis betuletana* (Haworth) dominated. The clearance of colonising birch scrub in this part of the moss had been a little over-enthusiastic, thus mines of *Atemelia torquatella* (Lienig & Zeller) were scarce. The pristine condition of the few *Philedone gerningana* (D.&S.) and *Coenonympha tullia* (Müller) (large heath) seemed to suggest that both were just starting to emerge. On the other hand, a very worn specimen of the local *Biselachista serricornis* (Stainton) indicated that its season was past. The highlight of the day occurred with a slow, laboured fly-past by a fresh female *Ochsenheimeria taurella* (D.&S.) as lunchtime sandwiches and parachutist-watching were being given priority! This appears to be the first confirmed Scottish record for this species. Visitors to the M.V. lights held few surprises. It was nice to see several *Idaea biselata* (Hufnagel) (small fan-footed wave), never a common species in Scotland, and a surprise in a habitat of this nature to find a single *Yponomeuta padella* (L.) on the sheet.

Diptera were the centre of David Horsfield's attention, with a good set of records again being obtained but not without a great deal of careful searching. However, it was a fly with an attitude, namely an acrocerid, *Acrocerus globulus* Panzer, the humpback or balloon fly, that headed the fly celebrity list of the day. A parasite of wolf-spiders, this was only the third Scottish record. Among the muscids, several local species were taken but none of them unexpected.

BOOK REVIEWS

Aquatic Insects of North Europe—A Taxonomic Handbook: Volume 2, edited by Anders Nilsson. Apollo Books, 1997, 440 pages, A4 hardcover, 550.00 Danish Kroner.—This volume completes a comprehensive multi-author review of the 2800-odd freshwater aquatic insects of northern Europe, which is taken to include Denmark, Scandinavia, Finland and Fennoscandian Russia. Volume 1, published in 1996, dealt with the smaller orders and the Coleoptera, whilst this larger second volume is almost entirely taken up by the Diptera, together with the Odonata. All families which contain truly aquatic representatives are covered, in some cases including the terrestrial representatives as well but more usually comprising only the aquatic elements.

As with the earlier volume, a simple glance at the author list indicates the quality to be expected, taking in as it does so many well-known names from amongst the European dipterological community. These include, *inter alia*, Hugo Andersson (Ptychopteridae, Scathophagidae), Milan Chvála (Tabanidae), Christine Dahl (Culicidae), Rudolf Rozkošný (Stratiomyidae, Sciomyzidae), Ken Smith (Immature stages), Rüdiger Wagner (Psychodidae, Dixidae, Thaumaleidae, Empididae) and Anders Nilsson himself, who contributed the introduction to adult Diptera as well as editing the work.

Volume 2 commences with a chapter on the Odonata, with excellent new keys to adults and larvae (including small larvae) of all species. This covers all of the British species except the widespread, southern *Ceriagrion tenellum*, the rare and localised *Coenagrion lunulatum*, *C. mercuriale* and *Sympetrum nigrescens*, and some of the extinct and rare vagrant species. These deficiencies are well covered elsewhere, however, and do not represent an undue detraction.

The Odonata are followed by two chapters introducing adult and larval Diptera respectively, with keys to families, and a further 22 chapters covering some 24 families of Diptera. Each chapter typically comprises a brief introduction and review of known biology, highlighting gaps in knowledge, morphology of life stages and methods for collection, preservation, study and rearing. This is followed by keys to adults and, in many cases, larvae and other life stages, references to other relevant literature sources and a checklist indicating national distributions. Many of the keys run to species-level, although some of the keys to larger families run to genera only, with references to relevant key-works to species. The volume is illustrated throughout by some 2055 monochrome line drawings, laid out in 195 clear plates.

It is an exceptional piece of work, bringing together and consolidating a very great deal of material which was previously scattered in the literature. Whilst there are necessarily some differences in scope and coverage between the families, the overall standard is consistently high. The keys are clear and well-illustrated, and in the families I looked at in detail, appeared to cover most of the British species. Users in Britain will find this an extremely valuable tool, although they will need to be watchful when using the keys to species as there are often situations where we have additional species present. This perhaps represents the main deficiency of the work from a British standpoint, falling as we do just outside of the faunistic range covered. It remains necessary to have access to, and knowledge of, the British literature in order to make certain that all of the possibilities have been checked. So, in a typical family such as Dixidae, for example, the handbook excludes mention of the British species *Dixa nebulosa*, *Dixella attica* and *D. filicornis*, for which it is necessary to turn to Henry Disney's 1975 Freshwater Biological Association key, as well as *Dixella graeca* which was added to the fauna in 1992 (*Entomologist's mon Mag* 128: 165–169). Only the former of these references is mentioned in the handbook bibliography.

Nevertheless, the handbook is likely to become a first source of reference when dealing with aquatic insects in Britain, and on the plus side includes reference to many boreal species not so far recorded from Britain but which may be awaiting recognition.

In recent use I found that I had little difficulty in running down material with a high degree of confidence, bolstered by the good provision of confirmatory characteristics. The literature references and taxonomy are well up to date. The standard of editing is also very high. Whilst some minor infelicities in grammar and spelling are perhaps to be expected, this is truly an English language work and generally reads very well. Inaccuracies are rare. The volume I saw came with a short corrigenda listing six errata, and itself listed 5 corrections to volume 1, evidence of conscientious checking by the authors and publishers.

I recommend the work wholeheartedly. Volume 1 is available at 450.00 DK, and the two volumes are available together at 900.00 DK, all plus postage, direct from Apollo Books, Kirkeby Sand 19, DK-5771 Strenstrup, Denmark. Prices quoted by British dealers vary, but generally come in at around £65 and £75.00, plus postage, for volumes 1 and 2 respectively.

DAVID CLEMENTS

Checked Beetles. Illustrated Key to the Cleridae of the Western Palaearctic by Roland Gerstmeier. Margraf Verlag, Weikersheim, Germany, 1998, 257 pages, 372 drawings and maps, 128 coloured photographs, hard cover, DM 93.00 (+ 7% VAT).

This book is a very useful addition to the growing number of bilingual well-illustrated guides to European Coleoptera. It includes a brief synopsis of the systematics and biology of the Cleridae and Thanerocleridae, and dichotomous keys to the 124 species known from the W. Palaearctic, with brief descriptions of each species and a synopsis of its distribution, and in some instances a distribution map. It also includes colour photographs of almost all the genera and most of the species known from the region.

For those of us who collect Coleoptera in the Mediterranean region, where Cleridae are more common than they are in N. & C. Europe, this book will be a valuable guide. However, as the author points out, a number of genera, especially *Trichodes*, the most commonly collected and speciose genus in the Mediterranean region, are in need of revision, and the key to *Trichodes* species will be difficult to use without having material for comparison available. I attempted to identify some of my *Trichodes* using the key and had difficulties at couplets 14, 15 and 40 where no illustrations of the diagnostic characters referred to are given. Also on none of the *Trichodes* photographs is there an indication of the sex of the specimens. As the author points out, females in this genus are often difficult to assign to species, and when comparing the colour patterns of specimens with the photographs I would have liked to know if I was comparing the same sex. Another minor criticism is that there is no indication of the actual size of the specimens on the colour plates, although the size range of each species is given at the beginning of each species description.

Despite these slight shortcomings this book will be a valuable addition to the bookshelf of anyone interested in W. Palaearctic Coleoptera.

BRIAN LEVEY

Somerset Hoverflies by E. T. and D. A. Levy. 74 pp & 7 pages of plates of which 4 are in colour, paperback. Privately published by the authors in 1998, supported by a

grant from Somerset Wildlife Trust. Available from the authors at 9 Chilton Grove, Yeovil, Somerset BA21 4AN. £6.00 plus £1.00 postage and packing (UK).

This is the second atlas of hoverflies produced by these authors, who published "Dorset Hoverflies" in 1992. It is based on fieldwork by the authors since 1976 and examination of specimens in local and national museum collections. Published data was checked as far as practicable and information from many other collectors and recorders was incorporated.

Following a general account of the biology of hoverflies, the history of recording in Somerset is described, with brief biographical details of six earlier collectors. The plates include black and white photographs of five of these collectors and four localities. An account is given of the geographical features of Somerset, with more detail on 12 of the "special localities" including lists of the significant species recorded from each of them; suggestions are made as to the possible course of future recording.

Myolepta potens Harris, which has been recorded this century only from the Somerset Levels and Bristol district, is the only British syrphid not to have been recorded in recent years and may now be extinct in Britain. The Somerset localities and the potential survival of the species are discussed, but despite continued availability of larval habitat (rot-holes), the loss is noted of some other species found at its main locality, Loxley Wood, in the 1940s by John Cowley. Another rare species *Eupeodes* (as *Lapposyrphus*) *lapponicus* (Zett.), found by Cowley in Devon, was discovered by the authors at a locality just within the southern border of Somerset.

The main part of the text comprises 10 km square maps with records marked on a tetrad basis for each of 200 species known to occur in Somerset, of which 186 have been recorded since 1980. A brief account is given of each species with details of the first known record for the county. The suprageneric classification and order of species follows that in *British Hoverflies* by A. E. Stubbs and S. Falk, but an attempt was made to update nomenclature from various sources including articles in *Dipterists Digest* (to which an apostrophe has intruded). The authors are to be commended for making this attempt, which is explained in a section entitled "The confusion of Latin names presently used", but this is not entirely successful and there are some inconsistencies in the use of names. They have followed some recent works in using the name *festivum* in *Xanthogramma* and their *Chrysotoxum arcuatum* (L.) is evidently the *festivum* of Stubbs & Falk, not their *arcuatum*, although this is not stated (a current application to ICZN, to restore the earlier usage in these genera, will hopefully resolve this problem).

Other nomenclatural changes will be apparent to syrphid enthusiasts, but the most significant is the raising of all subgenera to generic rank; this is presumed to be anticipation on the part of the authors that this might happen, as it is not explained in the text.

A more detailed map of the county shows the 1 km squares including the 864 localities from which hoverflies have been recorded in the county. The four colour plates include twenty photographs of adult hoverflies, mostly of the more frequent species, but including *E. lapponicus* mentioned above and *Callicera aurata* (Rossi). The locations and dates for these photographs are not given, but *C. aurata* must have been photographed outside the county as the only Somerset record cited was made in 1916.

Details of 18 national and local societies and conservation bodies are included in an appendix, with more detail of the funding body. A map showing the location of Somerset woodlands is provided on the rear cover.

This publication is the result of a considerable amount of work by the authors and their collaborators. The Levys are to be congratulated for having brought together

present knowledge on the distribution of hoverflies in their county and having presented it in this informative and easily used format.

PETER CHANDLER

Hoverflies of Surrey, by Roger K. A. Morris, hard cover. 244 pp. ISBN 0952606534. Published 1998 by Surrey Wildlife Trust, School Lane, Pirbright, Woking, Surrey GU24 0JN. Tel: 01483-488055. £15 + £2.70 p&p.

This is a most scholarly, and at the same time highly readable and useful hardback, produced to the highest standards. Although it is based on the best scientific observations and approaches, it is easy to follow and should suit both the expert and the newcomer. I have only one grumble and that is that the superb photographs were not reproduced to a larger size to show the intricate detail and colours even better.

Hoverflies really took off as a special interest group some years back when Alan Stubbs and Steve Falk produced their seminal work which made identification much more possible. Roger Morris acknowledges his debt to this event but it must be said he has moved on and added to knowledge with this fine volume.

On looking at the wealth of information included, it is difficult to imagine the amount of work to produce it in an easily understood and readable form, as well as the immense amount of effort which went into the fieldwork. This covered the whole area, not just the places favoured by the surveyors. The detail of this coverage is well illustrated by the maps shown for virtually all species. These are based on two-kilometre squares and provide a very real idea of the hoverfly population of this well-favoured county. 209 of the 270 or so British hoverflies have been found here, with a further 5 doubtful records. This is rendered even more memorable when it seems that all except 11 of these have been recorded since 1980.

This volume is the fourth of a series on the county's invertebrate groups, which must serve to encourage groups in other counties to have a go. It is vital that we find out more about our invertebrates and spread the knowledge to the general public if we are to retain the species in the future. A volume such as this carries out these aims admirably in its wide coverage of the subject, clear writing without more jargon than is strictly necessary, and excellent, eye-catching illustrations.

Roger Morris has devoted 13 years to the life of hoverflies in Surrey, as well as acting in a national capacity running the National Hoverfly Recording Scheme. The information gained is presented in clear form in the book and involved over 30,000 records. It includes sections on Surrey, its soils, geology, vegetation and important sites, all illustrated with easily-understood maps. There is an introduction to hoverflies, their structure, biology and conservation. Then comes the main body of the book with its species-by-species coverage of: number of records; Surrey and national status; flight times; peaks; followed by comments on the species, its associations, locations and type of habitat in the country, flowers visited, records; tetrad distribution map.

One of the interesting developments has been the change from pure recording to a much more comprehensive look at the life of the various species. The most noticeable here is the inclusion of much data on which flowers are visited by the hoverflies.

This book is a great effort and it can only be hoped that the recording continues in this disciplined manner and in due course an up-dated and expanded version will be produced. It is to be recommended to anyone who is interested in hoverflies. I hope that other counties will be moved to produce such studies in the same methodical detail.

ROBIN WILLIAMS

EDITORIAL

INSTRUCTIONS TO AUTHORS

It has been some years since "Instructions to authors" have been given and this issue presents (inside back cover) an updated version. Some particular changes have been discussed at Council. A short *Abstract* is now required for main articles. Perhaps a more fundamental change is to request that journal titles in the references are given in full. There has been no update of the "World List of abbreviations" for many years and none appears to be in preparation. (It is also a work probably few have access to.) At the same time there has been a wide variety of new journals without agreed abbreviations. Even agreed abbreviated versions were rarely followed anyway! Many Journals have adopted the use of the full titles and an increasing number of articles are submitted in this way. There were some misgivings that full titles would lead to longer papers and waste of space. A detailed analysis of the articles published in Volume 11 of the *British Journal of Entomology and Natural History* and the extra space needed for full titles showed that very few extra lines would be needed. The majority of these extra lines would be accommodated within the present page layout (i.e. there was already a little space on the same page). I hope that prospective authors will not find it too difficult to include the full titles of Journals. I should be able to assist with any that might cause problems.

SOCIETY'S WEBSITE

<http://www.benhs.org.uk>

I hope that members with internet access have checked what is available at the new website address (transferred from its earlier site). Many may just wish to check Society details and news but it is also just the starting point for investigating the astonishing amount of entomological information that is now available. One site that might be looked at is 'Gordon's Entomological Home Page' (www.insect.world.com). There you will find over 200 separate files dealing with a huge diversity of topics in great detail and with useful bibliographies. There are now also some sites covering online catalogues to collections and even those listing humorous scientific names (<http://www.best.com/~atta/taxonomy.html>). Something for everyone in fact and with local call lines at around £2 an hour cheaper than some other pastimes!

ARTICLES STILL REQUIRED

As members will have noticed the last issue of Volume 11 combined parts 3 and 4. This was an attempt to catch up and provide a better schedule for issues in 1999. It was also a response to the lack of articles under consideration for a time last year. I am pleased to say that a number of articles has been submitted in the past months and the next issue is almost ready for typesetting. However, there is a continued need for articles, short communications and also field meetings reports. Perhaps only half of the field meetings that are organised by the Society are reported on. Reports need not be long but they do mark the event.

BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

Instructions to Authors

Papers and short communications published in the *British Journal of Entomology and Natural History* are intended to reflect the interests of the membership, but manuscripts from non-members are also welcome. All aspects of invertebrate biology are covered although priority will be given to British and Palaearctic insects. Contributions dealing with conservation are welcomed.

General: Contributions should be double spaced on one side of A4 paper, with 3 cm margins either side to allow for marking up. Layout should follow Journal style for either articles or short communications. Apart from scientific names, which may be either underlined or given in italic, no other marks should be made to define the typeface.

Three copies of the text and figures are required; the additional copies may be photocopies.

Disk copies of the text are invited only upon acceptance. Guidance on format will be given as required.

Nomenclature: use the most up-to-date available. Include the Order in the title and family or subfamily where appropriate. After the first use of a specific scientific name give the author's name, which should not be abbreviated except for Linnaeus as L. and Fabricius as Fab. Where required these should be placed in parentheses. This should apply not only to insect names but to the names of plants, non-insect invertebrates and other animals.

Abstract: A short abstract should be provided describing the nature of the results.

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 to fit into the Journal page size. Colour illustrations may be accepted where they add to the text; please contact the Editor. In the text use the abbreviations Fig. e.g. Fig. 2; and Figs e.g. Figs 3–6.

Tables should be prepared on separate sheets; avoid vertical lines, use horizontal lines sparingly. Legends for figures and tables should be given on a separate sheet.

References: In the text, references should be given as author and date (e.g. Allan, 1947); multiple references should be given in date order; where there are more than three authors they should be cited e.g. Jones *et al.*, 1996. References should be given in alphabetical order at the end of the article. *Journal titles should be given in full.* Examples:

- Allan, P.B.M. 1947. *A moth-hunters gossip*. 2nd edn. Watkins and Doncaster. London. 149 pp.
- Baker, P. 1994. The modified status of *Strymonidia w-album* (Knoch) (Lepidoptera: Lycaenidae) in north west Surrey. *British Journal of Entomology and Natural History* 7: 25–26.
- Jones, R. A. 1994. [Bilobed inflorescences of *Plantago lanceolata* L. Exhibit at BENHS Annual Exhibition 1993.] *British Journal of Entomology and Natural History* 7: 179
- Stubbs, A. E. 1987. *Oxyccera dives*. In Shirt, D. B. (Ed.) British red data books: 2 Insects. Nature Conservancy Council, Peterborough. pp.304–305.
- Stubbs, A. E. & Falk, S. J. 1983. *British hoverflies: an illustrated identification guide*. BENHS. London, pp. 191–192.

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Whilst all reasonable care is taken of manuscripts and other material, neither the Editor nor the Society can accept responsibility for any loss or damage.

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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 27 November 1999 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, J. Muggleton, 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 01189-321402 for the latest meeting news. The Society's web site is: <http://www.BENHS.org.uk>

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Cover illustration: Solitary bee, *Andrena flavipes* female. photo: R. 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.

**THE TAWNY MINING BEE, *ANDRENA FULVA* (MÜLLER)
(HYMENOPTERA, ANDRENINAE), AT A SOUTH WALES FIELD
SITE AND ITS ASSOCIATED ORGANISMS: HYMENOPTERA,
DIPTERA, NEMATODA AND STREPSIPTERA**

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Abstract The fossorial solitary bee *Andrena fulva* was studied at one of its nesting aggregations in Cardiff, South Wales, and rates of parasitism by its natural enemies (Hymenoptera, *Nomada panzeri*; Diptera, *Bombylius major*, *Leucophora obtusa*) were quantified over six years. This was done by placing nets over the previous year's nest entrances and collecting all host bee offspring and associated organisms as they first emerged in spring, and by dissecting host bees and their associated organisms. Cleptoparasitism by the cuckoo bee *N. panzeri* averaged 18% (ie 18% of *A. fulva* offspring were replaced by a *N. panzeri* offspring). Other natural enemies were seemingly of lesser prevalence (*B. major*: 3% parasitism; *L. obtusa*: 3% cleptoparasitism). Numerical sex ratios of host and parasites did not differ from 1:1. First instar exuviae of *Stylops melittae* were positively identified within the haemocoel of one *N. panzeri* female. This is the first report of any stage of a strepsipteran within a nomadiine bee. However, there was no evidence of *S. melittae* adults in either *A. fulva* or *N. panzeri*, suggesting that both bee species were inadequate hosts for *S. melittae* at this field site in S. Wales.

INTRODUCTION

Andrena comprises a large genus of ground-nesting bees with a primarily Holarctic distribution (Michener, 1979). Approximately 65 species of *Andrena* are found in Britain (Fitton *et al.*, 1978). Some of these are relatively common members of our spring fauna, though in a recent review over half of the British *Andrena* species were considered scarce or threatened (Falk, 1991). One member of the genus, *Andrena fulva* (Müller) (= *Andrena armata* (Gmelin)) (Hymenoptera, Andreninae), a harbinger of spring, may nest in dense aggregations in lawns of city parks and gardens in England and Wales (an aggregation existed up to the 1990s immediately in front of the Natural History Museum, London) as well as in Central Europe (e.g. Klausnitzer, 1976; Gusenleitner, 1985). A nesting female produces a characteristic miniature 'volcano' of soil, a tumulus, above its nest entrance (Fig. 1). Its nesting habits and locations, along with its deep red dorsal covering of hair, mean that *A. fulva* is commonly encountered and recognized.

Bees and their nests are known to host a wide range of associated insects, particularly from the orders Diptera, Coleoptera and Hymenoptera, some parasitic and others commensal (e.g. Batra, 1965; Paxton *et al.*, 1996). Yet, despite the abundance and accessibility to observation of *A. fulva*, surprisingly little has been reported on its biology and associated organisms (cf. Gusenleitner, 1985). It is known to be the sole host of the rare cleptoparasitic bee *Nomada signata* Jurine (Hymenoptera, Anthophorinae) (Westrich, 1989) and to be one of several hosts of



Fig. 1. An *Andrena fulva* female (wing length circa 10 mm) emerges from its tunnel entrance around which there is a tumulus or 'volcano' of soil, material that she has removed from her nest during its construction. Photo: RJP (with permission, IBRA).

another cleptoparasite bee, *Nomada panzeri* Lepelletier (Hymenoptera, Anthophorinae) (Richards, 1946; Gusenleitner, 1985).

Strepsiptera comprise an order of 550 plus described species that are entomophagous endoparasites, attacking members of the following taxa: Zygentoma, Mantodea, Blattodea, Ensifera, Caelifera, Sternorrhyncha, Auchenorrhyncha, Heteroptera, Hymenoptera, and Diptera (Kinzelbach, 1978; Kathirithamby, 1989). Though they have a worldwide distribution and have for long attracted the attention of entomologists, they remain an understudied and enigmatic group. Their sexual dimorphism is extreme. The winged, short-lived males have a bizarre appearance whilst females are larviform and neotenic, most species remaining embedded within the abdomen or gaster of their hosts. A strepsipteran larva has a planidial primary larval stage that subsequently develops as an internal parasite of the juvenile stages of a host (Kinzelbach, 1978; Kathirithamby, 1989). Species identification, particularly of females, is difficult. Even the taxonomic position of the order is unclear, and has been debated since its erection by Kirby in 1813. The group was earlier considered to be related to, even a part of, the Coleoptera (Crowson, 1981; Lawrence & Newton, 1995). Kristensen (1991) suggested that the Strepsiptera are not members of the Endopterygota; he placed them as "Neoptera incertae sedis". Molecular phylogenetic analyses have more recently suggested that the Strepsiptera and Diptera are sister clades and therefore probably more closely related (Chalwatzis *et al.*, 1996; Whiting *et al.*, 1997).

Members of the stylopid genus *Stylops* are parasites of bees of the genus *Andrena* (Kinzelbach, 1978). Though *Stylops* are only sporadically encountered, they can be locally common, and have been implicated in the demise of nesting aggregations of their *Andrena* hosts (Theobald, 1892). Given the difficulties of stylopid species identification, little is known of their host specificity, though it is clear that some *Stylops* species can parasitize more than one *Andrena* species (Bohart, 1936; Kinzelbach, 1978; Pohl & Melber, 1996). Differences in the proportions of the female cephalothoraces, in the shape of the aedeagi of the males, and in the first instar larvae indicate that *S. melittae* from the Western Palaearctic is not a homogenous species (Kinzelbach, 1978; Borchert, 1963; Pohl, 1998), though the precise species status of morphologically disparate specimens is not clear. For this reason, we follow Kinzelbach (1978), who synonymized all described *Stylops* species from the Western Palaearctic.

Our study was designed to document the organisms associated with *A. fulva* at one of its nesting aggregations in the suburbs of Cardiff, Glamorgan, S. Wales, and to quantify rates of parasitism of its natural enemies. During the study, first instar larval stages of *Stylops melittae* Kirby 1802 (Strepsiptera, Stylopidae) were encountered in *N. panzeri*, a cleptoparasite of *A. fulva*; this is the first report of any stage of a *Stylops* found within a nomadine bee.

MATERIAL AND METHODS

Andrena fulva nests are often aggregated in a spatially discrete area of apparently suitable ground and, though the species is univoltine, with adults living but a few weeks in spring, aggregations persist over many years (Gusenleitner, 1985). *Andrena fulva* was studied for six consecutive years (1988–1993) at one such aggregation in Cardiff (field site 'Heol Don', ST149797).

The life cycle of *A. fulva* is typical of other vernal *Andrena* species; adults overwinter underground within their natal cells then emerge in the following spring, males to mate and females to provision their own offspring with self-collected pollen and nectar (Westrich, 1989). Each female constructs her own brood cells at the end of her own self-dug tunnel into the ground. Bees were collected as they first emerged from their natal cells in spring using cages of fine nylon netting (emergence traps) placed over the entrances of the previous year's nests (Fig. 2). Offspring generally first emerge in spring through their natal tunnel rather than excavating a new gallery from their natal cell to the soil surface.

Emergence traps were put out over individual nests in spring, well before the emergence of any bees, and they were examined one or more times per day throughout the emergence and flight period. All host bees and any associated organisms emerging from *A. fulva* nests into emergence traps were recorded and either released immediately or returned to the laboratory for further study. Emergence trap data provide one means of quantifying rates of parasitism for those brood parasites that have a life cycle and spring emergence behaviour similar to those of their host. Little is known of the life cycle of some of the Diptera associated with *A. fulva* at Heol Don and their mode of egress from host cells and nests in spring. Therefore the use of emergence traps may give only an approximate estimate of the importance of these organisms as putative parasites of *A. fulva*.

All emerging bees were examined visually for the presence of Strepsiptera protruding through their gasters, namely female cephalothoraces or male puparia. Additionally, some males and females of both *A. fulva* and *N. panzeri* were dissected under insect saline and their gastral tissues examined with the aid of a binocular microscope ($\times 40$ magnification) for the presence of internal parasites, including

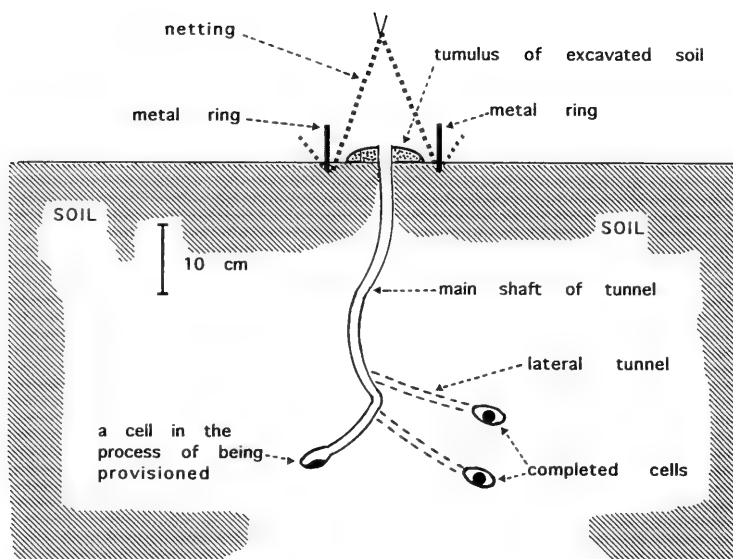


Fig. 2. Cross-sectional view of an *Andrena fulva* nest in spring with emergence trap *in situ* to collect all emerging offspring and associated organisms.

Strepsiptera. Other adults of *A. fulva* and *N. panzeri* were collected from Heol Don after emergence, visually inspected, and then dissected and also examined for parasites.

RESULTS AND DISCUSSION

The host bee, *Andrena fulva*

A total of 402 *A. fulva* was collected from emergence traps across the six years of their use at Heol Don, with a numerical sex ratio not significantly different from 1:1 ($\chi^2=0.020$, $df=1$, n.s.; Table 1). Generally, a non-biased sex investment ratio is

Table 1. Numbers of host *Andrena fulva* bees and their natural enemies collected from emergence traps across six years at Heol Don, Cardiff. The per cent parasitism by natural enemies assumes that one host bee is replaced by one enemy.

species	role	number of adults emerging			% parasitism
		females	males	unknown	
<i>Andrena fulva</i>	host bee	203	199	—	
<i>Nomada panzeri</i>	cleptoparasitic bee	44	51	—	17.9%
<i>Bombylius major</i>	parasitic fly	7	5	4	3.0%
<i>Leucophora obtusa</i>	cleptoparasitic fly	7	8	—	3.0%
<i>Brachicoma devia</i>	? parasitic fly	1	—	1	0.4%
<i>Fannia hamata</i>	? parasitic fly	—	1	—	0.2%

expected in solitary insects such as *A. fulva*, though the sex ratio varies from male-biased through to female-biased in other solitary bees (Crozier & Pamilo, 1996).

The cuckoo bee, *Nomada panzeri*

The cuckoo bee *N. panzeri* (Fig. 3) was abundant at Heol Don, where *A. fulva* represented its major host. It was often seen to enter burrows of *A. fulva*. *Nomada signata*, though found elsewhere in Cardiff (RJP, pers. obs.), was never encountered at Heol Don. Like its host, *N. panzeri* is univoltine and overwinters as an adult, ready to emerge in the following spring in the same fashion as its host, through the host mother's tunnel entrance. In addition to *A. fulva*, 95 *N. panzeri* were collected from emergence traps; the numerical sex ratio of the cuckoo bee at emergence was also not significantly different from 1:1 ($\chi^2 = 0.260$, $df = 1$, n.s., Table 1).

One or more *Nomada* females lay eggs within host cells, only one of which survives to consume the host egg or larva and the provisions of pollen and nectar which its host mother had stored in its cell (Westrich, 1989). Thus one, and only one, *Nomada* offspring can develop within a host cell, always replacing the host offspring (Rozen, 1991). Assuming one individual of all other parasites collected in the emergence traps likewise replaced one host offspring, parasitism of *A. fulva* brood cells by *N. panzeri* can be calculated to have averaged out at 17.9% across the six years of study.



Fig. 3. A *Nomada panzeri* female (wing length circa 8 mm), a common cleptoparasitic bee of *Andrena fulva* at Heol Don, sits ominously over a tunnel of its host. Photo: RJP.

Though a well known cleptoparasite of *A. fulva* and other members of the genus *Andrena* (Richards, 1946), the rate of parasitism by *N. panzeri* has not previously been quantified. Clearly, cleptoparasitism by *N. panzeri* represents a considerable cost to its host, *A. fulva*, at Heol Don.

Dipteran associates

Female bee flies, *Bombylius major* Linnaeus (Diptera, Bombyliidae), were occasionally observed over the Heol Don nesting aggregation, hovering 5–15 cm above *A. fulva* nest entrances and flicking dust-covered eggs towards the ground with a bobbing motion of the apex of the abdomen. Such oviposition behaviour is typical of bee flies (e.g. Andrietti *et al.*, 1997; Stubbs, 1997), whose larvae (planidia) crawl to underground host bee cells where they consume host larvae or prepupae (Bohart *et al.*, 1960). *Bombylius major* is thought to be a parasite of numerous fossorial bee species (Askew, 1971). Empty exuviae of *B. major* were often found protruding above the soil surface within the nesting aggregation at Heol Don, suggesting that their owners had parasitised *A. fulva* cells beneath. Excavation of one *A. fulva* nest at Heol Don revealed two larvae of *B. major* within host cells, thus confirming this bee fly as a parasite of *A. fulva*. Interestingly, both bee flies required two years to reach adulthood, suggesting they may have a two- or multi-year life cycle, as also seems to be the case for *B. major* parasitizing *Andrena scotica* Perkins 1916 in Sweden (Paxton *et al.*, 1996).

Estimating the rate of parasitism by *B. major* of *A. fulva* has three complications. Firstly, it is not known whether just one host bee larva/prepupa suffices for the development of a bee fly or whether several are required (see Batra, 1965). Secondly, bee fly larvae make their exit from subterranean host cells not through the host mother's tunnel but more likely by burrowing vertically upwards through the soil immediately above a host cell using large proximal and distal spines (e.g. Bohart *et al.*, 1960). Thirdly, as suggested above, *B. major* most likely has a multi-year life cycle, a feature which may be common in temperate bombyliids (Bohart *et al.*, 1960). They are therefore unlikely to be captured within emergence traps placed over the previous year's host nests. The 3.0% parasitism of *A. fulva* offspring by *B. major* (Table 1) is therefore probably a large underestimate. Other bombyliids are considered to inflict greater brood mortality on their host bees (e.g. at least 5.8% for a halictid bee, Packer, 1988). The numerical sex ratio of *B. major* at emergence was not significantly different from 1:1 ($\chi^2 = 0.168$, $df = 1$, n.s.).

The satellite fly *Leucophora obtusa* (Zetterstedt) (Diptera: Anthomyiidae) was often encountered around the nesting aggregation of *A. fulva* at Heol Don, and it has been previously recorded following *A. fulva* in Britain (Copeman, 1921; described therein as *Hammonyia* (*Hylephila*) *unilineata* Zett.). At Heol Don, a female satellite fly would pursue a female *A. fulva* returning to its nest carrying pollen provisions, 'shadowing' the host bee in flight by a distance of approximately 5–10 cm until the host entered its nest. *Leucophora obtusa* then followed one of two approaches to gain access to the bee's nest and, presumably, to oviposit within it. Either it would immediately follow the host bee into its nest (Fig. 4), presumably to inspect the nest's contents, reverse out of the nest, then re-enter the nest in reverse, presumably to oviposit. Alternatively, it would sit motionless at 2–6 cm distance from the host nest, head pointed at its entrance. After approximately 20–30 minutes, the host bee usually re-emerged and flew away on another pollen or nectar provisioning flight, whereupon the satellite fly ran up to the host nest, inspected it and oviposited within it as described above.



Fig. 4. A female of the anthomyiid satellite fly *Leucophora obtusa* (wing length circa 5 mm) enters head first a tunnel of its host, *Andrena fulva*, at Heol Don, possibly to inspect its contents. Photo: RJP (with permission, *Entomologisk Tidskrift*).

Though other *Leucophora* species are known to 'shadow' other presumed host bee or wasp species, there is little information on their oviposition strategies with which to compare these observations of *L. obtusa* (see Paxton *et al.*, 1996). Certainly *L. obtusa* has been reported to parasitise several *Andrena* species (Hennig, 1976).

Satellite fly larvae eat the pollen mass with which host bee larvae have been provisioned (Hennig, 1976); they are cleptoparasites. *Leucophora obtusa* offspring probably emerge from overwintering through their host's tunnel and collect in emergence traps. Assuming *L. obtusa* has the same life cycle as that of *A. fulva*, its rate of parasitism was low at Heol Don, at an estimated 3.0% (Table 1). It is likely that more than one *L. obtusa* could have developed on the provision mass of one host bee cell (see Knerer & Atwood, 1967) and therefore the estimate of 3.0% may itself be an overestimate. For other bee species, *Leucophora* cleptoparasitism has been shown to be higher (e.g. 7.2% for one population of halictid bees in the USA, Eickwort *et al.*, 1996). The numerical sex ratio of *L. obtusa* at emergence was not significantly different from 1:1 ($\chi^2 = 0.125$, $df = 1$, n.s.).

Two other fly species were collected in very low numbers from emergence traps (Table 1). *Brachicoma devia* Fallén (Diptera, Sarcophagidae) is a known parasite of bumble bee larvae (Alford, 1975). *Fannia hamata* Macquart (Diptera, Fanniidae) larvae are commensal in wasp (*Vespula* spp.) nests (Spradbery, 1973); other *Fannia* spp. larvae consume detritus in wasp and bumble bee nests (Spradbery, 1973; Alford, 1975). It is not clear whether these irregular associates of *A. fulva* nests were indeed parasites of the bee's brood.

Nematoda

Dissection of 159 female and 9 male *A. fulva* revealed 3 mermithid nematodes, one in each of three female bees. Mermithids are generalist parasites of soil-dwelling insects and have been previously recorded as parasites of other fossorial bees (Batra, 1965). No other organisms, such as diplogasterid nematodes (Giblin-Davis *et al.*, 1990; Erteld, 1995), were recorded in association with *A. fulva*.

Strepsiptera

All bees collected from emergence traps were without external signs of stylopisation. An additional 91 female and 73 male *A. fulva* and an additional 10 female and 11 male *N. panzeri*, collected as free-flying adults from around Heol Don, showed no external signs of stylopisation. During casual observation, other adults of *A. fulva* and *N. panzeri* were never seen with external signs of stylopids at Heol Don across the six years of study.

Dissection of 13 female and 6 male *N. panzeri* revealed 2–30 dark brown spheres approximately 1 mm³ in diameter within the gastral haemocoels of three of the females, each of which had been collected from Heol Don as a free-flying adult. Spheres were brittle and opaque so their contents could not be determined. Careful inspection by microscopy ($\times 400$ magnification) of brown flecks in the adipose tissue of one of the females containing dark spheres revealed the exuviae of two first instar larvae of *Stylops melittae* (Fig. 5), each approximately 0.23 mm in body length, and lacking any internal structures.

Only first instar exuviae of strepsipterans can be found in hosts because the second instar larva remains in its exuvia (Kathirithamby, 1989; H.P, pers. obs.). The encapsulation and melanisation of juvenile stage parasites by host insects is a well characterized immune response (Kraaijeveld & van Alphen, 1994). We hypothesize that the dark spheres that were found within *N. panzeri* haemocoels may represent encapsulated stylopids.

Though there are several cases of errant first instar larvae of Strepsiptera been found in non-specific hosts (e.g. in a first instar larva in an aphid, Prior, 1976; or in a phlebotomid, Rageau, 1951), this is the first report of any stage of a *Stylops* having been found inside an insect other than an *Andrena* host. Given the small size of stylopid first instar larval exuviae and their location, embedded within gastral adipose tissue, it may be the case that stylopids in other dissected bees (*A. fulva*: 159 females, 9 males; *N. panzeri*: 10 other females, 9 males) were overlooked in this study.

How is it that exuviae of stylopid first instar larvae were to be found inside *N. panzeri* adults? Primary larvae of *Stylops* are deposited onto flowers as host *Andrena* females, bearing a gravid *Stylops* female within their gasters, walk lethargically across blossoms (Linsley & MacSwain, 1957). *Stylops* larvae are assumed to climb onto other bees that subsequently visit the same flowers and are transported by them, possibly within the honey crop (Linsley & MacSwain, 1957; Batra, 1965). If the vector of the *Stylops* is a host female then, when the host bee is back at its nest, *Stylops* larvae climb onto or are deposited onto host provisions and subsequently enter the host egg or first instar larva to continue their own development (Linsley & MacSwain, 1957; Kathirithamby, 1989). For *S. melittae* to have been found within the haemocoelic tissue of *N. panzeri* adults implies that the stylopid first instar larvae must have entered a *N. panzeri* larva, presumably soon after it had itself consumed the original *A. fulva* egg or larva within a brood cell.



Fig. 5. An empty exuvia of a *Stylops melittae* first instar larva within adipose tissue of an adult *Nomada panzeri*. Total length of exuvial cavity: 0.23 mm. The head capsule has become partially detached from the rest of the exuvia. Photo: HP.

Each *N. panzeri* carrying dark spheres, including the individual in which *S. melittae* first instar exuviae were positively identified, contained spermatozoa in its spermatheca and mature oocytes in its ovarioles, suggesting that all were reproductively active. Host *Andrena* bees containing mature *Stylops* females in their gasters are effectively sterile, mating but not producing mature oocytes nor provisioning cells within a nest (Smith & Hamm, 1914; Linsley & MacSwain, 1957). It appears that *N. panzeri* was an inadequate host for *S. melittae*.

British *A. fulva* have occasionally been recorded as having been successfully styloped by *S. melittae* (Perkins, 1892, 1918a,b; Kinzelbach, 1978). In Germany, *A. fulva* is also an often reported host of *S. melittae* (Ulrich, 1956; Borchert, 1963; Saure, 1994; Kuhlmann, 1998). Within Berlin, there is one supposed 'host race' of *S. melittae* which parasitizes only *Andrena vaga* Panzer (Borchert, 1963) despite the presence of *A. fulva* at the same location. At our Welsh field site, *S. melittae* parasitizes *A. scotica*, where hosts infected with female *S. melittae* visit the same blossoms as *A. fulva* females. That there was no evidence of *Stylops* imagines in *A. fulva* at Heol Don despite the existence of *S. melittae* within its cuckoo bee and in the local environment suggests that *A. fulva*, too, may be an inadequate host for this putative 'host race' of *S. melittae* at this field site. A considerable step forward in the systematics of *Stylops* species can only be made with greater series of males and first instar larvae derived from different host bees.

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REFERENCES

- Alford, D. V. 1975. *Bumblebees*. Davis-Poynter, London. 352 pp.
- Andrietti, F., Martinoli, A. & Rigato, F. 1997. Quantitative data concerning the oviposition of *Bombylius fimbriatus* Meigen (Dip.: Bombyliidae), a parasite of *Andrena agillissima* (Scopoli) (Hym.: Andrenidae). *The Entomologist's Record and Journal of Variation* **109**: 59–63.
- Askew, R. R. 1971. *Parasitic Insects*. Heinemann Educational Books, London. 316 pp.
- Batra, S. W. T. 1965. Organisms associated with *Lasioglossum zephyrum* (Hymenoptera: Halictidae). *Journal of the Kansas Entomological Society* **38**: 367–389.
- Bohart, R. M. 1936. A preliminary study of the genus *Stylops* in California (part I). *Pan-Pacific Entomologist* **12**: 9–18.
- Bohart, G. E., Stephen, W. P. & Eppley, R. K. 1960. The biology of *Heterostylum robustum* (Diptera: Bombyliidae), a parasite of the alkali bee. *Annals of the Entomological Society of America* **53**: 425–435.
- Borchert, H.-M. 1963. Vergleichend morphologische Untersuchungen an Berliner *Stylops*-L1 (Strepsipt.) zwecks Entscheidung der beiden Spezifitätsfragen: 1. gibt es an unseren Frühjahrs-Andrenen (Hymenopt., Apidae) mehrere *Stylops*-Arten und 2. gibt es Wirtsspezifitäten? *Zoologische Beiträge (Neue Folge, Berlin)* **8**: 331–445.
- Chalwatzis, N., Hauf, J., van de Peer, Y., Kinzelbach, R. & Zimmermann, F. K. 1996. 18S ribosomal RNA genes of insects: primary structure of the genes and molecular phylogeny of the Holometabola. *Annals of the Entomological Society of America* **89**: 788–803.
- Copeman, S. M. 1921. Note on the capture (in London) of a rare parasitic fly, *Hammomyia (Hylephila) unilineata* Zett. *Proceedings of the Zoological Society of London* **1921**: 31–34.
- Crowson, R. A. 1981. *The Biology of the Coleoptera*. Academic Press, New York. 802 pp.
- Crozier, R. H. & Pamilo, P. 1996. *Evolution of Social Insect Colonies. Sex Allocation and Kin Selection*. Oxford University Press, Oxford. 306 pp.
- Eickwort, G. C., Eickwort, J. M., Gordon, J. & Eickwort, M. A. 1996. Solitary behavior in a high-altitude population of the social sweat bee *Halictus rubicundus* (Hymenoptera: Halictidae). *Behavioral Ecology and Sociobiology* **38**: 227–233.
- Erteld, C. 1995. Über die Bindung von *Diplogaster* spec. (Nematoda) an Sandbienen (*Andrena* spp.). *Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin* **33**: 143–155 (1994).
- Falk, S. (Ed.). 1991. *A Review of the Scarce and Threatened Bees, Wasps and Ants of Great Britain*. Nature Conservancy Council, Peterborough. 344 pp.
- Fitton, M. G., Graham, M. W. R. d. V., Boucek, Z. R. J., Fergusson, N. D. M., Huddleston, T., Quinlan, J. & Richards, O. W. 1978. *Kloet and Hincks. A Check List of British Insects. Part 4: Hymenoptera*. 2nd edn. Royal Entomological Society of London, London. 159 pp.
- Giblin-Davis, R. M., Norden, B. B., Batra, S. W. T. & Eickwort, G. C. 1990. Commensal nematodes in the glands, genitalia, and brood cells of bees (Apoidea). *Journal of Nematology* **22**: 150–161.
- Gusenleitner, F. 1985. Nestanlagen von *Andrena fulva* (Müller, 1776) in Stadtzentrum von Linz. *Naturkundliche Jahrbuch der Stadt Linz* **29**: 129–141 (1983).
- Hennig, W. 1976. *Die Fliegen der paläarktischen Region. 63a. Anthomyiidae. Part 1*. Schweizerbart'sche Verlag, Stuttgart, Germany. 680 pp.
- Kathirithamby, J. 1989. Review of the order Strepsiptera. *Systematic Entomology* **14**: 41–92.
- Kinzelbach, R. K. 1978. *Insecta Fächerflügler (Strepsiptera)*. Gustav Fischer, Jena, Germany. 166 pp.
- Klausnitzer, B. 1976. Nestkolonie von *Andrena fulva* Schrank im Stadtgebiet von Dresden (Hym.). *Entomologische Nachrichten (Dresden)* **20**: 99.
- Knerer, G. & Atwood, C. E. 1967. Parasitization of social halictine bees in southern Ontario. *Proceedings of the Entomological Society of Ontario* **97**: 103–110.

- Kraaijeveld, A. R. & van Alphen, J. J. M. 1994. Geographical variation in resistance of the parasitoid *Asobara tabida* against encapsulation by *Drosophila melanogaster* larvae: the mechanism explored. *Physiological Entomology* **19**: 9–14.
- Kristensen, N. P. 1991. Phylogeny of extant hexapods. In *The Insects of Australia*. Cornell University Press, Ithaca, New York. pp. 125–140.
- Kuhlmann, M. 1998. Nachweise mit Bienen und Wespen (Hymenoptera Aculeata) assoziierter Milben (Acari) und Fächerflügler (Strepsiptera). *Linzer biologischen Beiträgen* **30**: 69–80.
- Lawrence, J. F. & Newton, A. F. Jr. 1995. Families and subfamilies of Coleoptera (with selected genera, notes, references and data on family-group names). In *Biology, Phylogeny, and Classification of Coleoptera*. Papers Celebrating the 80th Birthday of Roy A. Crowson. Muzeum i Instytut Zoologii PAN, Warszawa, Poland. pp. 779–1006.
- Linsley, E. G. & MacSwain, J. W. 1957. Observations on the habits of *Stylops pacifica* Bohart. *University of California Publications in Entomology* **11**: 395–430.
- Michener, C. D. 1979. Biogeography of the bees. *Annals of the Missouri Botanical Garden* **66**: 277–347.
- Packer, L. 1988. The effect of *Bombylius pulchellus* (Diptera: Bombyliidae) and other mortality factors upon the biology of *Halictus ligatus* in southern Ontario. *Canadian Journal of Zoology* **66**: 611–616.
- Paxton, R. J., Tengö J. & Hedström, L. 1996. Fly parasites and other associates of a communal bee, *Andrena scotica* (Hymenoptera: Apoidea), on Öland, SE Sweden. *Entomologisk Tidskrift* **117**: 165–178.
- Perkins, R. C. L. 1892. Stylopized bees. *Entomologist's Monthly Magazine* **28**: 1–4.
- Perkins, R. C. L. 1918a. Further notes on *Stylops* and stylopized bees. *Entomologist's Monthly Magazine* **54**: 115–129.
- Perkins, R. C. L. 1918b. Synopsis of British Strepsiptera of the genera *Stylops* and *Halictoxenus*. *Entomologist's Monthly Magazine* **54**: 67–76.
- Pohl, H. 1998. *Die Primärlarven der Fächerflügler – evolutionäre Trends*. Ph.D. Dissertation, Technical University of Darmstadt, Germany. 252 pp.
- Pohl, H. & Melber, A. 1996. Verzeichnis der mitteleuropäischen Fächerflügler und die Beschreibung einer neuen Art der Gattung *Malayaxenos* Kifune 1981 (Insecta: Strepsiptera). *Senckenbergiana Biologica* **75**: 171–180.
- Prior, R. N. B. 1976. *Metopolophium festucae* (Theob.) (Homoptera, Aphidoidea) accidentally parasitised by larvae of *Elenchus tenuicornis* (Kirby) (Strepsiptera, Stylopidae). *Entomologist's Monthly Magazine* **111**: 91.
- Rageau, J. 1951. Un cas de parasitisme accidentel par une larve primaire de strepsiptère chez un phlébotome. *Annales de Parasitologie Humaine et Comparée* **26**: 473–474.
- Richards, O. W. 1946. *Nomada flava* Panzer and the strains of *N. panzeri* Lepeletier (Hymenoptera, Apidae). *Proceedings of the Royal Entomological Society of London, (B)* **15**: 17–26.
- Rozen, J. G. 1991. Evolution of cleptoparasitism in anthophorid bees as revealed by their mode of parasitism and first instars (Hymenoptera: Apoidea). *American Museum Novitates* **3029**: 1–36.
- Saure, C. 1994. Mitteilung über neue Nachweise von Fächerflüglern als Bienen- und Wespenparasiten in Berlin und Umland (Insecta: Strepsiptera: Stylopidae). *Brandenburgische entomologische Nachrichten* **2**: 47–53.
- Smith, G. & Hamm, A. H. 1914. Studies in the experimental analysis of sex. Part II. On *Stylops* and stylopization. *Quarterly Journal of Microscopical Science* **60**: 435–461.
- Spradbery, J. P. 1973. *Wasps*. Sidgwick & Jackson, London. 408 pp.
- Stubbs, A. 1997. British bee-flies. *British Wildlife* **8**: 175–179.
- Theobald, F. V. 1892. Stylopized bees. *Entomologist's Monthly Magazine* **28**: 40–42.
- Ulrich, W. 1956. Unsere Strepsipteren-Arbeiten. *Zoologische Beiträge (Neue Folge)*, Berlin **2**: 177–255.
- Westrich, P. 1989. *Die Wildbienen Baden-Württembergs*. Verlag Eugen Ulmer, Stuttgart, Germany. 972 pp.
- Whiting, M. F., Carpenter, J. C., Wheeler, Q. D. & Wheeler, W. C. 1997. The Strepsiptera problem: phylogeny of the holometabolous insect orders inferred from 18S and 28S ribosomal DNA sequences and morphology. *Systematic Biology* **46**: 1–68.

SHORT COMMUNICATION

Aggregation behaviour in *Philonthus cognatus* Stephens (Col.: Staphylinidae), at Burnt Wood, Staffordshire—On the morning of 3 and 4. ix.1998 whilst undertaking a survey of the epigeal beetle fauna at Burnt Wood, Staffordshire (SJ736534), I observed a mass aggregation of beetles, *Philonthus cognatus* (Col.: Staphylinidae), on the low vegetation adjacent to one of the rides bordering an area of coniferous plantation woodland (*Pinus* sp.). Walking a 30 m transect along the ride I recorded 616 of what appeared to be, and later proved to be, individuals of the same species of staphylinid beetle at rest on low vegetation. They were aggregated at a height of no more than 40 cm, particularly on *Rubus fruticosus*, *Dryopteris affinis* and the low sward of mixed common grasses, with some individual pieces of vegetation yielding between 40–50 individuals.

Even the slightest contact with the vegetation initiated a mass escape response whereby all the beetles spontaneously dropped to the ground amongst the dense vegetation. Adding these escapees to the recorded figure would produce an estimate of numbers in excess of one thousand along this transect. This aggregation behaviour was also observed at two other locations within the reserve, one on the opposite side of the ride, and one on an adjoining ride, giving an overall estimate in excess of 2,500 individuals. These figures were surprising as in the previous three months, whilst pitfall trapping a number of areas within the reserve, the overall total of carabid, and staphylinid beetles trapped had numbered less than 500 individuals.

Aggregation behaviour has been observed in other staphylinid species on the continent, particularly in *Stenus* spp., with occurrences also recorded for some Aleocharinae and Omaliinae (Lecoq, 1991, 1993; Orousset, 1993). *Agonum dorsale* Pontoppidan (Col.: Carabidae) have also been observed in aggregations, overwintering in the base of hedgerows in the south of England (N. Sotherton, *pers. comm.*), and although as yet there is no positive evidence as to why this occurs, it is possible that an aggregation pheromone is responsible for initiating this behaviour. However, this did not appear to be a typical overwintering aggregation, and the lack of physical contact between individuals suggests that this was not mating behaviour either. *P. cognatus* are however voracious predators of aphid species (Dennis & Wratten, 1991) and therefore it is possible that this aggregation is linked to prey searching behaviour, although there is as yet no evidence to support this hypothesis, leaving this behaviour, to date, unexplained. Thanks to Jonathan Webb of the Staffordshire Wildlife Trust for his assistance in confirming the beetle determination.—PHILIP J. SMITH, 437 Stone Road, Trentham, Stoke-on-Trent ST4 8NG & MARK R. WEBB, Biology Division, School of Sciences, Staffordshire University, College Road, Stoke-on-Trent ST4 2DE.

REFERENCES

- Dennis, P. & Wratten, S. D. 1991. Field Manipulation of Populations of Individual Staphylinid Species in Cereals and Their Impact on Aphid Populations. *Ecological Entomology* **16**(1): 17–24.
- Lecoq, J.-Cl. 1991. Observation d'un Comportement Rare Chez un Staphylin: Le Gréganisme (Col.: Staphylinidae). *L'Entomologiste* **47** (3): 173.
- Lecoq, J.-Cl. 1993. Gréganisme des Staphylins: Suite (Col.: Staphylinidae). *L'Entomologiste* **49** (1): 38.
- Orousset, J. 1993. Note De Chasse. Compliments D'Information Concernant le "Gréganisme" Chez les Staphylins. *Bulletin de Liaison de L'Association des Coleopteristes de la Région Parisienne*, 17th Septembre 1993, **17**: 50.

THOMAS VERNON WOLLASTON AND THE MADEIRAN BUTTERFLY FAUNA—A RE-APPRAISAL

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Abstract. In 1847, the British entomologist T. V. Wollaston visited Madeira and commenced a study of the invertebrate fauna of that island. He returned several times and his work culminated in the publication of *Insecta Maderensia* in 1854. Two years later he published *On the Variation of Species with especial reference to the Insects*, a text which clearly anticipated *On the Origin of Species by means of Natural Selection* by his friend Charles Darwin. Although Wollaston made only a small collection of Madeiran butterflies, he is remembered by the endemic subspecies of *Pieris brassicae* L. that bears his name. The present authors visited Madeira on a number of occasions during the period May 1997–August 1998 to survey Lepidoptera in the Parque Ecológico do Funchal, part of a long-term project to provide information for a field guide to the Lepidoptera of the park. This paper is an extension of that survey and presents data on all the Madeiran butterflies.

INTRODUCTION

‘The island being resorted to by so many invalids,’ wrote Professor Henry Moseley, on visiting Madeira in 1872 (Moseley, 1880), ‘the cemetery forms a conspicuous feature in the scenery.’ With this statement the scene is set, for almost 150 years ago the young T. V. Wollaston (1822–1878) Fig. 1, an ailing consumptive of 25 summers, first set sail for Madeira in the hope that constant sunlight and an equable climate might result in a cure for his tuberculosis. However, the truth is that few such individuals survived long. In travelling south, Wollaston was merely following that long line of Victorian invalids despatched overseas by doctors who were, themselves, unable to offer any effective treatment. Indeed, there was little hope of a cure, for the days of definitive anti-tuberculous medication were yet to come, but Wollaston, initially at least, did rather well. He was so taken by the beauty of the island, the friendliness of its inhabitants and the startling mountain scenery, that he returned on a number of occasions. While there he seized every opportunity to further his interest in entomology, and three prolonged visits to that island, undertaken at different periods of the year, supplied the basis for the most important of his written works—the monumental *Insecta Maderensia* (1854). This quarto volume of 677 pages was illustrated with exquisite coloured drawings by Professor J. O. Westwood FRS, and describes Madeiran insects in minute detail together with other works (e.g. Wollaston, 1858) (Fig. 2).

All that happened a very long time ago, and since then a not inconsiderable number of other naturalists have also made their way to the North Atlantic Islands of Macaronesia and some of them have studied the butterfly fauna of Madeira. Indeed, for a country with less than 20 butterfly species Madeira would appear to have received a great deal of attention. Many of these later authors, however, wrote little more about the entomology of Madeira and its neighbouring islands, Porto Santo and the Ilhas do Desertas, than short annotated lists of the species recorded,

and as far as the Coleoptera were concerned, such papers have often turned out to be no more than extensions of Wollaston's original works. So, was Wollaston an important figure and, if so, what did he actually achieve?

WOLLASTON'S EARLY LIFE

Thomas Vernon Wollaston was born on 9 March, 1822, at Scotter, Lincolnshire, the youngest son of Major Wollaston of Shenton Hall, Nuneaton. He was directly related to both William Wollaston (1659–1724), author of the *Religion of Nature Delineated*, and Dr William Hyde Wollaston FRS (1766–1828), the celebrated chemist who first discovered the metallic elements rhodium and palladium. Educated at the Grammar School, Bury St Edmunds, and Jesus College, Cambridge, he took his BA in 1845, and his MA in 1849. It was while at Cambridge that Wollaston first developed an interest in entomology, stimulated by the teaching and example of his mentors, Professor C. C. Babington FRS and, in particular, the Revd Hamlet Clark (1823–1867) (Fig. 3), a fellow undergraduate, who was elected Vice President of the Entomological Society of London in 1864. During his early years at Cambridge, Wollaston, with Hamlet Clark and the Revd J. F. Dawson organized collecting trips to the fens and Suffolk breckland. In 1843, Wollaston published his first entomological paper—a short account of the beetles found near Launceston—and it appears that from then onwards he was to devote most of his life to a continuous study of entomology and natural history. Under the guidance of Professor Babington and Hamlet Clark, Wollaston was soon elected a Fellow of the Cambridge Philosophical Society and then, in 1847, to Fellowship of the Linnean Society. Although his main interest was in the Coleoptera, Wollaston studied many other orders of insects as well as making studies of the botany of Madeira and its land shells. At least two species of Lepidoptera are named after him. There is little doubt that Wollaston's work on the North Atlantic Islands did much to stimulate others who were interested in the various endemic forms that inhabited them. What he achieved was to make people think.

During his undergraduate days, Wollaston was opposed to the theory of evolution but later, as a friend of Charles Darwin, he came to accept that some forms which could hardly be regarded otherwise than as individual species might have a recognizable derivative origin. Wollaston admired Darwin for his accurate field observations, but his own observations convinced him that there was no evidence that one species ever evolved into another. He concluded that species were separately created according to some divine plan, the details of which could be elucidated by the study of natural history. He insisted that his thesis stemmed not from religious belief but from observation and application of the inductive scientific method (Cook, 1995). In 1856, he published *On the Variation of Species with especial reference to the Insects*, a text which clearly anticipated Darwin's *The Origin of Species by means of Natural Selection* (1859).

Wollaston dedicated the work to his friend: "Whose researches, in various parts of the world, have added so much to our knowledge of Zoological geography." Darwin, in turn, sent him a complimentary copy of the *Origin of Species*. In spite of their conflicting views Wollaston and Darwin remained good friends, although the former's criticism of *The Origin of Species* clearly strained the relationship. Wollaston was quite unable to accept the central theme of Darwin's message (Anon, 1860). "A cold shuddering comes over us at what we are compelled to regard as a glorious *non sequitur*, and that, too, from premises which we cannot admit!" Darwin responded to this in a letter to his son William: "There was a rather fierce attack on it in Annals of

Nat. History by my friend Wollaston. . . . By Jove the Book has made row enough, & I shd [sic] now like to get on quietly with my work." Although Darwin would rather not have become involved he was provoked into retaliation. In July 1860, he wrote to Professor Westwood, who was attempting to raise money to purchase Wollaston's collections of Madeiran land and freshwater shells: "I have spent so much money lately that I am not willing to subscribe for the purchase of Wollaston's collections for your Museum." (Burkhardt, *et al.* 1993).

In the introductions to his various works on the fauna of the Atlantic islands Wollaston put forward his own hypothesis that the endemic Coleoptera could not be satisfactorily referred to any geographical area now existing, but rather to some Atlantic region of which they were the sole representatives of modern times. This view remained unchallenged until the latter half of the present century when a number of authors, including Mayr (1969), Bush (1975 and 1982), and Cain (1984), individually addressed the twin problems of evolution and speciation. More recently, Owen and Smith (1993a), who visited the North Atlantic Islands on a number of occasions, reviewed more than 300 publications on the butterfly fauna of Macaronesia, and postulated that this fauna consisted of four elements: a.) endemic taxa related to existing ones on the neighbouring continents; b.) relict endemic descendants of an extinct Saharan fauna; c.) recent (mostly post-fourteenth century) immigrants from Europe and East Africa; d.) cosmopolitan migrants. They suggested that an unknown but substantial number of species, mainly from Laurisilva which covered much of the island of Madeira, had probably become extinct since the islands were colonized by Europeans in the fourteenth century. They were able to show that the number of species and the number of endemic forms on each of the North Atlantic Islands were positively correlated with vegetation density and negatively correlated with distance from the nearest continent.

WOLLASTON IN MADEIRA

Two years after graduation, during the autumn of 1847, Wollaston developed early symptoms of severe pulmonary disease. His doctors advised him to seek a milder climate from the harsh British winter months ahead—advice that led him to convalesce in Madeira during the winter of 1847–1848. It was here that over the next few years, in spite of appalling ill health, he took every possible opportunity to study the entomology and natural history of the island. The result was the accumulation of a massive collection of Coleoptera, Lepidoptera and other orders of insects, as well as the first scientific collection of Madeiran land shells. On his return to England, Wollaston agreed to continue convalescence but this time in the West Country. He left his elegant town house in Park Lane, London; purchased property in Devon; married the youngest daughter of a close friend; wrote a slim volume of poems—*Lyra Devoniensis* (1868); only to die a few years later, at the age of 57, of pulmonary haemorrhage, the consequence of tuberculosis. He was buried at Teignmouth, Devon.

Madeira was not the only island that Wollaston visited. He seemed fascinated by islands, and visited, among others, the Canaries, the Cape Verdes, St Helena and Lundy. At each place he collected assiduously, his illness permitting, and produced detailed lists of species which included many that were new to science. In St Helena he specialized in the Cossonidae (Coleoptera), collecting from that island no less than 54 separate species, and this interest ultimately led to the description of 255 new cossonid species—world-wide—which was approximately 180 more than all other coleopterists had achieved. Looking back to those far off times one is immediately struck by the strength of purpose that Wollaston showed while engaged in these

studies. His illness was at times so severe that he suffered an almost unremitting battle to keep going. He once wrote "The constant warfare between physical incapacity and will was a curious feature, even at Madeira, where half my work was actually written in bed, and when suffering more or less from bleeding of the lungs; or else while sitting in a chair in the garden, basking in the sunshine." But Wollaston was obviously made of stern stuff. In the preface to *Insecta Maderensia* he wrote, "In May of 1850, . . . having procured a tent, I again set sail for the island,—prepared to take up my abode, during the hotter period, in districts as yet but imperfectly explored; and by applying myself in good earnest (at elevations, moreover, difficult of access except at that peculiar season), I conceived that I should be in a position, at the close of my third sojourn, to attempt a more lengthened and systematic treatise than I had at the beginning ventured to contemplate".

During the 1850s, the expatriate community in Funchal was sizeable, (averaging around 500 adults in the summer months and 700 in winter (Nash, 1990), and Wollaston found within it a number of devoted friends. One of these, John Gray, a wealthy business man and amateur coleopterist, invited him to join his yacht, the *Miranda*, for excursions to remote parts of the island, and later to the Canaries archipelago and Cape Verde Islands. Among his companions on these trips was Richard Thomas Lowe, another Cambridge man and Chaplain to the English Church in Funchal. Revd Lowe was a keen naturalist, particularly interested in botany as well as the Mollusca. Unfortunately his practice of attempting to convert expatriate parishioners to the ways of the Roman Church led him into deep waters. When news of these heretic practices came to the ears of parliament, Lord Palmerston was provoked to announce that there was a 'scandal in Madeira.' He dispatched an envoy, the Archbishop of Cape Town, to Funchal at once, hoping that mediation might put an end to these 'vile practices.' The Archbishop, however, failed in his mission and Palmerston ordered Lowe's immediate resignation, an order that Lowe just as quickly rejected. Through all this Wollaston continued to support Lowe and, together, they organized further collecting trips to remote and inaccessible parts of the island. We wonder if the Archbishop of Cape Town was persuaded to develop an interest in the natural history of Madeira.

Wollaston was totally captivated by the beauty of Madeira although, in 1854, journeys to the more central parts of the island must have been extremely difficult. Travel on horseback, tramping for hours over ill-defined rocky tracks into the evergreen Laurisilva, or attempting to land on the more remote parts of the coastline were all fraught with danger, especially to a man so physically unfit but Wollaston revelled in the challenge and readily accepted the difficulties that beset him along the way. He may well have been mindful of the words of Charles Kingsley (1819–1875), a fellow naturalist and author of *The Water Babies*—indeed, these two would appear to have had much in common. "The naturalist," wrote Kingsley, should be "strong in body; able to haul a dredge, climb a rock, turn a boulder, walk all day, uncertain where he shall eat or rest; ready to face sun and rain, wind and frost, and to eat or drink thankfully anything, however coarse or meagre . . ." On his trips, Wollaston was usually accompanied by his wife, a knowledgeable lepidopterist, and Portuguese porters who were responsible for bringing daily supplies. He was able to describe in glowing terms the joys of camping out in wildest Madeira. 'There is something amazingly luxurious in betaking oneself to Tent-life, after months of confinement and annoyance (it may be entirely,—*partially* it must be) in the heat and noise of Funchal. We are then perhaps more than ever open to the favourable impressions of an alpine existence;—and who can adequately tell the ecstasy of a first encampment on these invigorating hills! To turn out, morning after morning, in the solemn

stillness of aerial forests,—where not a sound is heard, save ever and anon a woodman's axe in some far-off tributary ravine, or a stray bird hymning forth its matin song to the ascending sun; to feel the cool influence of the early dawn on the upward sward, and to mark the thin clouds of fleecy snow uniting gradually into a solid bank,—affording glimpses the while, as they join and separate, of the fair creation stretched out beneath; to smell the damp, cold vapour rising from the deep defiles around us, where vegetation is still rampant on primaevial rocks and new generations of trees are springing up, untouched by man, from the decaying carcasses of the old ones; to listen in the still, calm evening air to the humming of the insect world (the most active tenants of these elevated tracts); and to mark, as the daylight wanes, the unnumbered orbs of night stealing one by one on to the wide arch of heaven, as brilliant as they were on the first evening of their birth;—are the lofty enjoyments, all, which the intellectual mind can grasp in these transcendent heights.'

In 1890, Mrs Wollaston presented George Baker with the greater part of her late husband's collection of Madeiran Lepidoptera. It contained 11 butterfly species and a much larger number of moths. Wollaston's original account (1858) consists of little more than short descriptive paragraphs, in Latin, of the various species, but Baker (1891) transcribed these, added notes of his own, and put forward his own theory that humidity of climate might be largely responsible for variation in certain species (see also Stainton, 1859).

From July 20–August 3, 1998, the authors visited Madeira under the auspices of the Madeiran scientific funding body—CITMA—to survey Lepidoptera in the Parque Ecológico do Funchal. This was part of a long-term project started in May 1997, to provide information for a field guide to the Lepidoptera of the Park, and to provide base-line information against which the effects of the attempted re-establishment of native vegetation (*Laurisilva*) on the butterfly fauna could be assessed (Wakeham-Dawson & Warren, 1998a). We were accompanied by entomological colleagues from the Natural History Museum (London) and the University of Warwick. The authorities of the Parque Ecológico do Funchal put the Casa do Barreiro (970 m.), one of the park houses used to accommodate visitors, at our disposal and we were able to visit most parts of the island to examine localities mentioned as specific in the literature. Although the butterflies of Madeira are well documented, a number of changes, some highly significant, have occurred during the past thirty years. It is with this in mind that we have re-examined the status of the butterfly fauna as it appeared on this visit, and in relation to Madeira's Oceanic existence (MacArthur & Wilson, 1967).

The Funchal Ecological Park

The Parque Ecológico do Funchal was founded in 1994 as a centre for environmental education. It is situated above Funchal, the capital city of Madeira, on the southern side of the island (Fig. 4). The Park covers an area of about 10 km²; its lowest point is 500 m. above sea level and it rises to over 1800 m. near Pico de Arreiro. The range of elevation together with a number of steep gullies within the Park, allows the area to support an interesting assemblage of endemic plants and animals (Wakeham-Dawson & Warren, 1998b).

One of the main aims of the Park authorities is to fell invasive *Eucalyptus* and *Acacia*, and replace them with Laurel trees. The hope is that native Laurel forest (*Laurisilva*) can be re-established. *Laurisilva* once covered most of Madeira and is a relic of the forests that covered southern Europe in the Tertiary Period (Press & Short, 1994). From sea-level (especially on the dry south side of the island) to c. 300 m. there



Fig. 1. Thomas Vernon Wollaston (1822–78).

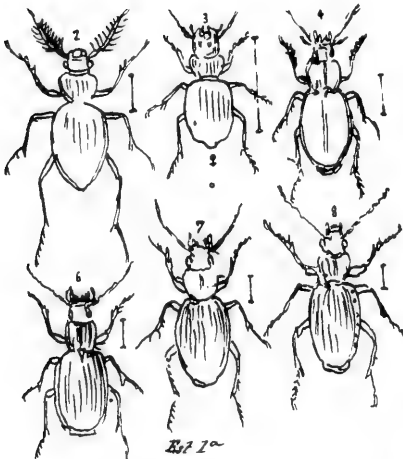


Fig. 2. Beetles sketched by T. V. Wollaston 1846. (Courtesy Mun. Museu Funchal).

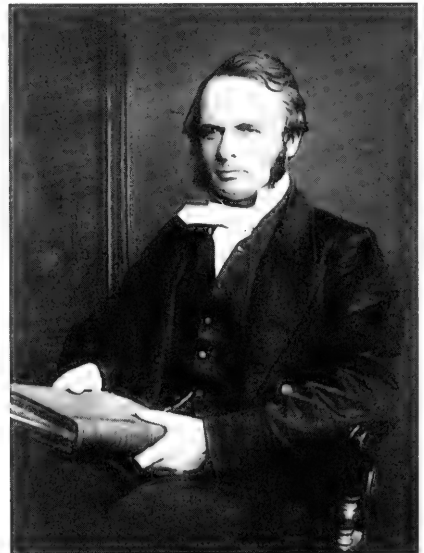


Fig. 3. Revd Hamlet Clark (1823–67).

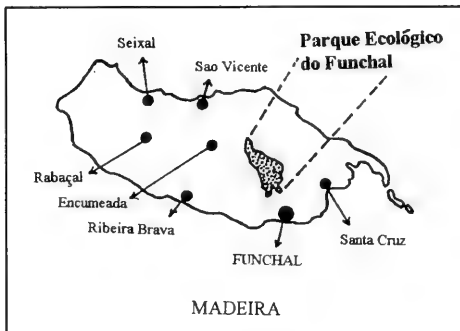
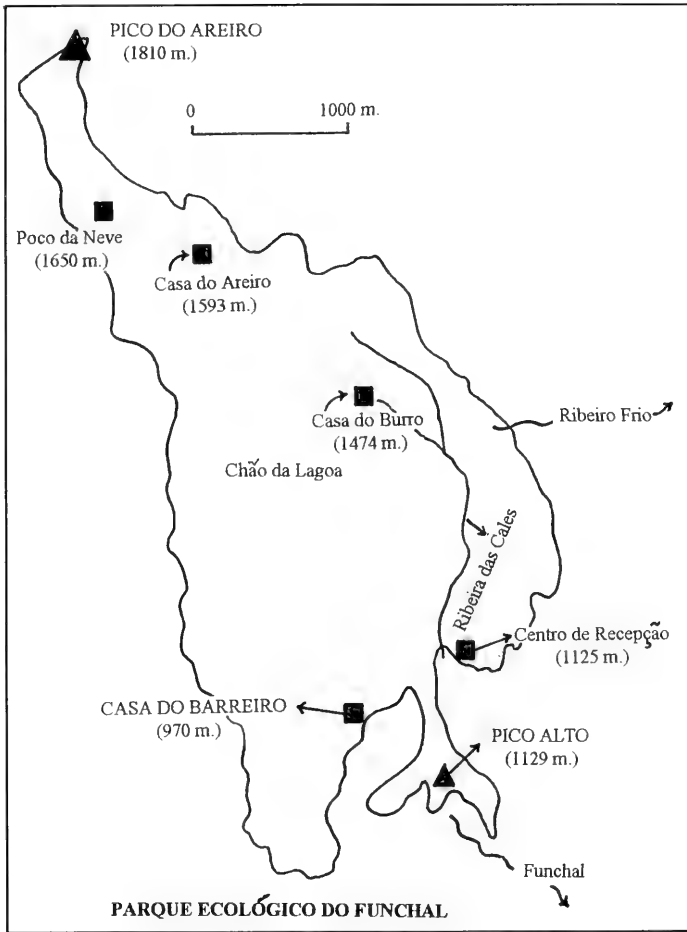


Fig. 4. Map of the Funchal Ecological Park (Parque Ecológico do Funchal).

was dry Laurisilva consisting of *Apollonias barbuiana* (Cav.) Bornm. with *Euphorbia* spp. and Dragon trees (*Dracaena draco* (L.) L.). From 300 m. to about 1200 m.: humid Laurisilva of *Laurus azorica* (Seub.) Franco, etc., and from 1200 m. to the summit of the island: *Erica* spp. (Tree Heathers) Laurisilva. Today, the scene is rather different. The humid Laurisilva is now restricted to the north and the dry Laurisilva is now almost totally replaced by urban development or agriculture (Press & Short, 1994). The humid Laurisilva is kept wet by condensation of water from the frequent sea fogs that form over the higher regions of the island. Much of the original area of Laurisilva on Madeira has been destroyed, and the Park's project may make a valuable contribution to the conservation of this important habitat type. According to Nash (1990) João Gonçalves Zarco, the Portuguese explorer who discovered Madeira in 1419, found the island covered with dense forest (in Portuguese, the word Madeira means wood). In order to clear the ground for the first settlement he caused fire to be put to the trees. There is a local legend that the whole of the island burned for seven years but this is probably no more than a legend.

CHECK-LIST OF THE MADEIRAN BUTTERFLIES
(arranged in the order that they are discussed below)

- Pieris rapae* (L.) small white.
Pieris brassicae ssp. *wollastoni* Butler. madeiran large white. (W) Endemic subspecies.
Gonepteryx maderensis Felder madeiran brimstone. (W) Endemic species
Colias crocea (Geoffroy) clouded yellow. (W)
Hipparchia maderensis Baker. madeiran southern grayling. (W) Endemic species.
Pararge xiphia Fab. madeiran speckled wood. (W) Endemic species.
Pararge aegeria (L.) speckled wood
Neohipparchia statilinus (Hufnagel) tree grayling. (US)
Vanessa atalanta (L.) red admiral. (W)
Vanessa indica ssp. *vulcania* Godart. indian red admiral. (W)
Danaus plexippus (L.) monarch or milkweed butterfly.
Cynthia cardui (L.) painted lady. (W)
Lycæna phlaeas ssp. *phlaeoides* Staudinger. small copper. (W)
Lampides boeticus (L.) long-tailed blue. (W)
Colias hyale (L.) pale clouded yellow. (US)
Cynthia virginensis (Drury). american painted lady. (US)
Issoria lathonia (L.). queen of spain fritillary. (W) (OS)
Hypolimnas misippus (L.) false plain tiger. (US)
Danaus chrysippus (L.) plain tiger. (US)

W = specimens in the T.V.Wollaston Collection (1847–1850)

OS = occasional vagrant

US = uncertain status

Pieris rapae (L.)

The small white is a relatively recent addition to the Madeiran fauna. Although there is the record 'of a possible sighting' in 1909 (Swash & Askew, 1982), it was not until December 1971 that a specimen was actually captured and not until 1974 that the species became definitely established. In July of that year a massive invasion occurred which Wolff (1975) suggested might have originated in Portugal and been driven by the prevailing Trade Wind towards Madeira. Why, Wolff asks, when similar climatic conditions must have occurred many times in the past, did sudden colonization not

occur until 1974? This question has not been answered. We found the Small White to be very common throughout the Parque Ecológico do Funchal (Table 1) and at the northern end of the island, inland from Seixal, and in the wooded laurel-covered valleys near Rabaçal. It could be seen flying from sea-level to an altitude of at least 1300 m. It is also common on the island of Porto Santo. We observed females ovipositing on Cabbage (*Brassica oleracea* L.) and Chagas (*Tropaeolum majus* L.) during July and August 1998. It has also been observed in Madeira laying on *Coronopus didymus* (L.) Sm. (Wakeham-Dawson, 1998). No named aberrations were observed.

Pieris brassicae ssp. *wollastoni* Butler

Since Wollaston first collected this butterfly in mid-Victorian times—and he collected a considerable series (Baker, 1891)—it has continued to decline in numbers and must now be regarded as extinct. This decline appears to be long-standing. Both Wollaston and Baker thought this subspecies was little more than a melanic variation of *Pieris brassicae* L., forming a natural transition between *P. brassicae* and the endemic Canary Island *P. cheiranthi* Hübner. Felder (1862), who published a list of the insects collected by scientific members of the frigate *Novara*, thought that this subspecies was *P. cheiranthi*, but Kudrna (1973), after critical examination of the genitalia of *P. brassicae*, *cheiranthi* and *wollastoni*, stated that there was sufficient evidence to consider *wollastoni* as a subspecies of *P. brassicae*. The male genitalia are illustrated in Fig. 5a, for comparison with illustrations by Higgins (1975).

Swash & Askew (1982) pose the question as to whether the decline in numbers of *Pieris brassicae* ssp. *wollastoni* and the increase in *P. rapae* might be inter-related; the decline of the former facilitating colonization by the latter, and the establishment of *P. rapae* possibly resulting in the final decline of *P. brassicae wollastoni*. This seems unlikely, however, as both taxa co-exist throughout much of Europe. It therefore remains a subject for debate. Another possibility is that a parasite arrived on the island and destroyed the *P. brassicae wollastoni* population. In the United Kingdom 95% of *P. brassicae* larvae are parasitized by the wasp *Apanteles glomeratus* L., and the population only survives because of the regular influx of migrants from the Continent (Cribb, 1983).

Although Martin (1941) found *P. brassicae wollastoni* at Santo da Serra, Oehmig (1977) at Pico Arreiro and Aguas Mensas, and Gardner & Classey (1960) at Rabaçal, Chão das Feiteiras and Caramujo, de Worms (1964) observed only a single specimen in 1964, at Monte, c. 700 m. above Funchal. Since then there have been only scattered sightings. Wolff (1975) reported a number of specimens in 1973 and 1974, and Swash & Askew (1982), various isolated sightings at Porto da Cruz, Ribeiro Frio, Funchal and Santa Cruz. They concluded that 'the only sizeable population located was in the valley leading to Fajã da Nogueira where, in July and August, several specimens were seen near the river and a few at greater altitude up to about 1000 m.' Two years later, Lacey & Jones (1984) reported seeing the Large White at Boca da Risco on the north coast, but Owen and Smith (1993a), who visited the island five times during the 1990s, were unable to find either adults or larvae. One of the present authors (A.W.D.), in six visits to Madeira since 1997, has been no more successful. In an extensive search during July 1998 we found no evidence that this butterfly still flies on Madeira. Resident entomologists have not seen this species in recent years and have been aware of a decline in *P. brassicae wollastoni* that appears to have matched the increase in *P. rapae* (Antonio M. F. Aguiar, pers. comm.).

Gonepteryx maderensis Felder

This species (Plate I, H), well known to Wollaston in the 1850s, is endemic to Madeira and formerly widely distributed and abundant. It was first described by Felder (1862) who thought it was no more than a variety of *G. cleopatra* L. Some thirty years later, Baker (1891) suggested that it formed a connecting link between the Mediterranean *Gonepteryx cleopatra* L. and *Gonepteryx cleopatra* ssp. *cleobule* from the Canaries. More recently, Kudrna (1975) has accorded both it and *cleobule* specific status. This action is supported by Brunton *et al.* (1996) who studied seven species of *Gonepteryx* under ultraviolet light to reveal their ultraviolet reflectance patterns. They were able to show that *G. maderensis* differed from other species in that the ultraviolet pattern on the underside of female specimens was typical of *Gonepteryx* males.

The literature suggests that over the past 25 years the madeiran cleopatra has declined steadily in numbers. Kudrna (1975) described *G. maderensis* as local and uncommon at higher elevations in mountains; Gardner & Classey (1960) thought it might be restricted to certain northern parts of the island; while Swash & Askew (1982) reported sightings at Fajã do Cedro Gordo, near Fajã da Nogueira, and the Botanical Gardens at Ribeiro Frio. Manley & Allcard (1970) found this species at an altitude of 1200 m. However, the Madeiran Cleopatra may in fact be more common than it appears, as it rarely comes down from the forest canopy. It is probably widespread but not common in March, May and July in areas of Laurisilva between 400–1000 m. In July 1998 we observed small numbers flying about the laurel forest at Chão da Ribeiro. This species was seen at Chão da Ribeiro near Seixal on the north coast in March (John Smit, *pers. comm.*) and again in May (W), and a female was seen ovipositing high up in the Laurisilva canopy on leaves of *Rhamnus glandulosa* Aiton on 24.vii.1998. A male was observed nectaring at *Hypochoeris radicata* L., and both sexes were observed feeding at *Agapanthus praecox* Willd. flowers by the roadside near Ribeiro Frio and at several locations near the Encumeada Pass. A single male was seen in the Funchal Ecological Park on 30.vii.1998 (Table 1). This butterfly had probably flown south west from Ribeiro Frio with the prevailing wind (Duarte Câmara, *pers. comm.*). This is encouraging because it suggests that the species may be able to re-colonise naturally in the Park, once Laurisilva is established. The male genitalia are illustrated in Fig. 5b.

Colias crocea (Geoffroy)

In July and August 1998, the Clouded Yellow was second only to the Madeiran Southern Grayling in abundance. It occurred at all altitudes from sea-level up to 1800 m. and was often observed flying in the streets and gardens of Funchal. A female was observed laying single eggs on the upper surface of the leaves of *Trifolium repens* L. in shaded areas near small cabbage fields at Seixal. We also noticed that a

PLATE I MADEIRAN BUTTERFLIES

A	B	C
D	F	G
E		
H	I	J
K	L	M
N	O	P

A: *Hipparchia maderensis* Male. B: *Hipparchia maderensis* Female. C: *Hipparchia maderensis* Female underside. D: *Pararge aegeria* Male. E: *Pararge aegeria* Male Dwarf Var. F: *Pararge xiphia* Female. G: *Pararge xiphia* Female underside. H: *Gonepteryx maderensis* Male. I: *Lycaena phlaeas* ssp. *phlaeoides* var. *caeruleopunctata*. J: *Vanessa indica vulcania*. K: *Colias crocea* var. *cremonae*. L: *Colias crocea* var. *dawsoni*. M: *Colias crocea* var. *geisleri*. N: *Colias crocea* var. *radiata*. O: *Colias crocea* male Dwarf var. P: *Colias crocea* var. *faillae*.



wings closed if the passing butterfly was a male or a mated female. Unmated females were pursued by several males and some pairs were observed mating in flight. Males were also observed drinking from wet mud. Oviposition was not observed. In July and August 1998, this was the most abundant butterfly on the island, with the sexes in approximately equal numbers. It was common in open grassy areas and pine woods above 1000 m. in the Park and other similar habitats across the island. It was also present in *Erica*-rich Laurisilva at Rabaçal below 600 m. Previously, Kudrna (1997) reported it at 1700 m. on Pico do Arieiro and at 1000 m. on Eira do Serrado, while Swash & Askew (1982) found it to be common between Pico do Arieiro and Pico Ruivo, and beside the track from Pico Ruivo to about halfway to Encumeada. They concluded that it was the most abundant butterfly at altitudes in excess of 1600 m.

Pararge xiphia Fab.

The madeiran speckled wood (Plate 1, F & G) is endemic to Madeira. In 1891, Mrs Wollaston reported it to be 'one of the commonest species in Madeira at intermediate elevations, and wasted examples may be found throughout the winter, especially in the district above Funchal, called "the Mount."' [Monte] (Baker, 1891). It is of interest to recall that the district known as Monte was much favoured by expatriate Britons and invalids seeking homes on the island. More recently, Swash & Askew (1982) found this species to be common near Portela and in the Ribeiro Frio-Fajã do Nogueira region, but absent at low altitudes and near the coast. Although *P. xiphia* is widely distributed and common above 500 m., it is most abundant in Laurisilva—and in this habitat can even be found flying when low clouds shroud the landscape in dense fog.

In July 1998 we found *P. xiphia* to be abundant in the Parque Ecológico do Funchal, especially along the edge of woodlands, where it flew in company with the european speckled wood (*P. aegeria* (L.)). Males were seen perching on bracken (*Pteridium aquilinum* (L.) Kuhn) fronds, or trees in the Laurisilva, waiting for females to approach. A number of males were also seen engaging in vertical spiral flights with other males intruding upon their territories. The resident male would usually return to its original perch once the intruder had been driven off. These spiral flights were similar to, but not so prolonged as those of *P. aegeria*. Females appeared extremely selective about where they would lay their eggs: flying into dark excluded places and often testing a potential food-plant with their ovipositor, but not depositing an egg. However, females were observed ovipositing in shaded areas of the Laurisilva forest on *Brachypodium sylvaticum* (Huds.) and *Poa trivialis* L. (especially dead leaves at the base of tussocks) at Fajã da Nogueira, Ribeiro Frio and Portela during July and August, 1998. One female was seen positioning a single egg on the underside of a dead fern (pteridophyte) frond above a levada (man-made watercourse). The eggs were very pale green, smooth to the naked eye, and about twice the size of *P. aegeria* ova laid on *Poa* sp. in southern England. The male genitalia are illustrated in Fig. 5c.

Pararge aegeria (L.).

The first Madeiran specimen of the european speckled wood was captured at Ribeiro Frio in 1976, by N. D. Riley (Higgins, 1977), since when it has become widely distributed (Plate 1, D & E) and abundant through much of the island from sea-level to about 1000 m. (Owen & Smith, 1994). It may, however, be absent from the Ilhas do Desertas and Porto Santo. In July and August, 1998, we found it to be quite common in the Parque Ecológico do Funchal, especially in wooded areas where

the scattered vegetation was interspersed by patches of dappled sunlight. It is widely distributed in gardens and *Eucalyptus* forest, especially below 1000 m., and it is less common in Laurisilva. A dwarf male specimen was taken in which the wingspan measured 30 mm. (average wingspan for males = 46–50 mm.). As with *P. xiphia* we observed males performing vertical spiral flights. Although a female was observed apparently searching for suitable egg-laying locations near clumps of *Poa trivialis* L., in a shaded area near a levada at Rabaçal, oviposition was not seen.

Neohipparchia statilinus (Hufnagel)

The tree grayling has been recorded from Madeira on one occasion. In the Zoological Museum of the University of Copenhagen there is a single specimen labelled: Madeira, Nogueira, Camara de Cargo, 1000 m., 23.viii.1974, E.Traugott-Olsen leg. (Karsholt, 1988). This was examined by Lionel Higgins who stated it to be of the form *allionia* (Fab.). As no other specimens have been recorded it may have been a misplaced specimen, although Karsholt suggests that the single specimen was probably a vagrant from the Iberian peninsula where the form *allionia* occurs (Higgins & Hargreaves, 1983).

Vanessa atalanta (L.)

The red admiral has probably never been a common species on Madeira. We saw no evidence of it in the Park during July and August 1998 but we did see worn specimens in the Botanical Gardens during this period. The three specimens in the Wollaston collection were taken in company with *V. indica* at Monte, above Funchal (Baker, 1891). More recently the species has been recorded from Pico das Pedras in April and Fajã da Nogueira during July by Swash & Askew (1982), who also found it sparingly on Deserta Grande (Ilhas do Desertas) and Porto Santo.

Vanessa indica vulcania Godart (= *occidentalis* Felder)

The Indian red admiral (Plate 1, J), which Owen & Smith (1993b) reported as well-established and common on Madeira, indeed more abundant than *V. atalanta*, is perhaps most often seen during April and May. It has been recorded from Machico, Santa Cruz, Santo de Serra, Porto da Cruz, Faial and São Jorge (Swash & Askew, 1982) as well as the botanical gardens at Ribeiro Frio. We observed a single specimen at Rabaçal in July 1998. The occurrence of this butterfly on Madeira, however, constitutes an enigma.

Field (1971) showed that of five separate subspecies of *V. indica*, four were restricted to South or East Asia, while *V. indica* ssp. *vulcania* Godart was confined to Macaronesia in general and Madeira and the Canary Islands in particular. Why should the Macaronesian populations be separated from the other subspecies by thousands of miles? The distribution of *Vanessa indica*, worldwide, has been discussed in considerable detail by Leestmans (1978) and Shapiro (1992). Leestmans was able to examine 40 examples of *V. indica* and *V. indica vulcania* from the Belgian National Collection and a further 12 *V. indica vulcania* from his own collection. *V. vulcania* appeared to be phenotypically constant and Leestmans suggested that it deserved full specific status on account of significant differences in the structure of the genitalia between it and Asian *V. indica*.

So how did *V. indica vulcania* first reach Macaronesia? Three possibilities have been suggested. (1) *V. indica vulcania* may have evolved from specimens accidentally introduced from India by early Portuguese traders. (2) It may have migrated to

Macaronesia from Asia, although there is little evidence that this butterfly is migratory. (3) It may be a relict, now endemic to Madeira and the Canaries, from the time when Laurisilva covered much of southern Europe (Tertiary Period).

Shapiro (1992) suggests that although the traditional view has been that Portuguese traders 'introduced' the butterfly during the past 500 years, this is unlikely to be correct. The phenotypic characters of *V. indica vulcania* from Macaronesia are just not consistent with a relatively recent introduction from the Portuguese trading centres in southern India or Sri Lanka. From an examination of biogeography and ecology Shapiro suggests that it is not possible to rule out an autochthonous origin as a relict of the once wide-spread Tertiary broad-leaved forests preserved in Macaronesia as Laurisilva. He goes on to add, 'The very different time scales of the two hypotheses [500 years or several million years] suggest that genomic comparisons would allow easy discrimination between them.' It is likely that future DNA analysis will provide a more accurate indication of this Macaronesian butterfly's ancestry.

V. indica vulcania has also been recorded from the neighbouring island of Porto Santo, where a century earlier, Alfred Russel Wallace (1889) quoting Wollaston, stated that specimens invariably tended to be smaller than those found on Madeira. Manley & Allcard (1970) noted that Stichel (in Seitz, 1906) also described Madeiran specimens of this species as being smaller and darker than those from the Canary Islands, but were unable to substantiate this. It is possible therefore that Stichel was referring to specimens from Porto Santo. In the Canary Islands the foodplant is *Urtica morifolia* Poir, where it occurs abundantly as a component of the ground flora of laurel forests (Owen & Smith, 1993b). However, *U. morifolia* is an uncommon plant on Madeira (Press & Short, 1994), where Manley and Allcard (1970) state that the larvae feed on *U. dioica* L.

Danaus plexippus (L.)

The monarch is not uncommon in the streets of Funchal, the botanical gardens at Ribeiro Frio, and a number of areas below 1000 m. on the warmer south side of the island. Occasional specimens were seen in the Parque Ecológico do Funchal during July and August 1998 (Table 1). Owen & Smith (1989) have shown that the Monarch tends to select introduced species of *Asclepias* such as *A. curassavica* L. or *A. fruticosa* L. to lay its eggs on rather than native species. This would probably account for its being seen most frequently in Funchal gardens where these ornamental plants are grown.

Cynthia cardui (L.)

Most authors suggest that *C. cardui* is seen frequently on Madeira but, during July and August 1998, we observed two specimens only in the Parque Ecológico do Funchal. Antonio M. F. Aguiar (*pers. comm.*) has evidence that this species breeds in Madeira as well as appearing as a regular migrant.

Lycaena phlaeas ssp. *phlaeoides* Staudinger

The small copper is represented on Madeira by the subspecies *phlaeoides* Staudinger. The fore-wing markings are darker than in the nominotypical form, with some enlargement of the submarginal spots. In extreme examples the copper band of the hindwings is reduced in size and sometimes almost obliterated. The underside is characterized by a band of grey scaling in the outer discal area. The

small copper is common in all habitat types in the Parque Ecológico do Funchal, even at altitudes of 1500 m., where it flies in the moorland gullies. We observed it also at Rabaçal in July 1998. It has also been recorded from Acada do Cedro Gordo, Balcoes, near Camacha and between Pico Ruivo and Encumeada (Swash & Askew, 1982). There is considerable variation in Madeiran specimens. In 1891, Baker recorded pale specimens, while Cockerell (1923) commented that a specimen from Porto da Cruz was 'ordinary *phlaeas*, not dark at all.' In July 1998 we captured a number of extremely dark examples—undoubtedly *L. phlaeas* ssp. *phlaeoides*—in the Parque Ecológico do Funchal which included the following named forms:

f. *caeruleopunctata* Ruhl, several specimens of this common aberration were observed, although none of these was extreme (Plate 1, I). In no case were there more than four pale blue submarginal spots to the hindwings.

f. *obsoleta* Tutt, a single specimen was observed in which the copper band on the hindwings was absent.

f. *radiata* Tutt, a single specimen in which the copper marginal band on the hindwings was divided into wedge-shaped rays.

Lampides boeticus (L.)

The long-tailed blue appears to be common and widely distributed on Madeira up to an altitude of about 1200 m. Females were observed laying on *Genista tenera* (Jacq. ex Murray) near Seixal; *Lupinus albus* L. (grown as a crop) near Encumeada; *Lotus pedunculatus* Cav. in the Fajã da Nogueira, and *Cytisus scoparius* (L.) Link at a number of locations during July and August, 1998. See also Wakeham-Dawson (1998).

Colias hyale (L.)

This species is strongly migratory and Cockerell (1923) records that Malcolm Burr had seen specimens in the collection at the Seminário in Funchal. No details of these are known and it is presumed that they originated from Spain or the Mediterranean Islands.

Cynthia virginiensis (Drury)

Godman (1870) mentions the american painted lady from Madeira but, curiously, not from the Canary Islands where it has been regularly recorded. It is possible that he confused the two island masses as no further records have been reported. Although Higgins & Riley (1970) included this record from Madeira, it has been omitted from the more recent editions.

Issoria lathonia (L.)

Although the queen of spain fritillary has been recorded from Madeira on a number of occasions—indeed, Baker (1891) described it as abundant—its appearance would appear to be dependent upon migration from Portugal, North Africa or even the Canary Islands. The Municipal Museum at Funchal has two specimens (nos. 1910 and 1911), but these carry no collection data.

Hypolimnas misippus (L.)

As with *Colias hyale*, Malcolm Burr is reported by Cockerell (1923) to have seen specimens of the false plain tiger in a collection at the Seminário in Funchal. It is not known whether these specimens still exist, or details as to the localities and dates of

their capture. In the Municipal Museum at Funchal there is a single specimen that was taken at Quinta Fé, Funchal, 12/11/1950.

Danaus chrysippus (L.)

There is a single reputedly Madeiran specimen (No. 23907) in the C. H. C. Pickering's Collection at the Funchal Natural History Museum. Unfortunately the specimen carries no other data. It is possible that this butterfly migrated from the mainland of Africa, or the Canary Islands (a distance of approximately 300 miles), where it occurs on Tenerife, Palma and Gomera.

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REFERENCES

- Anon. [T. V. Wollaston]. 1860. Bibliographical notice. On the origin of species by natural selection; or, the preservation of favoured races in the struggle for life.—by Charles Darwin M.A., F.R.S., F.G.S. etc. London 1859. *Annals & Magazines of Natural History* (ser. 3) **5**: 132–143.
- Baker, G. T., 1891. Notes on the Lepidoptera collected in Madeira by the late T. Vernon Wollaston. *Transactions of the Entomological Society of London*: 197–221.
- Brunton, C. F. A., Russell, P. J. C. & Majerus, M. E. N. 1996. Variation in ultraviolet wing patterns of brimstone butterflies (*Gonepteryx*: Pieridae) from Madeira and the Canary Islands. *Entomologist*, **115**: 30–39.
- Burkhardt, F., Porter, D. M., Browne, J. & Richmond, M. (eds.), 1993 and earlier. *The correspondence of Charles Darwin*. 8 vols. Cambridge University Press, Cambridge.
- Bush, G. L. 1975. Modes of animal speciation. *Annual Review of Ecology & Systematics*, **6**: 339–364.
- Bush, G. L. 1982. What do we really know about speciation? In Milkman, R. (ed.) *Perspectives on Evolution*. Sinauer, Sunderland, Mass.: 119–128.
- Cain, A. J. 1984. Islands and evolution: theory and opinion in Darwin's earlier years. *Biological Journal of the Linnean Society*, **21**: 5–27.
- Cockerell, T. D. A., 1923. The Lepidoptera of the Madeira Islands. *Entomologist*, **56**: 243–247.
- Cook, L. M. 1995. T. Vernon Wollaston and the "monstrous doctrine". *Archives of Natural History*, **22**(3): 333–348.
- Cribb, P. W. 1983. *Breeding the British Butterflies*. A.E.S., London.
- Emmet, A. M. & Heath, J., 1989. *The Moths and Butterflies of Great Britain and Ireland*. **7**(1): Harley Books, Colchester.
- Felder, C. 1862. Verzeichniss der von den Naturforschern der k.k. Fregatte "Novara" gesammelten Macrolepidopteren. *Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien*. **12**: 473–496.

- Field, W. D. 1971. Butterflies of the genus *Vanessa* and of the resurrected genera *Bassaris* and *Cynthia* (Lepidoptera: Nymphalidae). *Smithsonian Contributions to Zoology*, number 84.
- Gardner, A. E. & Classey, E. W., 1960. Report on the insects collected by the E. W. Classey and A. E. Gardner expedition to Madeira in December 1957. *Proceedings of South London Entomological and Natural History Society*, 1959: 184–206.
- Godman, F. D. 1870. *Natural History of the Azores, or Western Islands*. London.
- Higgins, L. G. 1975. *The Classification of European Butterflies*. Collins, London.
- Higgins, L. G. 1977. The Speckled Wood (*Pararge aegeria* L.) in Madeira. *Entomologist's Record and Journal of Variation*, **89**: 22–23.
- Higgins, L. G. & Riley, N. D. 1970. *A Field Guide to the Butterflies of Britain and Europe*. Collins, London.
- Higgins, L. G. & Hargreaves, B., 1983. *The Butterflies of Britain and Europe*. Collins, London.
- Karsholt, O. 1988. On Butterflies from Madeira with a check list. *Entomologist's Record and Journal of Variation* **100**: 115–117.
- Kudrna, O. 1973. On the status of *Pieris cheiranthi* Hubner (Lep., Pieridae). *Entomologist's Gazette*, **24**: 299–304.
- Kudrna, O. 1975. A revision of the genus *Gonepteryx* Leach (Lep. Pieridae). *Entomologist's Gazette*, **26**: 3–37.
- Kudrna, O. 1977. A Revision of the Genus *Hipparchia* Fabricius. Faringdon, E.W.Classey.
- Lace, L. A. & Jones, M. J. 1984. Habitat preferences and status of the Madeiran butterfly fauna. *Boletim do Museu Municipal do Funchal*, **36**: 162–176.
- Leestmans, R. 1978. Problèmes de spéciation dans le genre *Vanessa*. *Vanessa vulcania* Godart stat. nov. et *Vanessa buana* Frhst. stat. nov.: bonae species. (Lepidoptera, Nymphalidae). *Linneana Belgica*, **7**: 130–156.
- MacArthur, R. H. & Wilson, E. O., 1967. *The Theory of Island Biogeography*. Princeton University Press, Princeton.
- Manley, W. B. L. & Allcard, H. G., 1970. *A Field Guide to the Butterflies and Burnets of Spain*. Classey, England.
- Martin, K. 1941. Schmetterlinge von Madeira. *Zoologische Mededelingen*, **23**: 1–12.
- Mayr, E. 1969. The biological meaning of species. *Biological Journal of the Linnean Society*, **1**: 311–320.
- Moseley, H. N. 1880. *Notes by a Naturalist on H.M.S. Challenger*. London.
- Nash, R. 1990. *Scandal in Madeira*. The Book Guild, Lewes, Sussex.
- Oehmig, S. 1977. Die Tagfalter Madeiras. *Entomologische Zeitschrift*, **87**: 169–176, 189–199.
- Olivier A. & Coutsis, J. G. 1997. A revision of the Superspecies *Hipparchia azorina* and of the *Hipparchia aristaeus* group (Nymphalidae: Satyrinae). *Nota Lepidopterologica*, **20**: 150–292.
- Owen, D. F. & Smith, D. A. S. 1989. Utilization of alien Asclepiadaceae as larval food-plants by *Danaus plexippus* (L.) (Lepidoptera: Danaidae) on the Atlantic Islands. *Entomologist*, **108**: 158–164.
- Owen, D. F. & Smith, D. A. S. 1993a. The Origin and History of the butterfly fauna of the North Atlantic Islands. *Boletim do Museu Municipal do Funchal*, (Proceedings of Manchester N. Atlantic Islands Conference), Supp. 2: 211–241.
- Owen, D. F. & Smith, D. A. S. 1993b. Habitat and food-plants of *Vanessa indica* (Herbst) (Lepidoptera: Nymphalidae) on the Canary Islands and Madeira. *Entomologist*, **112**: 187–190.
- Owen, D. F. & Smith, D. A. S. 1994. Colonization of Madeira by *Pararge aegeria* (L.): evidence for a founder effect (Lepidoptera: Nymphalidae, Satyrinae). *Linneana Belgica*, **14**: 247–256.
- Press, J. R. & Short, M. J. 1994. *Flora of Madeira*. HMSO, London.
- Seitz, A., 1906. *Die Gross-Schmetterlinge der Erde*. **1**: 1–379, pls. 1–89. Stuttgart.
- Shapiro, A. M. 1992. How did *Vanessa indica* (Herbst) (Lepidoptera: Nymphalidae) get to the Canary Islands and Madeira? *Entomologist*, **111**: 10–21.
- Smith, D. A. S. & Shreeve, T. G. 1993. The systematics, behaviour and habitats of the Madeiran grayling (Genus *Hipparchia*: Lepidoptera, Satyrinae). *Boletim do Museu Municipal do Funchal*, Supp. 2: 279–283.
- Stainton, H. T. 1859. Notes on Lepidoptera collected in Madeira by T.V. Wollaston Esq. *Annals and Magazine of Natural History*, **3**: 209–214.

- Swash, A. R. & Askew, R. R., 1982. A Survey of Madeiran Butterflies, 1981. *Boletim do Museu Municipal do Funchal*, **34**: 60–66.
- Wakeham-Dawson, A., 1998. Larval host-plants of *Artogeia rapae* (L.) and *Lampides boeticus* (L.) on the island of Madeira (Lepidoptera: Pieridae and Lycaenidae) in May 1998. *Entomologist's Gazette*, **49**: 218.
- Wakeham-Dawson, A. & Warren, L., 1998a. Conservation of butterflies (Lepidoptera: Rhopalocera) in the Parque Ecológico do Funchal, Madeira. *Programme of the III Symposium Fauna and Flora of the Atlantic Islands*, September 21–25, 1998: 257–258. Departamento de Biologia, Universidade dos Açores.
- Wakeham-Dawson, A. & Warren, L. 1998b. Conservation of butterflies and other endemic species in the Funchal Ecological Park, Madeira. *British Journal of Entomology and Natural History*, **10**: 210–213.
- Wallace, A. R., 1889. *Darwinism*. London.
- Wolff, N. L., 1975. On the sudden mass occurrence in 1974 of *Pieris rapae* L. (Lep. Pieridae) in Madeira. *Boletim do Museu Municipal do Funchal*, **29**: 26–32.
- Wollaston, T.V. 1854. *Insecta Maderensia*. Van Voorst, London.
- Wollaston, T. V. 1858. Brief diagnostic characters of undescribed Madeiran Insects. *Annals and Magazine of Natural History*, **3**: 1–22.
- Worms, C. G. M. de, 1964. Madeira in the spring, April 1964. *Entomologist's Record and Journal of Variation*, **76**: 252–254.

SHORT COMMUNICATION

***Catharosia pygmaea* (Fallén) (Diptera: Tachinidae): a second record in Essex—** Whilst sorting through some pan-trap material collected by Peter Harvey during surveys of Rainham marsh, Essex, and passed to me by Colin Plant, I came across a very distinctive tachinid which was unfamiliar to me. It failed to key in Belshaw (1993) but keyed readily to the genus *Catharosia* in McAlpine (1987). Reference to the excellent tachinid bibliography on the website <http://res.agr.ca/ecorc/isbi/biocont/biblio.htm> compiled by James E. O'Hara disclosed that Falk (1998) had added this species to the British list from a ruderal site in Warwickshire. Falk's paper enabled me to confirm the description that the Rainham specimen was the same species. The single male specimen was captured at the eastern end of the old silt lagoons on Rainham marsh, TQ5279, between the 25. viii. and the 6.ix.1998. The pan trap was set by Peter Harvey amongst flower-rich ruderal vegetation. My thanks go to Peter Harvey for permission to publish this note.—D. A. SMITH, 12 Tring Gardens, Harold Hill, Romford, Essex RM3 9EP.

REFERENCES

- Belshaw, R. 1993. Tachinid Flies (Diptera:Tachinidae). *Handbooks for the Identification of British Insects* **10**: 4a(i).
- Falk, S. 1998. *Catharosia pygmaea* (Fallén) (Diptera:Tachinidae) new to Britain. *British Journal of Entomology and Natural History* **11**: 1–5.
- McAlpine, J. F. (Ed.) 1987. *Manual of Nearctic Diptera*. Vol. 2. Agriculture Canada Monograph 28.

AGGREGATION OF OVER ONE MILLION 16-SPOT LADYBIRDS IN A BRAMBLE HEDGE, AND "BLUSHING" IN TWO SPECIMENS

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Abstract.—An unusual aggregation of the 16-spot ladybird, *Tytthaspis sedecimpunctata* (L.) is described, in which over 1 million individuals might have been involved. Among them were individuals of a red–orange form.

INTRODUCTION

The 16-spot ladybird, *Tytthaspis sedecimpunctata* (L.), is well known for its overwintering aggregations, and although it is not in the same league as some New World coccinellids which congregate by the bushel, it is regularly found in clusters of several hundreds. Occasionally, overwintering masses number in their thousands and in his recent *New Naturalist* volume, Majerus (1994: Plate 10f) makes a point of illustrating a Suffolk gorse bush where upwards of 30,000 individuals of this species have been known to overwinter.

I have often found a handful, perhaps a few score, of 16-spots gathered together during very early spring—at the base of a fence-post, or against a grass tussock—but I was amazed to discover a bramble hedge in which I estimated over one million individuals were sheltering.

OVERWINTERING AGGREGATIONS

On 22.iv.1998, whilst carrying out an ecological survey of Woodlands Farm, near Bexley in Kent (TQ450768), I noticed several accumulations of the 16-spot ladybird in a bramble hedge. Initial curiosity became incredulity as it soon became apparent that the accumulations were very many and very extensive.

The long bramble hedge (Fig. 1) ran along the top of a large open field that had once been arable, but which had lain fallow for several years. It was exposed and rather windswept, but was south-facing and warm in the spring sunshine. The bramble growth arose slowly and obliquely from the grass edges of the field, with a shallow sloping border rather than the abrupt bulging form characteristic of many blackberry bushes.

Examination showed that this shallow hedge edge had a fringing band about half a metre wide which was about 10 to 20 cm deep. This low edge was dotted with a vast number of clusters of 16-spot ladybirds. They were huddled together on leaves (Fig. 2) and also on the stems, particularly where one stem crossed another (Fig. 3).

A quick estimate showed that there was a group of ladybirds every 10 or 20 cm in each direction across the shallow half-metre border. Clumps ranged from 10 to maybe 150 individuals. I carried out a rough count over a few metres and estimated at least 200 ladybirds per linear 10 cm along the hedge. After walking the half-kilometre field boundary to confirm that the ladybirds were indeed gathered along its entire length, I calculated that it appeared to house at least one million individuals.

The year 1997 was very dry and warm, and judging from the numbers of 16-spot ladybirds in the hedge, this species had a very good season. The hedge in which they were overwintering ran in a zigzag along the northerly edge of the field and, at least on the day of the field visit, the prevailing wind was southerly, directly off the field and onto the hedge. It is tempting to suggest that the beetles lived out in the field

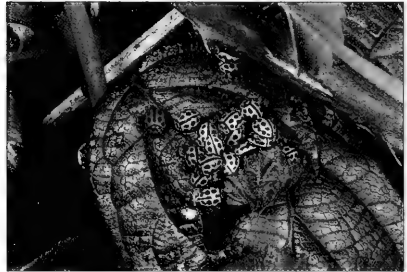
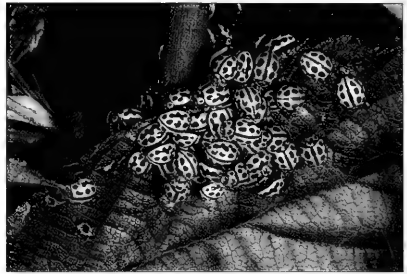


Fig. 1. The half-kilometre bramble hedge running along the top of a large field. It slopes up very gently from the grass of the meadow.

Figs 2–4. *T. sedecimpunctata* aggregations.

Fig. 2. Accumulation of about 50 overwintering on a bramble leaf. They closely matched the patches of dead leaf in their beige coloration.

Fig. 3. Accumulation of about 35 overwintering on a bramble stem. Their pale colour equally closely matched the buff of the woody stems.

Fig. 4. Single reddish form, one of two specimens found in the hedge, amidst normal 16-spot ladybirds overwintering.

during the summer and that the bramble boundary was the logical place for the overwintering ladybirds to end up.

I was rather surprised to find ladybirds still congregated in overwintering masses in late April, but later discovered (M. Majerus, *pers. comm.*) that because it is a mildew feeder, the 16-spot often does not become active until later in the year than other species. Also the previous fortnight had been very cold and wet. When I revisited the site on 13.v.1998, there was no sign of the ladybird congregations, and only a very few specimens in the sweep net as I searched the nearby edges of the field.

“BLUSHING”

The largest of the clusters that I noticed contained about 150 ladybirds, but there were also many groups of 5 to 10 and also singletons walking about on the bramble. Despite the notionally strong black and beige patterns of the beetles, they were nevertheless quite cryptic, camouflaged against the mottled and slightly faded leaves, and blending in well with the drab beige of the bramble stems. In the 50 or so groups that I examined closely I kept a keen look-out for any dark specimens, knowing that this species does very rarely have melanic forms. None was found, but, amongst the

knots of 16-spots were the odd 7-spot, 2-spot and 22-spot ladybirds. In addition, there were two specimens of a reddish orange form (Fig. 4).

I have it on good authority (M. Majerus, *pers. comm.*) that no such colour form is named, and anyway it is unlikely to be a true variety. Instead, it may be physiologically somehow analogous to the "blushing" seen in the water ladybird, *Anisosticta novemdecimpunctata* (L.). In that species, overwintering specimens are also a drab beige, making the insect well camouflaged against dead reed stems and leaves, but during spring, it acquires a pinkish red background colour (Majerus, 1994: Plate 12c,d). Majerus suggests that this development of red pigment is due to the need for a brighter warning coloration as the beetles become more active, more obvious and more vulnerable to predators.

The reddish form of the 16-spot ladybird is obviously not a common colour variety, and one wonders why it was shown in what appeared to be less than one-hundredth of a per cent of the Bexley specimens. It could be a throwback or some evolutionary potential bubbling under, or it may simply be an artefact of the metabolic changes undergone by an overwintering insect as it prepares for activity once again.

ACKNOWLEDGEMENTS

My thanks to the trustees of the Woodlands Farm Trust for inviting me to survey the farm, and to Mike Majerus for his comments on this article and for his enthusiasm which spurred me on to write it.

REFERENCE

Majerus, M. E. N. 1994. *Ladybirds*. The New Naturalist volume 81. London, Harper Collins.

SHORT COMMUNICATION

***Gonocerus acuteangulus* (Goeze) (Hemiptera:Coreidae) in a house at Ham, Surrey—** My colleague G. P. Lewis brought me a live bug he had found in mid-December 1998 at TQ174716 in his house at Ham, into which he had just moved. It had been noted whilst he was unpacking boxes, including some from Ecuador where he had recently been working. Since the insect was unfamiliar to me there seemed a possibility it might have been introduced, but it soon became apparent from the literature that it agreed closely with *Gonocerus acuteangulus* and I then remembered that R. D. Hawkins had told me how this bug, for so long apparently restricted to box bushes on Box Hill, had been turning up further afield (see also 1997 Annual Exhibition report in *Br. J. Ent. Nat. Hist.* **11**: 110 (1998)). Even so the disparity between the four descriptions and the three illustrations I examined made me uncertain until I actually showed the specimen to Roger at Dinton Pastures and compared it with authentic material. One illustration showed the legs to be coarsely hairy, whereas the indumentum is scarcely visible under high power. One of the most obvious characters not mentioned by anyone (not even Douglas & Scott, whose attention to detail is far superior to all subsequent efforts) is the dazzling yellow abdomen revealed when the hemelytra are raised. Whilst the insect was with me for investigation it became active and I put a cherry tomato in its container; feeding was noticed on several occasions over a period of three weeks. It was released near the point of capture on 15. ii. 1999. —B. VERDCOURT, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB.

SHORT COMMUNICATION

Stenamamma debile (Förster) and *Lasius sabularum* Bondroit (Hymenoptera: Formicidae) new to Lancashire The uncommon ant *Stenamamma debile* (Förster) (Dubois, 1993) was discovered at Gait Barrows National Nature Reserve (SD483775) on 21/04/98. A small nest containing a few workers and brood was found under a stone in a shaded area of woodland not far from a flourishing colony of *Lasius fuliginosus* (Latr.). The *Stenamamma* locality is about 200 km north of the nearest known record in Wales. In England the furthest north that this species has been taken is the Wyre Forest near Button Oak, Worcestershire, and there is an old record for Ayleston, Leicestershire. The locality at Gait Barrows seems quite suitable for this species with many loose boulders and stones in shaded woodland. Robinson (1998) drew attention to the relative abundance of *Formicoxenus nitidulus* (Nyl.) in nests of *Formica rufa* L. at Gait Barrows where most nests of the wood ant contained this small inquiline. Other Myrmicine ants seen include *Leptothorax acervorum* (Fab.) with several nests located under small stones and in moss. *Myrmica* species were few with only *M. sabuleti* Meinert taken once in a stony bank and *M. ruginodis* Nyl. generally abundant.

Formicine species included polygynous nests of *Formica rufa* with several egg-laying queens seen in the top layer of a single nest. *Formica fusca* L. was abundant under stones and in stumps in open ground and in one small nest a small queen, possibly a microgyne, was taken. The head width of this specimen measures 1.65 mm compared with the normal range of 1.85–2.1 mm. *F. lemani* Bondroit also occurs on the reserve under stones in partial shade. *Lasius niger* (L.) was dominant throughout the limestone pavement area. *L. flavus* (Fab.) is common along the fringes of the pavement area and on a later visit on June 12 many large nests were seen in sandy soil in the lower part of the reserve near Hawes Water Lake. A very interesting discovery on the later June visit was a specimen of *Lasius sabularum* Bondroit under a deep stone below a rocky bank. This species was revived from synonymy by Seifert (1988) and has only recently been added to the British list (Skinner & Allen, 1996). It has characters somewhat intermediate between *L. umbratus* (Nyl.) and *L. mixtus* (Nyl.) and the senior author has specimens from Devon, Dorset and Boscombe, Wilts. There are also queens of this species from Oxfordshire, Surrey and Middlesex.—CEDRIC A. COLLINGWOOD, 18 Milton St, Skipton BD23 2ED & NEIL A. ROBINSON, 3 Abbey Drive, Natland, Kendal LA9 7QN.

REFERENCES

- Dubois, M. B., 1993. Whats in a name? A clarification of *Stenamamma westwoodii*, *S. debile* and *S. lippalum*. *Sociobiology* **21**: 299–334.
- Robinson, N. A., 1998. Observations on the "Guest Ant" *Formicoxenus nitidulus* (Nylander) in nests of the 'red wood ant' *Formica rufa* L. in 1997. *British Journal of Entomology and Natural History* **11**: 125–128.
- Seifert B., 1988. A revision of the European species of the ant genus *Chthonolasices*. *Entomologische Abhandlungen Staatliches Museum für Tierkunde, Dresden* **51**: 143–180.
- Skinner, G. J. and Allen, G. W., 1996. Ants. Naturalists' Handbooks 24; 83 pp. Richmond Publishing Co. Ltd.

A NEW ABERRATION OF THE CLOUDED YELLOW *COLIAS CROCEUS* (GEOFFROY) (LEPIDOPTERA: PIERIDAE)

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Abstract.—A new aberration ab. *russwurmi* Harmer of the clouded yellow, *Colias croceus* (Geoff.) is described. A series was bred from a typical female captured near Lymington, Hampshire in 1994.

INTRODUCTION

The clouded yellow is a regular migrant to the British Isles, arriving most years and in varying numbers, the last immigration of exceptional note being 1983. In this species the female is dimorphic; the rarer of the two forms has the ground colour creamy white and is called f. *helice* Hübner (*pallida* Tutt). It is inherited as a sex-controlled dominant gene, expressed only in the female. Intermediate shades occur, from pure white ground colour (*alba* Lempke) to the typical orange-yellow. There are ninety-nine named aberrations of *C. croceus*, as at 1972 (Howarth, 1984).

In describing the white or creamy-white ab. *pallida* Tutt, F. W. Frohawk (Frohawk, 1934) states 'These palest forms occur only in the female; no such coloured male is known to exist'. Although the male upperside of ab. *russwurmi* bears a superficial resemblance to these female forms, there is no evidence to suggest a genetic relationship exists between them; rather that it is due to complete loss of yellow and pink pigmentation.

A typical female *C. croceus* captured on 4.viii.1994, near Lymington, Hampshire, produced a brood of about thirty-two imagines. Approximately thirteen of these, of which only four (three males and one female) emerged successfully, were of an aberrant form not previously described and not represented in either the National Collection of British Lepidoptera (RCK) or the European Collection, held at the Natural History Museum, London. It would appear to be a new aberration that is characterized by a complete absence of yellow and pink pigmentation to wings, body, antennae and legs. On the underside, the hindwings and borders to the forewings are creamy grey, creating a pale blue effect. The name ab. *russwurmi* is here proposed.

DESCRIPTION

ab. *russwurmi* ab. *nov*

Male. On the upperside of the forewings the normal golden yellow is entirely absent and is replaced by a creamy white; the discoidal spot and marginal borders are black; the basal and costal irroration as normal. The normal ground colour of the hindwings is replaced by creamy white, heavily dusted with grey scales; the discoidal spots are white, encircled in grey; the borders to the wings are black. The hairs to the body are silvery white; cilia white chequered with black.

The underside of the forewings has the normal yellow ground colour replaced by a creamy white somewhat paler than the upperside, especially to spaces 1 and 2, and extending over the marginal borders, creating a pale bluish appearance; the costal irroration and the discoidal and marginal spots are black. Spaces 9 and 10 are densely covered with black scaling uniting with the two black spots—normally



Fig. 1. Clouded Yellow, *Colias croceus* ab. *russwurmi* ab. nov. Top row (centre). Male, upperside (emerged 9.x.1994). Bottom row (left). Male, underside, (emerged 3.x.1994); (right). Male, underside (emerged 9.x.1994). (Photo: D. Wilson).



Fig. 2. Clouded Yellow, *Colias croceus* ab. *russwurmi* ab. nov. (Photo: A. S. Harmer). Underside of male shown in Fig. 1. Top row (centre). All specimens bred from typical wild female taken on 4.viii.1994, Sowley, near Lymington, Hampshire. The original examples of this aberration are in the author's collection.

reddish brown—in these spaces. A narrow blackish border extends from the apex down the outer margin as far as space 2.

The normal greenish yellow of the hindwings is replaced by creamy white heavily dusted with grey to give an overall pale bluish appearance. The costal spot in space 8 is accompanied by dense grey scaling which extends towards and along the apex. Both the costal spot and the marginal spots are a much darker, duller reddish brown than normal, almost black. The pupils of the discoidal spot are silvery-white encircled in a dull reddish brown.

Hairs to the underside of the body yellowish grey; cilia silvery white and antennae light brown.

Female. As above, the normal yellow spots in the borders replaced by creamy white.

The aberration has been named after the well-known butterfly artist, collector and a dear personal friend, Mr A. D. A. Russwurm, who will be celebrating his 95th birthday in June 1999.

DISCUSSION

This aberration was bred from a typical female caught by my son Arran Harmer at Sowley, near Lymington, Hampshire, on the 4.viii.1994. The larvae were kept outside and reared on birdsfoot trefoil (*Lotus corniculatus*), white clover (*Trifolium repens*), and lucerne (*Medicago sativa*). They were brought indoors when the weather began to deteriorate and the first few larvae had pupated. The first male *ab. russwurm*i emerged on 3 October followed by two more on 9 October. A slightly crippled female emerged on 8 October. An unsuccessful attempt was made to breed from her and she now exists only as an extremely worn specimen.

The exact number of the *ab. russwurm*i in the brood is not known. Possibly a further 10 more coloured up in the pupa and subsequently failed to emerge, or otherwise had difficulty in extricating their wings from the pupa: the slight ciliary damage sustained by some of the males during emergence may indicate that the gene responsible for *ab. russwurm*i has a deleterious effect upon this critical stage. It is not thought the difficulty in emergence was due to environmental factors as typical imagines did so without difficulty. The three males that did emerge successfully also seemed particularly weak. The brood consisted of 12 normal males, 7 normal females, 11 (approximately) male *ab. russwurm*i, and 2 female *ab. russwurm*i.

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REFERENCES

- Frohawk, F. W. 1934. *The complete book of British butterflies*. Ward, Lock & Co., Ltd. p. 335.
 Harmer, A. S. 1995. [Exhibit at BENHS Annual Exhibition 1994] *British Journal of Entomology and Natural History*, 8 (4): Plate II, Fig. 1. and p. 179.
 Howarth, T. G. 1984. Revised edition. *Colour identification guide to butterflies of the British Isles*. Viking. p. 28.

TERRESTRIAL INVERTEBRATES IN SITE ASSESSMENT: A LOCAL PERSPECTIVE

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Abstract. The use of terrestrial invertebrates to evaluate sites of local importance for nature conservation is reviewed using Leicestershire as an example. Numerical scores of saproxylic assemblages based on local rarity, national conservation status and dependence on habitat continuity achieved similar rankings. However, the selection of locally important sites using the presence of local red data book species as a threshold criterion reduces problems of ranking sites on the basis of non-comparable data and is simpler to implement. Habitat structures of importance mainly for invertebrates are identified together with suitable quality indicator groups for targeting in surveys. Different target groups are required when assessing sites for educational use. Assessing site management options requires a more comprehensive approach.

INTRODUCTION

The increasing recognition of the contribution that invertebrates make to global biodiversity in terms of sheer numbers of species has highlighted both the importance and the difficulties of invertebrate conservation. In Britain, sophisticated systems for the use of aquatic invertebrates in assessing river systems have now been developed (Wright *et al.*, 1993) and terrestrial invertebrates are becoming more widely employed for site assessment at national level. They feature, albeit briefly, in the guidelines for selecting Sites of Special Scientific Interest (SSSIs) (NCC, 1989) and, more substantially, in the national Biodiversity Action Plan (Anon, 1995). However, their use for site assessment at a county or regional level is patchy, because of the lack of local knowledge and expertise to cover such a wide range of taxonomic groups. Consequently, habitat features of importance for invertebrates are often inadequately considered in assessments of wildlife sites below SSSI level. However, the use of invertebrates in site assessment has a potentially valuable contribution to make in three areas:

1. site quality evaluation and selection of sites for protection,
2. site interpretation for education,
3. predicting the impact of site management options.

These three types of assessment are often confused when designing invertebrate surveys and interpreting data. This paper concentrates on how invertebrates can be used in local site quality evaluations with special reference to Leicestershire, a largely lowland, agricultural county. Other forms of site assessment are briefly mentioned in order to illustrate how they require a different approach.

CURRENT PRACTICE IN LOCAL SITE QUALITY EVALUATION

In many counties, large areas of countryside have been surveyed in order to assess their value for nature conservation. Sites of value from a county level perspective are given a local designation and usually receive some measure of protection under

development plans produced by planning authorities according to the Town and Country Planning Act (1981) supplemented by planning policy guidance from central government (Collis & Tyldesley, 1993). These locally designated sites are variously termed Sites of Importance for Nature Conservation (SINCs) or County Wildlife Sites and they represent a tier of protection below statutorily protected Sites of Special Scientific Interest (SSSIs). Some idea of their prevalence in the countryside can be gauged from the fact that, in Leicestershire, they outnumber SSSIs by a factor of approximately 100:1. In urban areas, they often represent the only form of protection given specifically for nature conservation. Nature conservation bodies have also used the evaluations for prioritising conservation action through the acquisition of land for nature reserves and, more recently, through the implementation of local Biodiversity Action Plans (e.g. Jeeves *et al.*, 1998) and targeting of environmental land management grant schemes such as Countryside Stewardship.

In Leicestershire, site evaluations have been based on phase 1 habitat surveys (Anon, 1990) supplemented by information on the presence of quality indicator species (Wyatt, 1991). This methodology is mainly designed to identify sites of interest for higher plants. For some sites, additional information has been used including lists of invertebrate species supplied mainly by amateur naturalists through the Leicestershire Biological Records Centre, although very few sites have been designated for invertebrates alone.

SPECIES ATTRIBUTES OF USE IN SITE ASSESSMENT

The distribution of invertebrate information is patchy, both geographically and taxonomically, but there are a number of species attributes with the potential to be used to select quality indicators. These attributes include rarity, habitat specificity and level of threat.

Threatened species and other species of conservation value are listed in the national red data books (Shirt, 1987; Bratton, 1991) or national conservation reviews (e.g. Falk, 1991a; 1991b; Kirby, 1992a; 1992b; Hyman & Parsons, 1992; 1994; Parsons, 1995) and are given various grades of conservation status. In Leicestershire, a series of local red data books have also been produced (Lott, 1995a; McPhail & Morris, 1997). In addition to species of national conservation status, these contain species which are under threat at the local level, where such information is available. The criteria for selection of species in all these lists are largely based on rarity, but also include declining ranges and threatened habitats.

Foster (1996a) discussed the quantification of species attributes for water beetles so that site scores can be calculated from combinations of individual species scores. These procedures can also be applied to terrestrial groups.

National conservation status has been used as the basis for scoring individual species of aculeate bees and wasps (Archer, 1996) and beetles associated with decaying wood (saproxylic beetles) (Fowles, 1997). Rarity scores have been assigned to individual species of ground beetles on the basis of their range size measured in the number of 10 km O.S. grid squares occupied according to data provided by the national recording scheme (Eyre & Rushton, 1989).

Eyre (1996) assigned regional rarity scores to ground beetle species in north-east England on the basis of tetrad (2 × 2 km squares) occupancy. In Leicestershire, there is sufficient data to assign similar scores on the basis of 1 km square occupancy to beetles, macro-Lepidoptera, dragonflies, spiders and woodlice, but not to other important taxa such as two-winged flies and aculeate bees and wasps.

Dependence on habitat continuity has been used to assign scores to saproxylic beetles. Harding & Rose (1986) allocated saproxylic beetles to three lists according to their strength of association with a continuity of dead wood at a site. These three lists have been used to assign habitat quality indicator scores to individual species (Harding & Alexander, 1994).

In practice, all these different attributes usually give broadly similar results for site evaluation. Table 1 shows the site scores and rankings derived from saproxylic beetle lists from ten sites in Leicestershire. Three sets of scores were calculated from three different species attributes as detailed in Table 2. Rankings are broadly consistent (Kendall's coefficient of concordance, $W = 0.65$, $p < 0.05$). The advantages of using a substantial species list are illustrated by the inflated habitat continuity score for Beacon Hill which was caused by the presence of a single high-grade indicator in a short list.

SITE RANKING AND QUALITY THRESHOLDS

There are two frequently used methods for calculating site scores from individual species scores.

1. Summation: the sum of all saproxylic species scores is used to calculate the Index of Ecological Continuity (Harding & Alexander, 1994). The disadvantage of this method is that the score depends heavily on sampling effort (Fowles, 1997).

2. Averaging: the mean score of all species present was used by Eyre & Rushton (1989) in order to reduce the undesirable influence of sampling effort on site scores.

Even after eliminating the influence of sampling effort, seasonal fluctuations and variations in sampling methods can still lead to difficulties in comparing species lists from different sites. Table 3 compares the scores of saproxylic species collected by five different sampling methods at a site in Leicestershire and there is a large variation between them. Omission of the Tullgren funnel samples would substantially alter not only the cumulative score but also the mean species score. Results are also highly dependent on the skills of the surveyors. A false identification of just one high-scoring species can lead to a large error in the site rarity index.

Table 1. Saproxylic quality scores from ten Leicestershire sites using three different species attributes as listed in Table 2.

Site	Mean species scores				Rankings			
	No. spp.	Local Rarity	National Status	Habitat Continuity	Local Rarity	National Status	Habitat Continuity	Mean
Donington Park	116	7.31	2.77	1.58	1	1	1	1
Bradgate Park	88	6.79	1.33	1.32	3	4	3	3.3
Swithland Wood	71	6.73	1.58	1.18	4	2	7	4.3
Buddon Wood	107	6.53	1.44	1.30	5	3	5	4.3
Burley Wood	90	6.27	1.29	1.31	6	5	4	5
Ulverscroft Nature Res.	86	6.82	1.07	1.16	2	8	8	6
Croxton Park	70	6.22	1.13	1.24	7	6	6	6.3
Beacon Hill	16	3.13	1.06	1.50	10	9	2	7
Boathouse Walk Plantn.	25	3.56	1.08	1.04	9	7	10	8.7
Barrow Gravel Pits	19	4.84	1.05	1.11	8	10	9	9

Table 2. Species scores developed from a) local rarity based on number of grid squares occupied in Leicestershire, b) national conservation status (Hyman & Parsons, 1992: 1994), c) saproxylic indicator grade (Harding & Rose, 1986).

Species score	Local Rarity index	National Status index	Habitat Continuity index
1	recorded in > 31 10km squares	not listed	not listed
2	recorded in 16 to 31 squares	Nationally scarce grade b or ungraded	grade 3
4	recorded in 8 to 15 squares	Nationally scarce grade a	grade 2
8	recorded in 4 to 7 squares	Red Data Book list 3	grade 1
16	recorded in 2 to 3 squares	Red Data Book list 2	
32	recorded in 1 square	Red Data Book list 1	

Similarly, lack of experience in field surveyors can lead to rare species being overlooked.

These difficulties become overwhelming when ranking sites of a similar quality. Small aberrations in sampling can have a large influence on the precise ranking of a site. However, detailed ranking of sites is rarely required for conservation purposes. The setting of a simple threshold value to qualify sites for designation, reduces many of the ranking problems due to sampling bias, and a threshold is often all that is needed when selecting sites for conservation priority.

New draft criteria for selecting SINC in Leicestershire include the presence of a breeding or hibernating population of an invertebrate species which qualifies for inclusion in the Leicestershire Red Data Book. In tests, this criterion has proved workable, provided that short-term, artificial sites such as dung heaps and arable fields are excluded. The potential simplicity of this approach makes it easy to operate and easy to understand and avoids many of the pitfalls associated with ranking sites on the basis of non-comparable sampling programmes. It also gives invertebrates the same importance as other groups such as higher plants.

In other regions, there may need to be further modifications of this criterion. It is common practice for local red data books to include nationally scarce species even

Table 3. Variations in species scores achieved by different sampling methods used to collect saproxylic beetles at Donington Park (including Boathouse Walk Plantation), Leicestershire (based on Lott, 1995b).

Sampling method	Total no. species	No. of indicator species			Cumulative score	Mean species score
		Grade 1	Grade 2	Grade 3		
Beating branches	30	2		4	10	0.33
Searching fungal fruiting bodies	32			7	7	0.22
Grass trap in tree hollow	34		1	2	4	0.12
Searching under bark	37		1	5	7	0.19
Tullgren funnel extraction from rotten wood	36	3	3	4	19	0.53
Whole site	140	5	4	19	42	0.3

when these are relatively common in the region. This is entirely appropriate when the region is the national centre of distribution for the species, but, unfortunately, the current list of nationally scarce species includes several that have either recently increased their range or been under-recorded in the past (Eyre, 1998). The use of nationally scarce species to designate SINC's may cause more problems in other parts of the country than in Leicestershire. However, it is feasible to design local red data book selection criteria so that they could be used to identify SINC's effectively.

INVERTEBRATE GROUPS AND HABITATS RELEVANT TO SITE QUALITY EVALUATION

Because there are so many species of invertebrates, it is quite impossible to commission a complete inventory survey for every local site. It is necessary to select target groups for each site in order to achieve maximum benefit from limited resources. Different invertebrate groups vary widely in their suitability for site quality evaluation. Foster (1996b) listed the attributes required for a taxonomic group to be used at a national scale. These can be adapted for local purposes as follows. Target groups should:

- contain a large number of quality indicator species,
- cover the required range of habitats and microhabitats,
- be easy to sample over an extended season,
- be easy to identify and have a well understood taxonomy,
- add significantly to information obtained from other groups.

Table 4 shows that, in Leicestershire, beetles, moths, spiders and flies all contain a sufficient number of potential site quality indicators to make them candidates for survey and use in site evaluation, if the criteria for selecting local red data book species are used to select site quality indicators. On the other hand, although over

Table 4. Numbers of invertebrate species qualifying for inclusion in the Leicestershire Red Data Books. Insufficient data prevents the designation of locally significant flies, ants, bees and wasps (based on Lott, 1997).

Group	Recording effort in Leics.	No. National RDB spp.	No. Nationally scarce spp.	No. spp. with local status	Total no. spp. with conservation status
Beetles	high	25	269	64	358
Butterflies & moths	high	2	33	62	97
Spiders	high	4	14	35	53
Flies	limited	4	44	0	48
Aculeate bees & wasps	low	1	10	0	11
Plant bugs	high	0	4	1	5
Dragonflies	high	0	4	1	5
Woodlice	high	1	1	1	3
Caddis-flies	low	2	0	0	2
Grasshoppers	high	0	0	2	2
False scorpions	high	1	0	0	1
Molluscs	high	0	1	0	1
Freshwater crustaceans	limited	0	0	1	1
Total invertebrates		40	380	167	587

200 species of plant bugs have been recorded in Leicestershire, very few of them can be regarded as good site quality indicators.

Recent local reviews of invertebrate groups (Lott, 1995a; Crocker & Daws, 1996; McPhail & Morris, 1997) and of key habitats for conservation (Bowen & Morris, 1995; Lott, 1997) have highlighted a range of habitat features of value for invertebrates. Often these are small scale features which are difficult to relate to more traditional habitat classifications. Several of these habitat features are of minor importance for the standard vertebrate and plant groups used for site conservation evaluation and so they have been somewhat neglected in the past. Therefore, invertebrate groups containing site quality indicators associated with these habitat features become a priority for use in site evaluation. Table 5 lists some habitat features in Leicestershire which are of importance mainly for invertebrates together with the invertebrate groups that are chiefly dependent on them. Aculeate bees and wasps are included on the basis of their importance in neighbouring counties (Falk pers. comm.). A higher local level of aculeate recording would undoubtedly discover species of conservation value associated with bare ground. Flies associated with mature trees are included, because their microhabitats are different from beetles.

Several major invertebrate groups are missing from Table 5. Although there are many species of conservation interest among moths and spiders, they have mainly been recorded at woodland and grassland sites which are already recognised for their botanical interest. It is beetles, flies, bees and wasps that appear to have the capacity to fill gaps in the list of SINC based on traditional floral assessments. On current knowledge, these are the most efficient target groups to use in surveys designed for site quality evaluation in Leicestershire. Other groups will be of use for other habitats outside Leicestershire. Reviews of invertebrate habitats of wider relevance in Britain include Fry & Lonsdale (1991) and Kirby (1992c).

INVERTEBRATE GROUPS RELEVANT TO OTHER TYPES OF SITE ASSESSMENT

Different species attributes are needed for use in site interpretation or for educational purposes. For example, the best subjects for inclusion in guidebooks and similar media are attractive species which are easily noticed by visitors. Butterflies, dragonflies and grasshoppers are all groups which meet these criteria. They are of limited use for site conservation evaluation in Leicestershire, because they contain too few site quality indicator species and they cover a limited range of habitats.

Table 5. Habitat features of predominantly invertebrate interest in Leicestershire and appropriate target groups for their evaluation.

Sites containing. . .	Target groups	No. indicator spp.
mature trees (woods, parks, hedges)	saproxyllic beetles	81
	flies	7
bare ground (heathland, quarries, urban demolition sites)	aculeate bees & wasps	5
	ground beetles	22
	other beetles	39
undisturbed wetlands (especially temporary ponds, spring-fed flushes, small floodplain features)	ground & rove beetles	41
	flies	26
exposed riverine sediments	riparian beetles	38

Nevertheless, they are often quoted in evaluation documents due to a confusion between these two site assessment functions.

The diversity of invertebrates and their sensitivity to environmental change make them suitable candidates for selecting appropriate site management options and monitoring the impact of changes in site management (Eversham, 1994). Falk (1998) has developed a procedure for assessing the impact of site development on individual invertebrate species. A proper assessment of site management priorities should consider a much wider range of groups than an evaluation for the selection of sites of conservation importance. Butterflies and moths may be of limited use for site selection, but the decline of species associated with open woodland (Warren & Key, 1991) warrants their consideration when drawing up woodland management plans. Unfortunately, two practical difficulties have prevented the use of invertebrate data at many sites which are managed for nature conservation.

First, there is a lack of information on the invertebrate interest present at the majority of sites of local importance. Even where such information does exist, it is often confined to the more popular groups which may not give a true picture of conservation priorities.

Second, non-specialists cannot translate site invertebrate data into management plans. Sites of conservation value are frequently represented somewhere by a forgotten file containing lists of invertebrates compiled by visiting naturalists. Usually, they appear to the site manager as a meaningless procession of scientific names. The interpretation of these lists can only be done by a small number of experts who are familiar with the specialist literature and whose competence is often limited to a small number of groups. There is a need to devise more effective procedures for incorporating the requirements of invertebrates into site management plans.

CONCLUSIONS

It is important to clearly establish objectives for any assessment exercise because taxonomic groups vary widely in their suitability of use in achieving different objectives.

Although local invertebrate records are neither taxonomically nor geographically comprehensive, existing species data can be used to select an initial schedule of sites of importance for invertebrate conservation by reference to the various lists of species of conservation status. Simple criteria for selection give adequate results and this reduces the resources required for survey and analysis. Consequently, there is little benefit to be gained from developing more complex systems and the priority in site selection should be more fieldwork to identify currently unrecognized sites which are worthy of conservation status for invertebrates. This can be accomplished most efficiently by looking for known habitat features of importance primarily for invertebrates and then surveying the invertebrates associated with them. In Leicestershire, beetles and flies have proved useful in the identification of important nature conservation sites which floral surveys have missed. Several well studied groups do not appear to generate extra sites. Other groups of terrestrial invertebrates cannot be used on current knowledge, although further work may find that aculeate bees and wasps are effective site quality indicators.

The adoption of systems and procedures for accommodating invertebrate interest in site management plans is a much greater challenge for the invertebrate specialist than site quality evaluation. The habitat approach adopted by Kirby (1992c) has potential for prioritizing management objectives at sites where invertebrate data are

absent, but species data may be required to resolve potentially conflicting priorities and, in any case, should provide a surer foundation for making decisions. The successful use of species data depends on selecting management options to meet the ecological requirements of species of conservation value in all taxonomic groups.

REFERENCES

- Anon. 1989. *Guidelines for Selection of Biological SSSIs*. Nature Conservancy Council, Peterborough.
- Anon. 1990. *Handbook for Phase 1 Habitat Survey—a Technique for Environmental Audit*. Nature Conservancy Council, Peterborough.
- Anon. 1995. *Biodiversity: The UK Steering Group Report*. (2 vols.). HMSO, London.
- Archer, M. E. 1996. The use of solitary wasps and bees in site assessment for wildlife conservation. In *Environmental Monitoring, Surveillance and Conservation using Invertebrates* (Ed Eyre, M. D.), 14–17. EMS Publications, Newcastle.
- Bowen, J. & Morris, D. 1996. *Leicestershire and Rutland Biodiversity Action Plan Audit*. Leicestershire & Rutland Trust for Nature Conservation, Leicester.
- Bratton, J. H. (Ed) 1991. *British Red Data Books: 3. Invertebrates other than Insects*. Joint Nature Conservation Committee, Peterborough.
- Collis, I. & Tyldesley, D. 1993. *Natural Assets—non statutory Sites of Importance for Nature Conservation*. Local Government Nature Conservation Initiative, Winchester.
- Crocker, J. & Daws, J. 1996. *Spiders of Leicestershire and Rutland*. Kairos Press, Newtown Linford.
- Eversham, B. C. 1994. Using invertebrates to monitor land use change and site management. *British Journal of Entomology and Natural History*, 7(supplement 1): 36–45.
- Eyre, M. D. 1996. Examples of site assessment and environmental surveillance using invertebrates in northern England and southern Scotland. In *Environmental Monitoring, Surveillance and Conservation using Invertebrates* (Ed Eyre, M. D.), 48–52. EMS Publications, Newcastle.
- Eyre, M. D. 1998. Invertebrates and the environment: a time for reassessment. *Antenna* 22: 63–70.
- Eyre, M. D. & Rushton, S. P. 1989. Quantification of conservation criteria using invertebrates. *Journal of Applied Ecology* 26: 159–171.
- Falk, S. J. 1991a. A review of the scarce and threatened bees, wasps and ants of Great Britain. *Research & Survey in Nature Conservation*, 35. Nature Conservancy Council, Peterborough.
- Falk, S. J. 1991b. A review of the scarce and threatened flies of Great Britain (Part 1). *Research & Survey in Nature Conservation*, 39. Nature Conservancy Council, Peterborough.
- Falk, S. J. 1998. Individual species impact assessments: a standardized technique for describing the impact of development proposals on critical invertebrate species. *British Journal of Entomology and Natural History* 11: 19–29.
- Foster, G. N. 1996a. Wetscore revisited—The value of values and scores of scores. In *Environmental Monitoring, Surveillance and Conservation using Invertebrates* (Ed Eyre, M. D.), 93–96. EMS Publications, Newcastle.
- Foster, G. N. 1996b. Beetles as indicators of wetland conservation quality. In *Environmental Monitoring, Surveillance and Conservation using Invertebrates* (Ed Eyre, M. D.), 33–35. EMS Publications, Newcastle.
- Fowles, A. P. (1997). The Saproxyl Quality Index: an evaluation of dead wood habitats based on rarity scores, with examples from Wales. *Coleopterist*, 6: 61–66.
- Fry, R. & Lonsdale, D (Eds) 1991. *Habitat Conservation for Insects a neglected green issue*. Amateur Entomologists' Society, Middlesex.
- Harding, P. T. & Alexander, K. N. A. 1994. The use of saproxyl invertebrates in the selection and evaluation of areas of relic forest in pasture-woodlands. *British Journal of Entomology and Natural History*, 7(supplement 1): 21–26.

- Harding, P. T. & Rose, F. 1986. *Pasture-woodlands in lowland Britain*. Institute of Terrestrial Ecology, Huntingdon.
- Hyman, P. & Parsons, M. S. 1992. A review of the scarce and threatened Coleoptera of Great Britain Part 1. *UK Nature Conservation* 3. Joint Nature Conservation Committee, Peterborough.
- Hyman, P. & Parsons, M.S. 1994. A review of the scarce and threatened Coleoptera of Great Britain Part 2. *UK Nature Conservation* 12. Joint Nature Conservation Committee, Peterborough.
- Jeeves, M. B., Kindleysides, D., Bullock, J. A. & Lott, D. A. (Eds) 1998. *Biodiversity Challenge for Leicestershire, Leicestershire and Rutland*. Leicestershire & Rutland Wildlife Trust, Leicester.
- Kirby, P. 1992a. A review of the scarce and threatened Neuroptera of Great Britain. *Research & Survey in Nature Conservation*, 34. Nature Conservancy Council, Peterborough.
- Kirby, P. 1992b. A review of the scarce and threatened Hemiptera of Great Britain. *UK Nature Conservation* 2. Joint Nature Conservation Committee, Peterborough.
- Kirby, P. 1992c. *Habitat Management for Invertebrates: a practical handbook*. Royal Society for the Protection of Birds, Sandy.
- Lott, D. A. 1995a. *Leicestershire Red Data Books—Beetles*. Leicestershire Museums, Arts & Records Service, Leicester.
- Lott, D. A. 1995b. The dead-wood beetles of Donington Park, Leicestershire. *Coleopterist* 4: 47–54.
- Lott, D. A. 1997. Leicestershire Biodiversity Action Plan: An Inventory of Key Species in Leicestershire and Rutland. Leicestershire & Rutland Wildlife Trust, Leicester.
- McPhail, J. & Morris, R. 1997. *Leicestershire Red Data Books—Butterflies and Moths*. Leicestershire & Rutland Trust for Nature Conservation, Leicester.
- Parsons, M. S. 1995. A review of the scarce and threatened ethmiine, stathmopodine and gelechiid moths of Great Britain. *UK Nature Conservation* 16. Joint Nature Conservation Committee, Peterborough.
- Shirt, D. B. (Ed) 1987. *British Red Data Books: 2. Insects*. Nature Conservancy Council, Peterborough.
- Warren, M. S. & Key, R.S. 1991. Woodlands: Past, Present and Potential for Insects. In *The Conservation of Insects and their Habitats* (Ed. Collins N. M. & Thomas, J. A.), 155–211. Academic Press, London.
- Wright, J. F., Furse, M. T., Armitage, P. D. & Moss, D. 1993. New procedures for identifying running-water sites subject to environmental stress and for evaluating sites for conservation, based on the macroinvertebrate fauna. *Archiv für Hydrobiologie* 99: 319–326.
- Wyatt, G. 1991. *A Review of Phase 1 Habitat Survey in England Volume 5—East Midland Region*. Nature Conservancy Council, Peterborough.

OFFICERS' REPORTS FOR 1998

Council's Report

At the end of the year the Society's membership stood at 844, an increase of 29 on the previous year. Forty-eight new members joined the Society, seven resigned and ten were struck-off for non-payment of subscriptions. Two deaths were reported to the Society during the year. Mr K. A. Spencer completed 50 years continuous membership of the Society at the end of the year and was elected a Special Life member.

The Council met seven times during the year at Baden-Powell House and, on average, 14 members attended each meeting. During the year consideration has been given to improving the efficiency and reducing the running cost of the air

conditioning system in the Pelham-Clinton Building. A new maintenance company has been employed and electricity consumption has been much reduced. A final decision on a new temperature and humidity regime for the building has yet to be made. The Society has responded to a consultation paper from the Department of the Environment, Transport and Regions (DETR) on proposed amendments to the list of candidate Special Areas of Conservation (SACs) in the UK, and to another on the entomological content of the Wildlife and Countryside Act. The time given to reply to consultation papers is often very short and the Council is grateful to Mr Stephen Miles for co-ordinating the response to these two papers. A letter was sent to the RSPB in support of their plans for developing a nature reserve on the Inner Thames Marshes.

A new initiative agreed by the Council is the involvement of the Society in collecting data on three heathland flies included on the short list of species requiring action under the UK Biodiversity Action Plan. The Society has set up a steering group to manage this research and has sought volunteers from the membership to carry out the investigation. The Society will provide half the funding for the project for a period of five years and will apply to English Nature for a grant for the other half. The Society's Conservation Working Group held an 'Insect Identification Day' in collaboration with the RSPB at their Minsmere reserve. Six Society members introduced around 60 RSPB members and members of the public to the insects of the reserve and the methods of identifying them. Many appreciative remarks were received from those attending.

Eleven indoor meetings were held at the rooms of the Royal Entomological Society and seven workshop meetings were held in the Pelham-Clinton Building, which was also opened on fourteen occasions for members to consult the collections and library. As a new venture Dipterists Forum and BWARS were invited to host two of the indoor meetings. The average number attending each indoor meeting and signing the attendance book remained at 19. The workshop meetings continue to prove popular with 17 people attending the Pyralid workshop and an average attendance of 12. It is good to see that the rooms are used by members coming from as far away as Yorkshire and Cornwall and, on average, ten people attended on each occasion the library and collections were opened. The numbers attending workshop and other meetings at the Pelham-Clinton Building are taken from those signing the visitors book, the actual numbers attending are likely to be slightly larger. The Council greatly appreciates the contribution of all this year's speakers and workshop leaders. A video microscope system has been purchased for use at workshops and will enable participants to view on a TV screen the identification characters seen under the microscope by the tutor. Dr I. McLean must be thanked for organizing the programme of meetings and the Council's thanks are also due to Mr P. Chandler for being present to open and supervise the Pelham-Clinton Building on nearly every occasion.

The Annual Exhibition and Dinner were again held at Imperial College in South Kensington and 213 members and 68 visitors signed the attendance book for the exhibition. This was a slight increase on the numbers attending compared with 1997. An analysis of the figures suggests that members living furthest from London are more likely to attend than those living close by. Although attendance has remained much the same since Imperial College was first used as the exhibition venue in 1987, the number of exhibits has decreased in the past two years. In order to give members more time, after the end of the season, to prepare exhibits a member's suggestion that the exhibition should be held a month later will be given a trial in 1999. The exhibition venue remains under review but, given the good attendance figures, the

Council is reluctant to make a change that would inevitably put a different group of members at a disadvantage. The meal provided by the College for the Annual Dinner was thought to have been the best for many years and the Society is very grateful to Mr M. Simmons for his faultless and unobtrusive organization of both the Dinner and Exhibition.

David Young continues to ensure that the Society's *Journal* and notices are distributed to members and, in spite of some unpredictability with *Journal* delivery times, still manages to despatch material within a few days of receipt. This year Mr Young has also arranged for the Society to have its own web site and has ensured that the information displayed is kept up to date.

Sales of the Society's publications are managed by Mr Gavin Boyd and approached £6000 this year. In spite of sales to individual members being much reduced, as there have been no new publications for several years, sales to commercial booksellers remained good.

At the end of the year several members took part in the Society's third expedition to Belize and, because of the different season of the visit, the species list was considerably extended. A video film was made of the expedition and an edited version will be shown at a future indoor meeting. Earlier in the year there were twenty-nine field meetings organized by Paul Waring, ten of these were joint meetings with other societies. The meetings covered a wide range of localities and habitats from Perthshire to Devon and much useful data were collected.

JOHN MUGGLETON

TREASURER'S REPORT

Last year I reported that the Society had spent more than it had received but this year we are back in surplus. We received £836 more than we spent and additionally there was an unrealised gain on investments of nearly £18,000. It is prudent to discount the investment gains as we have no intention of realising these assets at the moment but we must continue to try and spend our tangible income to further the Society's charitable aims. The overall net worth of the Society continues to increase but Council must always remember the strictures of the Charities Act that we have no business accumulating income without a specific future use in mind.

I am encouraged to report that managing and administering the Society has cost slightly less than last year at £3,108 while our direct charitable expenditure has risen to £31,852. In addition we have spent just over £4,000 on equipment designed to enhance the facilities available to members, especially at workshops. Both the Research Fund and the Hering Fund have enjoyed more income than the grants made from them, so there is more available for suitable projects in 1999.

Turning to the other funds it is pleasing to report that the Housing Fund, in addition to holding the leasehold at a written down value of £141,000 now has investments valued at £85,000 towards the next time we look for premises! Ambitious plans for publications are in hand for the next few years and the Special Publications Fund is in good heart to finance them with disposable assets of £53,000.

As we, in our previous instar as the South London, entered the century we are now leaving, our financial position was very precarious. Publications were only possible with the aid of donations from anonymous benefactors, and the Society's guarantors still had to occasionally dig into their own pockets. The annual subscription was seven and six, which I calculate is considerably higher than today's twelve pounds fifty, but it still did not pay for the cost of the Proceedings. It seems from insurance

records that the whole assets including library, collections and scientific equipment were valued at about five hundred pounds. In total the Society's funds now exceed £460,000 putting us in a strong financial position to maintain stability in a rapidly changing world and provide our members with increasing facilities while making a significant contribution to the study of entomology generally.

Once again I thank Dennis O'Keeffe and Reg Bell for giving up their time to audit our accounts.

A. J. PICKLES

Independent Examiners' Report

We report on the accounts of the Society for the year ended 31 December 1998, which are set out below as follows.

Respective Responsibilities of Trustees and Examiners

As the Charity's Trustees you are responsible for the preparation of the accounts, you consider that the audit requirement of Section 43 (2) of the Charities Act 1993 does not apply. It is our responsibility to state, on the basis of procedures specified in the General Directions given by the Charity Commissioners under Section 43 (7) (b) of the Act, whether particular matters have come to our attention.

Basis of Independent Examiners' Report

Our examination was carried out in accordance with the General Directions given by the Charity Commissioners. An examination includes a review of the accounting records kept by the Charity and a comparison of the accounts presented with those records. It also includes consideration of any unusual items or disclosures in the accounts, and seeking explanations from you as Trustees concerning any such matters. The procedures undertaken do not provide all the evidence that would be required in an audit, and consequently we do not express an audit opinion on the view given by the accounts.

Independent Examiners' Statement

In connection with our examination, no matter has come to our attention:

1. which gives us reasonable cause to believe that in any material respects the requirements
 - a. to keep accounting records in accordance with Section 41 of the Act; and
 - b. to prepare accounts which accord with the accounting records and to comply with the accounting requirements of the Act have not been met; or
2. to which, in our opinion, attention should be drawn in order to enable a proper understanding of the accounts to be reached.

D. O'KEEFFE and R. A. BELL

Notes to the accounts for the year ended 31 December 1998

1. Accounting Policies

The Accounts of the Charity are prepared in accordance with the Charities (Accounts and Reports) Regulations 1995, the statement of recommended practice, Accounting by Charities, and with applicable accounting standards. They are drawn up on the historical accounting basis except that investments held as fixed assets are carried at market value.

1.1 Income

Donations and legacies are accounted for as soon as their amount and receipt are certain. In the case of donations this is usually when they are received. All other income is accounted for under the accruals concept. Gifts in kind are valued at their estimated value to the Charity.

1.2 Expenditure

Expenditure is accounted for under the accruals concept. The irrecoverable element of VAT is included with the item of expense to which it relates. Depreciation is allocated over the expenditure headings on the basis of the use of the assets concerned.

1.3 Tangible Fixed Assets

Tangible fixed assets are stated at cost or trustees valuation less depreciation which is calculated at rates to write off the excess of cost over estimated residual values of individual assets over their estimated useful lives as follows

Leasehold Buildings at Dinton Pastures	1/70th of cost
Fixtures and Equipment	10% of written down value

1.4 Investments

Fixed asset investments are stated in the balance sheet at mid market value at the balance sheet date.

1.5 Stock

Stock is valued at the lower of cost, including irrecoverable VAT, and market value and consists of publications and sundries held for resale.

1.6 Restricted Funds

Restricted funds are subject to specific conditions laid down by the donors as to how they may be used.

2. Trading Income and Expenditure

Trading income is derived from the sale of the *British Journal of Entomology* to non-members of the Society and from the sale of the Society's other publications and products, costs are those of printing and distributing these items.

3. Sundry Income

Sundry income has been derived from the sale of surplus insect cabinets and specimens and income from the annual dinner.

4. Tangible fixed assets

	Leasehold Property	Fixtures & Equipment	Total
Cost	£	£	£
At 1 January 1998	154736	48928	203664
Additions		4085	4085
Disposals	—	—	—
At 31 December 1998	<u>154736</u>	<u>53013</u>	<u>207749</u>
Depreciation			
At 1 January 1998	11050	9228	20278
Charge for year	2210	4378	6588
On disposals	—	—	—
At 31 December 1998	<u>13260</u>	<u>13606</u>	<u>26866</u>
Net book values			
At 31 December 1998	<u>141476</u>	<u>39407</u>	<u>180883</u>
At 31 December 1997	<u>143686</u>	<u>39700</u>	<u>183386</u>

Leasehold premises represents the cost of building and equipping the headquarters at Dinton Pastures Country Park. The total cost of these premises which were completed during the year to 31 December 1993 are being amortized over the seventy year term of the lease. Fixtures and equipment includes a value for the library and collections as well as computers, microscopes and other ancillary equipment.

5. Investments

In accordance with accounting requirements investments are shown in the balance sheet at market value.

	1998		1997	
	M.V.	Cost	M.V.	Cost
Shell T & T	4207	1250	6510	1250
Unilever	4481	248	4941	248
M & G Charifund	67003	20238	61471	20238
Treasury 1999 91 4 %	2640	2392	2600	2392
Treasury 83 4 %	3688	3688	3882	3688
Hendersons Bond	64951	58000	59007	58000
Sun Life Bond	65142	56000	56568	56000
Barings Bond	<u>24916</u>	<u>25000</u>	<u>24291</u>	<u>25000</u>
	<u>237028</u>	<u>166816</u>	<u>219270</u>	<u>166816</u>

6. Debtors

Due within one year

Trade debtors	473	561
Recoverable taxation	4474	3714
Prepayments and accrued income	<u>2800</u>	<u>2398</u>
	<u>7747</u>	<u>6673</u>

7. Cash at Bank and in Hand

	1998	1997
National Westminster Bank		
Capital Reserve	5703	25108
Societies Reserve	23039	5257
Current Account	6004	1914
Eurocheque Account	582	77
Cash waiting to be banked	—	—
	<u>35328</u>	<u>32356</u>

8. Creditors: amount falling due within one year

Trade creditors	1400	2342
Accruals	<u>4620</u>	<u>4299</u>
	<u>6020</u>	<u>6641</u>

9. Funds

Analysis of net assets between funds

	Tangible Fixed Assets	Investments	Net Current Assets	Total
Endowment Fund:				
Hering Fund	—	15940	—	15940
Restricted Funds:				
Housing Fund	141476	85444	—	226920
Special Publications	—	53121	8776	61897
Unrestricted Funds:				
Research Fund	—	34181	—	34181
General Fund	39407	48342	37476	125225
	<u>180883</u>	<u>237028</u>	<u>46252</u>	<u>464163</u>

The Hering Fund was endowed to make grants out of income for research in specific areas of entomology.

The Housing Fund consists of the property at Dinton Pastures and money put aside to finance its upkeep and eventual replacement. The funds were derived principally from bequests from the late Duke of Newcastle, Mr Crow and Mr Hammond.

The Special Publications Fund finances the Society's publications other than the *British Journal of Entomology* and surpluses from such publications are credited to this fund to finance future publications.

The Research Fund was set up in 1996 with funds derived from part of the old Bequest Fund which was closed with the intention of financing future grants for entomological research which would be authorized by Council but not so narrowly defined as those made by the Hering Fund. In 1997 the first grants were made from this Fund.

10. Grants

In addition to grants of £600 paid from the Hering Fund and £1003 from the Research Fund the Society has granted £2000 towards the Society's Third Expedition to Belize out of General Fund.

*Statement of Financial Activities
for the year ended 31 December 1998*

	Unrestricted Funds	Restricted Funds	Endowment Funds	Total Funds 31.12.98	Total Funds 31.12.97
Incoming Resources					
Subscriptions	12128	—	—	12128	10410
Investment Income	4813	7284	910	13007	13409
Bequests & Donations	—	—	—	—	—
Trading Income note 2	1161	4090	—	5251	6523
Sundry Income note 3	7621	—	—	7621	—
Total Incoming Resources	25723	11374	910	38007	30342
Resources Expended					
Direct Charitable Expenditure:					
Cost of Journal & Distribution	10490	—	—	10490	9289
Cost of facility at Dinton Pastures	—	3681	—	3681	3693
Members Meetings & Exhibitions	3527	—	—	3527	3789
Library & Curation	3963	—	—	3963	693
Grants note 10	3003	—	600	3603	6120
Depreciation	4378	2210	—	6588	6629
	25361	5891	600	31852	30213
Other Expenditure					
Management costs	3108	—	—	3108	3357
Trading costs note 2	68	2143	—	2211	3162
	3176	2143	—	5319	6519
Total Resources Expended	28537	8034	600	37171	36732
Net Resources before transfers	(2814)	3340	310	836	(6390)
Transfers between funds					
Net Incoming/Outgoing Resources	(2814)	3340	310	836	(6390)
Gains & Losses on Investment assets					
Realised	—	—	—	—	—
Unrealised	6570	9945	1243	17758	3669
Net movement in Funds	3756	13285	1553	18594	(2721)
Fund Balances brought forward at 1st January 1998	155650	275532	14387	445569	448290
Fund Balances carried forward at 31st December 1998	159406	288817	15940	464163	445569

Summary Income and Expenditure Account

	1998	1997
Gross Income of continuing operations	38007	30342
Total expenditure of continuing operations	<u>37171</u>	<u>36732</u>
Net Income/Outgoings for the year	<u>836</u>	<u>(6390)</u>

*Balance Sheet
as at 31 December 1998*

	Notes	1998	1998	1997	1997
Fixed Assets					
Tangible Assets	4		180883		183386
Investments	5		<u>237028</u>		<u>219270</u>
			417911		402656
Current Assets					
Stocks		9197		10525	
Debtors	6	7747		6673	
Cash at Bank and in hand	7	<u>35328</u>		<u>32356</u>	
		52272		49554	
Creditors: amounts falling due within one year	8	<u>6020</u>		<u>6641</u>	
Net current assets			<u>46252</u>		<u>42913</u>
Net assets			<u>464163</u>		<u>445569</u>
Funds	9				
Endowment Funds—Hering Fund			15940		14387
Restricted Funds—Housing Fund		226920		221735	
Special Publications Fund		<u>61897</u>	288817	<u>53797</u>	275532
Unrestricted Funds:					
Research Fund		34181		30877	
General Fund		<u>125225</u>	<u>159406</u>	<u>124773</u>	<u>155650</u>
			<u>464163</u>		<u>445569</u>

The accounts were approved by the Council on 4 February 1999 and signed on its behalf.

BENHS RESEARCH FUND

The sum available for grants in 1998 was £1500, and four applications were received. Three awards were made as follows:

1. Mr M. V. L. Barclay and Mr C. Lopez-Vaamonde, £418, to assist with a project on successional and seasonal changes in the saproxylic Coleoptera of a Berkshire woodland. This grant is for the first year of a longer study on the ecological requirements of the beetles of dead wood and their relevance to the conservation of these species.
2. Dr A. J. A. Stewart, £405, to assist with the collection, collation and computerization of data on the distribution of Auchenorrhyncha. The award will enable a large back-log of distribution records of this important group to be completed so that distribution maps can be produced. It will also enable some under-recorded sites to be surveyed and data to be extracted from some museum collections.
3. Mr J. Webb (Staffordshire Wildlife Trust), £180, towards a project on the distribution of ground nesting solitary bees and wasps in Staffordshire. This survey over three years will help to achieve the objectives of the Staffordshire Biodiversity Action Plan for these species.

The Council invites applications for future awards and hopes that as the Fund becomes better known the number of applications will increase. As the Research Fund was undersubscribed the Council decided that £200 could be transferred to the Hering Memorial Fund which was oversubscribed. The balance of £300 would be available for future awards from the Research Fund. As a consequence the Hering Fund was able to award an additional £200 to Dr V. Zlobin (see Hering Fund Report).

An interim report has been received from Mr J. E. Milner and Mr R. F. McCormick has sent the latest reports of the Devon Moth Group which acknowledge the support of the Research Fund; both were recipients of awards in 1997.

I should like to thank the members of the Research Fund panel for their time and careful consideration of this year's applications.

JOHN MUGGLETON

PROFESSOR HERING MEMORIAL RESEARCH FUND

The Committee agreed to make two awards from the Fund this year. The sum of £300 was granted to Dr Vladimir Zlobin of the Zoological Institute of the Russian Academy of Sciences, St Petersburg. It was agreed by the Council of the BENHS that this amount should be increased by a further £200 from the newly created British Entomological and Natural History Society Research Fund. Dr Zlobin will use the total sum of £500 to support a visit to London to study types of Agromyzidae housed in the Natural History Museum, London.

Dr Elisenda Olivella-Pedregal, from the Federal Biological Research Centre, Dossenheim, Germany, was awarded the sum of £300 to study the systematics and taxonomy of leaf-mining moths in European orchards. In particular, she plans to resolve taxonomic problems in species of the genus *Phyllonorycter*. Dr Olivella-Pedregal will use her grant to visit the Natural History Museum, London to study relevant types of this genus.

Professor Rimantes Puplesis, from Vilnius Pedagogical University, Lithuania, made a visit to Belize to collect Lepidoptera leaf-miners last year. Although his grant from the Fund was originally made for work in eastern Siberia, the Committee agreed to allow him to use it instead to support a month-long fieldtrip to Belize. This situation arose because Professor Puplesis was spending an extended period of time at the Natural History Museum, London, an institution with an active research programme in Belize. The visit proved to be extremely successful with over 400 specimens of the moth family Nepticulidae being collected. Among this material about 50 new species are represented. The results of the research will be included in a review of neotropical Nepticulidae and submitted to the *Bulletin of the Natural History Museum* (Entomology series) for publication later in the year. Our taxonomic knowledge of neotropical Nepticulidae is conspicuously weak, so the grant has enabled an achievement of considerable importance.

The microscope belonging to the Fund has continued to be lent to Mr David Morgan who is preparing illustrations for a book on bees, being written by Mr George Else.

I am grateful to my colleagues on the Hering Fund Committee for their advice and support, and I record my thanks to Dr John Muggleton, who, as Secretary both of the BENHS and the Society's Research Fund, has also helped the Hering Fund achieve its ends over the last year.

Mozuraitis, R., Buda, V., Borg-Karlson, A.-K., Ivinskis, P., Karalius, V., Laanmaa, M. & Plepys, D. 1998. New sex attractants and inhibitors for 17 moth species from the families Gracillariidae, Tortricidae, Yponomeutidae, Oecophoridae, Pyralidae and Gelechiidae. *Journal of Applied Entomology* **122**: 441-452.

MALCOLM SCOBLE

LIBRARIAN'S REPORT

Those of you who have visited the Pelham-Clinton Building at Dinton Pastures this year will have noticed that large portions of our journal holdings have been removed from the shelves and are not available for loan. This is because I have concentrated on getting unbound journal back numbers bound this year, and in July I sent a large consignment to the binders. This included our journal, the old *Proceedings and Transactions* as well as the new *British Journal*. I also sent a bound set of *Proceedings and Transactions* covering the "war years" for rebinding. This was in poor condition, in odd covers and is the only copy we possess of our own journal for this period. By necessity, it is very slim, a sad reflection on those infamous times. Also included in this batch were *Annales Entomologica Fennici*, *Entomologica Fennica*, *Entomologist's Gazette*, *London Naturalist*, *Entomologist's Record*, *Entomologist's Monthly Magazine* and *Linneana Belgica*. A list of fairly exacting specifications accompanied these items and I am pleased to report that the bound journals were returned safely to Dinton Pastures in December. A fine job was made, and these items are once again available for loan to members. However, this is not the end of this project as many more titles remain to be dealt with. Consequently, earlier this month I sent for binding a large consignment of the various journals published by the Royal Entomological Society, some of which had been wrongly collated in the past. I look forward to reporting a similarly successful outcome this time next year.

I am also pleased that the new books I reported ordering this time last year have all arrived safely and are available for loan. I have produced a short article listing these which should be published in our journal soon.

After my report at the AGM last year, Raymond Uffen requested that I prepare some instructions on the use of the Society's electronic library database. This I have done, and a plastic-laminated copy is secured to the wall behind the access terminal. May I take this opportunity to ask anyone using these instructions who finds an error in them, or thinks that they could be clarified, to leave me a written note of their suggestion. I will review this and, where appropriate, amend the instructions accordingly. While on the subject of things laminated, visitors to the library will observe that we now have lists of subject-areas attached to the ends of the relevant shelves. These should aid you in locating the subject you are looking for and I hope you find them useful; I am in the process of preparing similar lists for the shelves holding bound journals. I wish to take this opportunity to thank Martin Albertini for producing additional shelf labels during the year. The fact that these were needed is testimony to how much the library has expanded its holdings in the past year or two.

As a change to my usual reports I thought I'd include a few basic statistics this year to illustrate the increase in use that the library has seen since the move to Dinton Pastures (Fig. 1).

1989 was the last full year that the Society was based at the Alpine Club. During that year a total of 85 library items were loaned, split roughly equally between books and journals. Our first full year at Dinton Pastures (1993) saw the number of loans equal those in 1989, the main difference being the greater proportion of book to journal loans (roughly 3/4 were books). From 1994, loans have increased steadily but, interestingly, the proportion of books is still outstripping that of the journals (2/3 are books). The last full year for which figures are available (1998) shows that members borrowed a total of 179 items. Though membership numbers may have changed since 1989, this represents an increase in loans activity of 210% since our

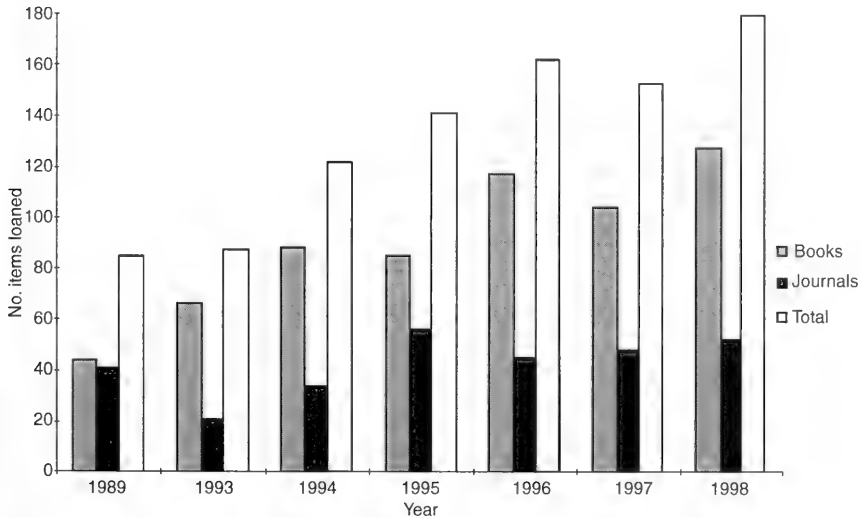


Fig. 1. Library loans.

days at the Alpine Club, and is good justification, if any is needed, for the difficult choice of location made by Council at that time. The low proportion of journal loans compared to books shows that members are taking advantage of the photocopy facilities which were not available at the Alpine Club. I am sure that without this facility many more journals would have been borrowed over this period.

This year the library has benefited from donations of books from Matthew Smith, Mark Iley, Ian McLean, Paul Waring, Bernard Verdcourt, Brian Baker, John Bradley and Ian Wallace. As is customary, I wish to express my thanks to them for their generosity. I also wish to thank John Muggleton for his continuing help in logging the receipt of journals and updating the database in this respect.

My main aim for the coming year is to continue the journal binding project. I also hope to attend more open days at Dinton Pastures than I have been able to this year. A long-term aim regarding the journals section remains the establishment of an electronic database of bound journals along the lines of the one we have for books, but I doubt that this will be achieved in the coming year.

IAN SIMS

CURATOR'S REPORT

The past year has mainly seen continuity of the projects mentioned in last year's report. My main activity has been the completion of the new layout for European and other foreign butterflies. As mentioned these follow the arrangement in the recent European checklist. They include 350 species and have been accommodated in 5 cabinets, totalling 145 drawers; in the last three drawers the small collections of Oriental Lycaenidae and American butterflies have been placed.

Duplicate European butterflies have consequently been available, in a separate cabinet, for a few months now. Considering the relatively low rate of consultation of the main collection, I was surprised by the rapidity with which these have been raided, so anyone who seeks specimens should come soon.

The Papilionidae, Pieridae and Nymphalidae from the Bretherton collection have been transferred to the cabinet provided by the Reading Museum, so the four cabinets housing this collection are now all the property of the Museum.

David Moore has continued work on the layout of the British Noctuids and will be completing this shortly. As the layout in Bradley & Fletcher order of the British macro-moths will then be complete, I will not mention this in next year's report so I thank David now for the considerable assistance he has given in arranging this collection to a high standard. I also thank Peter Baker for continuing to repaper drawers to be used in this layout.

Consideration will now be given to revising the layout of the micro-moths. As Eric Bradford's collection is already arranged according to Bradley & Fletcher, this will form the basis for the new arrangement. We have many unnamed micro-moths, many of them sorted to family, so any volunteers to look at these or pick out specimens of value to the collections, will be welcomed.

A collection of Coleoptera made by John Sankey has been received from his widow and I am grateful to John Owen for conveying this collection to me. It comprises nearly 1000 specimens arranged in storeboxes, many of them from Surrey. This material has been assessed by Jonty Denton, who has kindly picked out some specimens for addition to the collection, while extracting Surrey data.

Specimens have also been donated by Jonty Denton, Peter Grainger, Andrew Halstead, Tony Harman, Roger Hawkins, Matthew Smith and Bernard Verdcourt, to whom I am grateful for their continuing interest in improving the collections.

The re-arrangement of the Lepidoptera collections mentioned has resulted in several cabinets becoming vacated. Seven cabinets and a number of storeboxes were sold during the year and several other cabinets will be available for sale shortly. As offers have already been made for some of these, anyone wanting a cabinet should contact me as soon as possible. The proceeds of sales are being used to purchase further new cabinets which will be obtained shortly, to enable the rehousing of the remaining Hymenoptera and the reorganization of the Diptera according to the new checklist. The plan is to eliminate the central block of cabinets to provide more space for open days and workshops and to enhance security.

Finally, I would like to thank members for keeping the floor relatively clean since the industrial cleaning operation last year and also Ian McLean for recent mopping activity.

PETER CHANDLER

THEFT OF BUTTERFLIES FROM THE SOCIETY'S COLLECTION

It was brought to my notice by a member, in January 1999, that some aberrations were apparently missing from the Society's collection of British butterflies. This was not mentioned in my annual report, because it had yet to be confirmed and the numbers of specimens involved was not known. Since then the collection has been checked by David Moore, who was responsible for laying out the butterflies in their present arrangement, during the latter years at the Alpine Club. He has confirmed that several specimens are missing, in at least two instances other specimens, presumably from the Duplicate Collection, have been substituted for the missing specimens but in other cases it was more obvious as gaps and pinholes were apparent. Unfortunately, the Society does not have a record of the precise composition of the collections so the total number of specimens stolen cannot be ascertained.

While it was not possible to be sure of the full extent of the theft, the following specimens are certainly known to have been removed:

- Ab. *deleta* of the Brown Argus, *Aricia agestis* (Denis & Schiffermüller)
 - Ab. *nigrina* (entirely dark upper side) of the White Admiral, *Limnitis camilla* (L.)
 - Albino (no dark marking on forewing) of the Orange Tip, *Anthocharis cardamines* (L.)
 - A bilateral gynandromorph of the Chalkhill Blue, *Lysandra coridon* (Poda)
- Several other Lycaenidae are also missing but their identity is uncertain.

It is not known whether any specimens have been removed from the Bright collection, which chiefly comprises aberrations of the Common and Chalkhill Blues, as there is no record of its contents and there have always been many gaps (and pinholes) in this collection during the time that I have been Curator. The collection is laid out with labels for many aberrations that are not represented by specimens. It must, however, be considered possible that specimens have also been removed from this collection and any member visiting the building, who is familiar with this collection, will be asked if they can advise of any losses.

The member, who first discovered these losses, was certain that the specimens had been present during his previous visit (in September 1997), so it would appear that

they were removed either late in 1997 or during 1998. This must have taken place during an open day or workshop meeting. Although I was present at all but one open day and at most workshops during this period, it is not of course possible to observe all visitors continuously and the layout of the collections room precludes simultaneous observation of the entire room.

In order to minimize the chance of any recurrence of this problem, the two Hills units containing British butterflies and the two cabinets housing the Bright collection are now being kept locked and any member wishing to view specimens in these collections should first contact the Curator and will be asked to sign a record book when asking for the relevant key. As I am occasionally absent during open days, anyone planning a visit specifically to see these collections would be well advised to inform me in advance (Tel: 01628-664111) as the keys will not be available during my absence.

It is also planned to photograph the contents of these cabinets in the near future, so that a permanent record will be available to enable closer control of these specimens in the future.

PETER CHANDLER

EDITOR'S REPORT

Steady progress has been made through the year in attempting to catch up the publication times of issues of the *Journal*. However, general shortage of articles and short communications prevented a more rapid publication of individual parts. Volume 11, parts 1 and 2 contained 64 pages each but towards the end of the year it was clear there was insufficient material to sustain this size of part. Accordingly parts 3 and 4 were combined and published in January 1999. This should allow the parts of Volume 12 in 1999 to be published in a more timely fashion. Emphasis will be placed on more timely production to enable better co-ordination with other Society mailings. A revised "Instructions to Authors" has been agreed, which will be published in the first part of Volume 12.

As well as reports of Society Indoor and Field meetings, the Annual Exhibition report and Officers' reports, Volume 11 included 22 articles. There were 8 on Lepidoptera, 5 on Diptera, 4 on Coleoptera, 2 on Hymenoptera, 1 Hemiptera paper and 1 on Isopoda. One paper was on broadly conservation issues. The majority of these articles are of broadly taxonomic content. This seems a reasonable balance across the Orders and probably reflects the interests of the Members although some groups are not covered at all. I would welcome more contributions on conservation matters and I would also welcome and encourage more formal reports from groups such as County Moth recording schemes, as well as BWARS and Dipterists Forum. I would also like to encourage those who organize field meetings but don't send reports to try and write something, however brief. We probably only receive reports of around half the field meetings that take place. We should also not forget that the Society's web site can easily carry information on current activities, as well as being a link into other web sites.

The general lack of articles has meant that some can be published very quickly after review. However, I would prefer to have more ready in the pipeline to make planning future issues easier. I am not sure if some articles that might have been sent to the Society in the past are being published in specialist Newsletters.

I would like to again take this opportunity to thank all those who have given their time in assisting the production of the *Journal* in the past year, not only in writing articles and communications but in reviewing other contributions.

MICHAEL R. WILSON

THE 1998 PRESIDENTIAL ADDRESS—PART 1 REPORT

BRIAN EVERS HAM

The reports published here confirm that the hard work which keeps the Society alive is done by its officers, and the President needs do little more than preside at this Annual Meeting and in Council meetings.

Quiet efficiency characterises each officer: Secretary, Treasurer, Editor, Curator, Librarian, Lanternist and Field Meeting Organiser. Each has performed diligently, effectively and with good humour throughout the year. I should also highlight the role of key figures in the well-being of the Society: Roger Hawkins and Andy Godfrey ensuring membership matters are dealt with promptly, and not least Mike Simmons once again organising the Annual Exhibition and Dinner. Both were judged a great success, and I can now recommend Imperial College as a place to eat!

I should also record our thanks to the Committees who have appraised applications to the Hering Memorial Fund and our Research Grants with probity, imagination, and good sense. And it has been a busy year for the Publications Committee. Under the chairmanship of Ian McLean, it has steered the new *Brachycera* book toward publication. Particular thanks to the authors, Alan Stubbs and Martin Drake, for their enormous efforts, and to the editing and typesetting team of Roger Morris, Peter Chandler and Malcolm Storey. It is by our publications that future generations will know the Society. I am sure the *Brachycera* book will do for soldierflies and horseflies what Stubbs & Falk did for hoverflies; and in doing so will enhance the Society's reputation still further. It should also help strengthen our partnership with *Dipterist's Forum*. I think the BWARS evening did.

If publications form a tangible legacy for the Society, its diverse and geographically widely spread field meetings programme confirm our role as the foremost society for *field* entomology in Britain. Congratulations to Paul Waring for maintaining the momentum.

Likewise, our indoor meetings have maintained their customary excellence, as have the very popular workshops at Dinton Pastures. I am grateful to Ian McLean for his efficiency and insights—it was an especial pleasure to hear talks on shieldbugs, ground-beetles and peatbogs during my year in the chair.

Another steady rise in membership, and one more member being elected to Special Life Membership after 50 years in the Society, suggest we are providing what our members want. Sadly, time, takes its toll, and I have to record four deaths which came to our notice this year.

Mr M. G. Venton died on 14 January 1996. From Barnes in London, he was a lepidopterist, and a regular attender at indoor meetings until the early 1980s. He joined the Society in 1971, and exhibited and communicated at meetings throughout the 1970s.

Mr J. E. Maskrey died in July 1997. Resident in Lymington, Hampshire, he worked on a County Council nature reserve there. He was a good all-round

naturalist, especially interested in aculeate Hymenoptera and several families of Diptera. He had been a member since 1987.

Major A. Bedford-Russell, of Porton, Wiltshire, died in October 1998; a member since 1960, he was an authority on butterflies.

Finally, Mr R. G. Warren of Stoke-on-Trent has died at the age of 86. A very active lepidopterist, and county recorder, he was the author of the *Atlas of the Lepidoptera of Staffordshire* in 1981, and an updated county list two years later.

THE BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY RESEARCH FUND

The following grants were made from the fund in 1998: Mr M. V. L. Barclay & Mr C. Lopez-Vaamonde, £418, to assist with a project on successional and seasonal changes in the saproxylic Coleoptera of a Berkshire woodland; Dr A. J. A. Stewart, £405, to assist with the collection, collation and computerization of data on the distribution of Auchenorrhyncha; Mr J. Webb, £180, towards a Staffordshire Biodiversity Action Plan project on the distribution of ground nesting solitary bees and wasps in Staffordshire.

The Society now invites applications for grants to be awarded in December 1999. Awards are open to both members and non-members of the BENHS and will be made to support research on insects and spiders with reference to the British fauna, and with emphasis on:

- (a) the assistance of fieldwork on insects with relevance to their conservation,
- (b) work leading to the production of identification guides and distribution lists.

Travel to examine museum collections and to consult taxonomic specialists would be included. The work and travel is not limited to the British Isles but must have a demonstrable relevance to the British insect or spider fauna. Preference will be given to work with a clear final objective (e.g., leading to publication or the production of a habitat management plan). Work of leaf miners and gall forming insects should be submitted to the Society's Professor Hering Memorial Research Fund.

Individual grants are unlikely to exceed £400 and the total available for 1999 is £2000.

Applicants should send seven copies, if possible, of their plan of work, the precise objects, the amount for which an award is requested and a brief statement outlining their experience in this area of work, to Dr J. Muggleton, 30 Penton Road, Staines, Middlesex, TW18 2LD, as soon as possible and not later than 30 September 1999. Further information may be obtained from the same address (email, jmuggleton@compuserve.com).

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 for fieldwork, for the study of collections, for attendance at conferences, or, exceptionally, for the costs of publication of finished work. In total they are unlikely to exceed £1000 in the year 2000.

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 1999.

Applications are also invited from persons wishing to borrow the Wild M3 Stereomicroscope 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 six months in the first instance.

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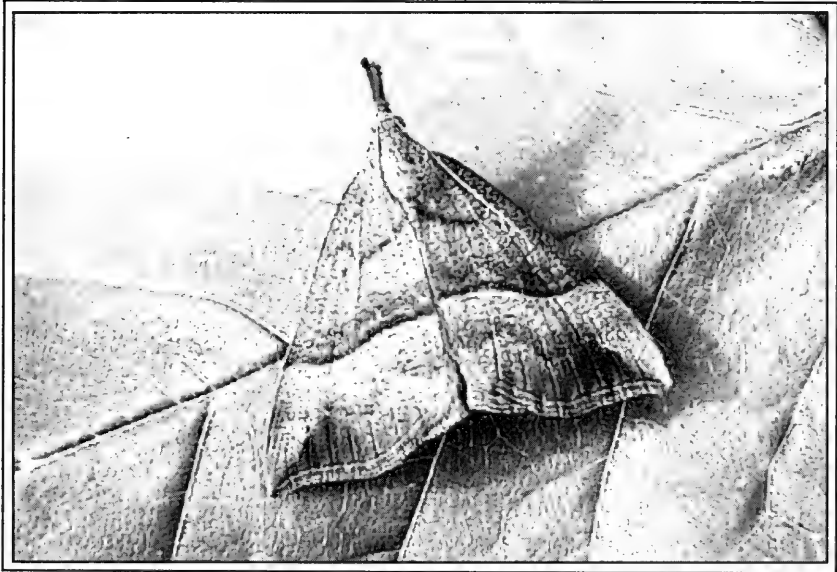
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Meetings of the Society are held regularly in London, at the rooms of the Royal Entomological Society, 41 Queen's Gate, London SW7 and the well-known ANNUAL EXHIBITION is planned for Saturday 27 November 1999 at Imperial College, London SW7. Frequent 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, J. Muggleton, 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 01189-321402 for the latest meeting news. The Society's web site is: <http://www.BENHS.org.uk>

Applications for membership to the Membership Secretary: A. Godfrey, 90 Bence Lane, Darton, Barnsley, South Yorkshire S75 5DA.

Subscriptions and changes of address to the Membership Secretary: R. D. Hawkins, 30d Meadowcroft Close, Horley, Surrey RH6 9EL.

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: The snout, *Hypena proboscidalis* L. photo: H. A. Wilson.

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.

CREAGDHUBHIA MALLOCHORUM GEN. AND SP. N. (DIPTERA: MYCETOPHILIDAE), A REMARKABLE NEW SCOTTISH GNAT WITH A DISCUSSION OF ITS RELATIONSHIPS

PETER J. CHANDLER

43 Eastfield Road, Burnham, Slough, Berks SL1 7EL

Abstract. Two new genera are proposed, *Creagdhubhia* for a new species from Scotland, *C. mallochorum* sp. n., and *Phoenikiella* for a single Mediterranean species, *Grzegorzekia phoenix* Väisänen. The relationships of these genera with other genera of Gnoristinae, including *Grzegorzekia* Edwards, which is here reclassified to *G. collaris* (Meigen), are discussed.

INTRODUCTION

On 17 May 1994, Graham Rotheray and David Robertson were searching for early stages of saproxylic Diptera in an area of relict Caledonian pine (*Pinus sylvestris* forest (NN6595), situated on a hilltop about 6km south-west of Newtonmore, Inverness-shire and about 1km west of Creag Dhubh (pronounced Craig Dou). When they lifted some loose bark from a dead pine trunk, they were surprised to find an adult male fungus gnat which was subsequently passed to me for examination. The site was visited as part of the Malloch Society Saproxylic Diptera project.

The gnat was predominantly dark grey in colour, slender bodied with long yellow legs and comparatively large bulbous brownish yellow genitalia. The wings (length 5.2 mm) were narrow, yellowish with a faint dark patch over a median radial cell.

It was soon realised that this was something unusual. The specimen ran in the keys by Hutson, Ackland & Kidd (1980) to the genus *Grzegorzekia* Edwards, which includes a single British and European species *G. collaris* (Meig.) and which was monotypic until Väisänen (1984) described a second species, *G. phoenix*, from Tunisia and Israel. The Creag Dhubh specimen, however, differed in many respects from these species. It was, nevertheless, assigned provisionally to *Grzegorzekia* and was cited under that name in Note 1 in the new British Diptera check list (Chandler 1998).

An attempt was made to find further material of the species, when I visited the site with its collectors on 18 July 1997. The location, reached after a steep climb through conifer plantations on the lower slopes, afforded spectacular views of the surrounding landscape which were enjoyed by eagles (*Aquila chrysaetos*), whose eyry surmounted a standing pine at the edge of the hilltop. However, although 41 species of fungus gnats were recorded, the species sought was not found and it remains represented by a unique example.

This species is here described as new and a new genus is also proposed for it. This is placed in context by discussion of the characters of *Grzegorzekia* species and recognition of this new genus and another for *G. phoenix* are justified.

***Creagdhubhia* gen. n.**

A genus of Gnoristinae *sensu* Väisänen (1986) with wing venation resembling that of *Grzegorzekia* Edwards, presently known only from the male. Adult slender bodied, with long slender antennae and legs, short proboscis and long narrow wings.

Head with three ocelli, almost in line, with the lateral ocelli larger, ovate and situated their individual diameter from the eye margins. Antennae comprising 2 + 14

segments, with long slender flagellomeres. Palpi normally developed, five segmented, with third palpomere bearing a round sensory pit dorsally, fifth palpomere long and slender. Eyes ovate, distinctly emarginate adjacent to antennal base.

Thorax with long irregularly biserial acrostichals and dorsocentrals as well as long setae on sides of mesoscutum; long scutellar marginals and long setae on proepisternum; pleura including laterotergite, mediotergite and metepisternum bare.

Legs slender with all setulae irregular; mid and hind tibiae with some stronger setae on shaft. Mid tibia of male slightly swollen basally, with elongate bare area on basal third, probably corresponding to the apparently sensory area in some other genera (see below). Hind tibia without apical comb. Tibial spurs 1:2:2. Empodium not developed.

Wing membrane devoid of setae and macrotrichia. Vein Sc ending in costa, not setose. Vein sc-r present and situated beyond middle of vein Sc. Vein R_4 present, vertical, forming a small rectangular radial cell. Vein R_5 downturned apically, costa exceeding its tip by a short distance. Crossvein r-m oblique. Median fork with stem short but more than twice as long as r-m. Posterior fork with long stem, fork beginning basad of base of stem of median fork. Radial veins, veins of median and posterior forks and A_1 setose on the dorsal surface; other veins including stem of posterior fork bare.

Male abdomen slender with anterior sternites (1-5) bearing a weakly sclerotised median furrow; segments 7 and 8 short but their sternites well developed, tergite 7 shorter than its sternite and narrowed medially, tergite 8 narrow and about half length of sternite 8 laterally, strongly constricted medially. Tergite 9 large and broad, covering more than basal half of genitalia. Tergite 10 short, cleft medially, bearing pair of oval spinose cerci and well developed bilobed epiproct, basally articulating with bilobed hypoproct. Gonocoxites large and bearing basal (ventral) and apical lobes. Gonostylus present but small and weak, set between apical lobes of gonocoxites. Aedeagus and parameres situated close to ventral surface of gonocoxites.

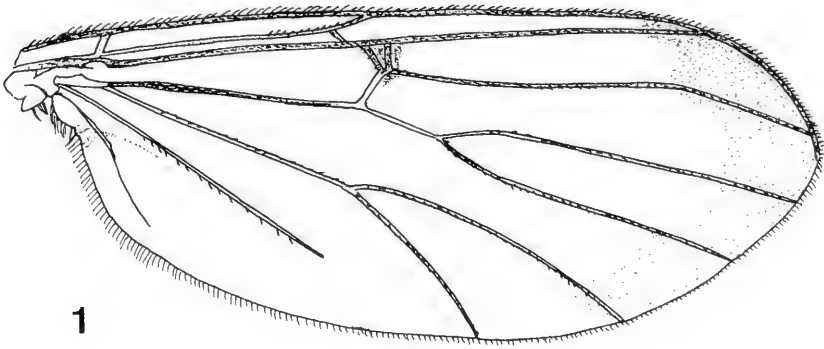
Etymology. The genus is named for the only known locality of the type-species.

Type-species: *C. mallochorum* sp. n.

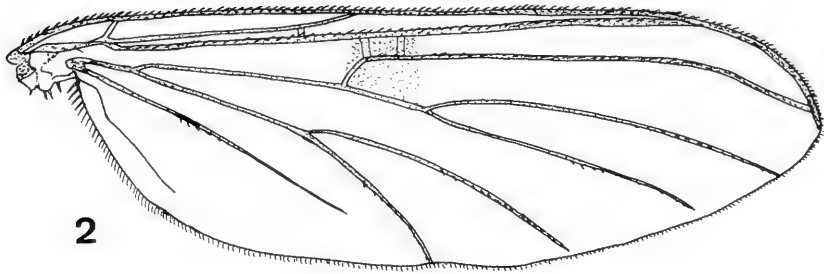
DISCUSSION

Diagnostic characters of this genus in common with *Grzegorzekia* are Sc ending in costa, sc-r present and situated within apical third of Sc, R_4 present and relatively close to R_5 , posterior fork with long stem but forking at or before level of base of the stem of the median fork; lateral ocelli their diameter distant from the eye margins; tibial setulae irregular and no hind tibial comb; empodium rudimentary or absent. Some characters of the male genitalia are in common with *G. collaris* but not with *G. phoenix*, e.g. well developed proctiger and the gonocoxites with lateral parts bearing a converging basal lobe ventrally and bilobed apically.

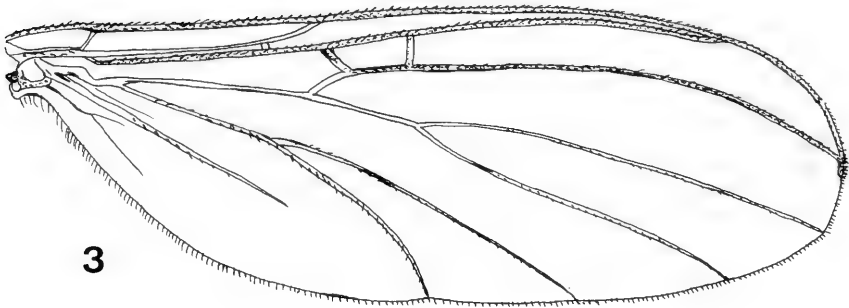
It differs from both *Grzegorzekia* species in absence of setae on the stem of the posterior fork and from *collaris* in Sc also lacking setae. It resembles *phoenix*, but not *collaris*, in R_4 not being closely approximated to R_5 and in the posterior fork arising just before rather than immediately below the base of the stem of the median fork. Other differences from both *Grzegorzekia* species are the presence of the "sensory" area on male mid tibia, presence of gonostyli (although these are reduced) and presence of spinose setae on the cerci. The relationship between these three species is discussed below and the conclusion is drawn that the differences between *G. collaris* and *G. phoenix* are also sufficient to warrant generic separation and a new genus is described for the latter.



1

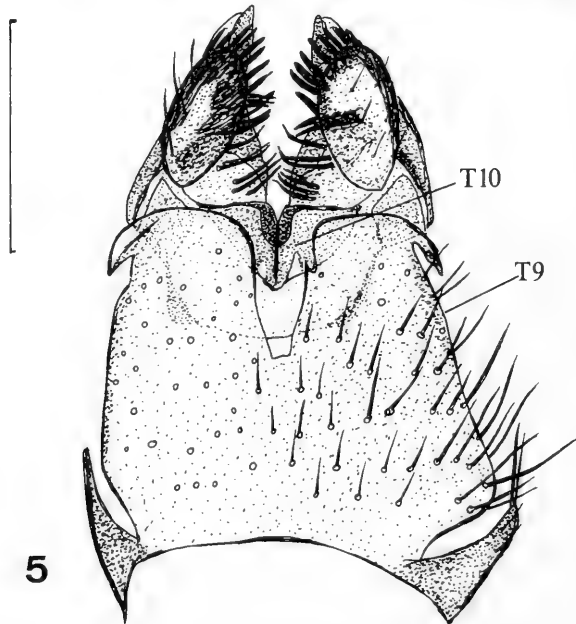
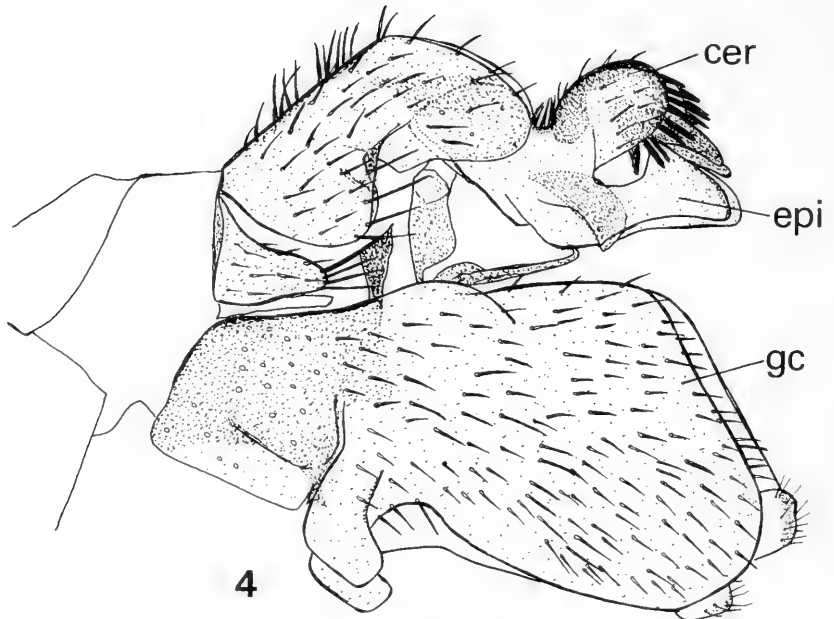


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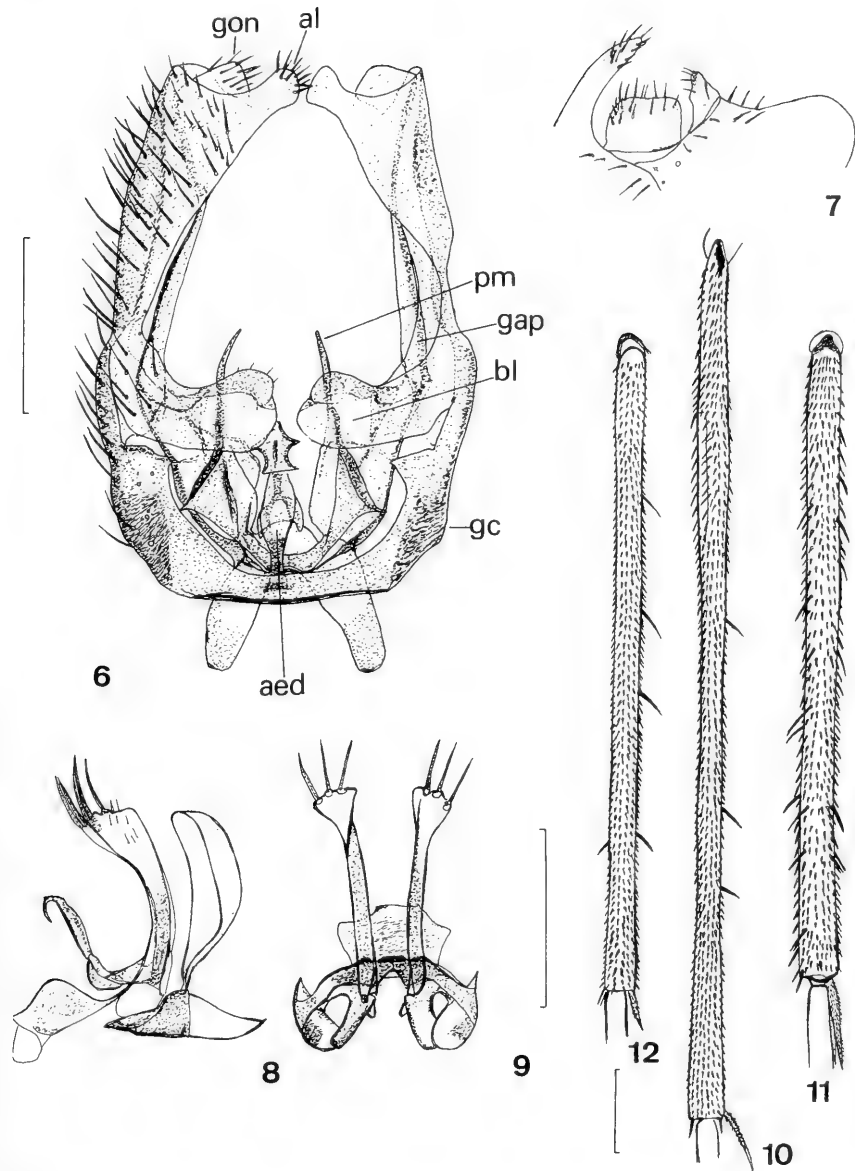


3

Figs 1-3. Male wings. 1, *Grzegorzekia collaris* (Meigen); 2, *Creagdhubhia mallochorum* sp. n.; 3, *Phoenikiella phoenix* (Väisänen).

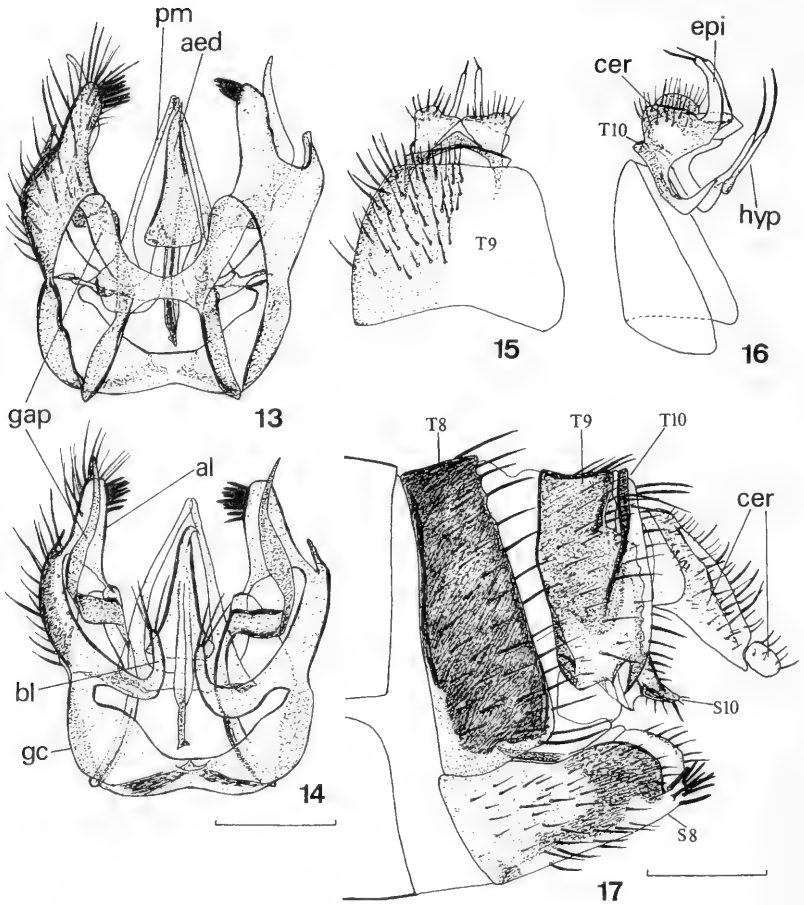


Figs 4-5. Male genitalia of *Creagdhubhia mallochorum* sp. n. 4, lateral view; 5, dorsal view of tergites 9-10 and cerci. Abbreviations: cer = cercus, epi = epiproct, gc = gonocoxites, T = tergite. Scale line 0.2 mm.



Figs 6–12. 6–9, male genitalia of *Creagdhubhia mallochorum* sp. n.: 6, ventral view of gonocoxites, aedeagus and parameres; 7, ventrolateral view of gonostylus; 8, lateral view of hypoproct; 9, ventral view of hypoproct. Scale line 0.25 mm. Abbreviations: aed = aedeagus, al = apical lobe of gonocoxite, bl = basal lobe of gonocoxite, gap = gonocoxal apodeme, gc = gonocoxites, gon = gonostylus, pm = paramere.

10–12, male mid tibia, dorsal view: 10, *Creagdhubhia mallochorum* sp. n.; 11, *Grzegorzekia collaris* (Meigen); 12, *Phoenikiella phoenix* (Väisänen). Scale line 0.2 mm.



Figs 13–17. *Grzegorzekia collaris* (Meigen): 13–16, male genitalia: 13, dorsal view of gonocoxites, aedeagus and parameres; 14, ventral view of gonocoxites, aedeagus and parameres; 15, dorsal view of tergites 9–10 and cerci; 16, lateral view of cerci and proctiger. 17, ovipositor, lateral view. Abbreviations: as Figs 4–6 and hyp = hypoproct, S = sternite. Scale line 0.25 mm.

Creaghubhia mallochorum sp. n. (Figs 2, 4–10)

Male. Head dark grey with pale setae. Antenna as long as the thorax, with short dark basal segments; first flagellomere pale at base, flagellum otherwise dark grey, covered with short pale hairs; flagellomeres elongate, first 4.5 × as long as broad, subsequent flagellomeres progressively shorter, terminal flagellomere 3 × as long as broad, with a small narrow apical protuberance. Palpus slender, about as long as height of eye, third and fourth palpomeres about twice as long as broad, dark grey; apical palpomere long, slender and paler; proboscis short.

Thorax entirely shining dark grey with three more shining blackish stripes on mesoscutum. Median row of acrostichals and rows of dorsocentrals between these stripes are long, pale and irregularly biserial. Long pale setae on sides of dorsum and irregular series of pale setae on scutellum, some a little more than scutellar length. Proepisternum with long pale setae. Pleura including laterotergite and mediotergite are bare.

Legs yellow, with coxae slightly greyish; long setae on coxae pale, other leg setae dark. Femora with only irregular short setulae. Tibiae covered with irregular dark setulae, mid and hind tibiae with a few larger setae, which are shorter than tibial width. Mid tibia (Fig. 10) with basal two-fifths slightly swollen, with a narrow bare strip situated posterodorsally on second fifth, with a row of longer setulae on its anterior margin; beyond this area 3 anterodorsal setae and 1 posteroventral seta level with the last of these. Hind tibia with 2 anterodorsals, 3 posterodorsals and 3 short posteroventral setae near tip. Tibial spurs pale yellow; 1 = tibial width, 2 a little longer, 3 $2.5 \times$ tibial width.

Wing (Fig. 2) long and narrow, pale yellowish with a faint darker patch over the radial cell, extending to the stem of the median fork. Costa and radial veins brown, Sc and other veins paler. Sc long, reaching costa level with base of Rs, crossvein sc-r at its apical quarter. Veins R_1 and R_5 long, parallel. R_5 ending near wing tip, costa exceeding it by a quarter distance to M_1 . R_4 vertical, forming a short radial cell subequal to crossvein r-m in length. Stem of median fork short, but more than twice as long as r-m and fork begins a little beyond level of R_4 . Veins M_2 and CuA_1 slightly abbreviated from wing margin. Posterior fork long, beginning basal to base of stem of median fork. Vein A_1 long, reaching level of half length of CuA_2 . Haltere yellow.

Abdomen shining dark grey with pale hairs; tergites 2–4 long, 5–6 progressively shorter, 7–8 short but distinct; tergite 7 narrowed to a third length of sternite 7 medially; tergite 8 laterally about a third length of sternite 8 but strongly narrowed medially; sternites 1–5 weakly sclerotised with broad median and narrow submarginal furrows; sternites 6–8 more uniformly sclerotised. Genitalia large and mainly brownish yellow (Figs 4–9); basal part covered by tergite 9 (Fig. 5) which is large and dark grey, truncate apically, with median emargination. Cerci are large, ovoid and bearing strong spinose setae on the apical and internal surfaces. Proctiger well developed; epiproct (Fig. 4) with two strongly thickened lobes, closely apposed to the cerci; hypoproct (Figs 8–9) with a pair of strap-shaped processes, broadened and bearing 3 setae apically. Gonocoxites large with broad lateral lobes (Fig. 4, 6), each of these basally bearing a broadly rounded ventral lobe and apically bilobed with narrower setose ventral lobe and small quadrate gonostylus (Figs 6–7), articulating with inner surface between these apical lobes. Basally gonocoxites enclose aedeagus and parameres (Fig. 6), situated ventral to the gonocoxal apodemes, which are apically fused to the internal surface of the lateral lobes of the gonocoxites.

Wing length 5.2 mm, body 5.5 mm, antenna 2.7 mm, hind leg 7.5 mm.

Female. Unknown.

HOLOTYPE male, Scotland: Inverness-shire, NN6595, near Creag Dhubh, southwest of Newtonmore, 17.v.1994, under loose bark of dead *Pinus sylvestris*, G. E. Rotheray and D. M. Robertson, deposited in National Museums of Scotland.

Etmology. The specific name refers collectively to the members of the Malloch Society, who have done so much to advance knowledge of the biology and distribution of Scottish Diptera.

Biology. Little can be deduced as to the precise requirements of this species from the circumstances of the single find. However, it seems likely that the gnat had recently emerged from the pupa, which was probably situated under the pine bark.

Development may also have taken place in this situation, although whether the larva is saproxylic or mycophagous awaits further investigation.

Grzegorzekia collaris is known to be associated with damp decaying wood of broad-leaved trees and several of the recently recorded sites are alderwoods; it is very local, but found throughout Britain. Details of the rearing by R. E. Evans were given by Hutson, Ackland & Kidd (1980) and Chandler (1993). Larvae live on the surface of damp rotten wood, from which they retreat into a web, which is individual but may be in numbers together. Pupation takes place on the wood, without a cocoon. The biology of *G. phoenix* is unknown, but it was found in Tunisia at a locality with date palms (*Phoenix dactylifera*), hence the name.

CHARACTERS OF THE SPECIES HITHERTO PLACED IN *GRZEGORZEKIA* EDWARDS

As indicated above, *G. collaris* (Meig.) differs in many respects from *C. mallochorum*. The body and legs are less slender. The thorax is shining black, except for the yellow prothorax, so the mesoscutum is without distinct stripes. The abdomen is shining black with yellow basal markings on each segment, especially developed on tergites 3–4. The legs are entirely yellow, lacking the "sensory" area on mid tibia (Fig. 11). The wing (Fig. 1) is broader than that of *mallochorum* and is brownish apically as well as a spot over the radial cell; the latter spot is darker but more restricted to the vicinity of the cell than in *mallochorum*. Vein R_4 is situated close to the junction of R_s with r-m and is variable in the extent of this proximity (even in two wings of the same individual), sometimes being fused with R_s before the junction, so radial cell more or less contracted and in some cases almost obsolete. Vein Sc is setose on the apical half and sc-r is situated closer to the base of R_s than in *mallochorum* or *phoenix*.

The male genitalia of *collaris* also differ markedly in structure from *mallochorum*. They were figured by Hutson, Ackland & Kidd (1980) and by Sølvi (1997; Figs. 27, D–F, not C–F as stated), who indicated the homologies of the parts with other genera of Mycetophilidae. The figures provided here (Figs 13–16) illustrate the differences from *mallochorum* and *phoenix*, as well as the characters in common with these species. The most significant character is the loss of differentiated gonostyli, a character shared with *G. phoenix*. The weakly developed gonostyli in *C. mallochorum* may represent a stage in the loss of these structures. The genitalia are overall shorter and broader than in *mallochorum*; tergite 9 (Fig. 15) is similar proportionally but simple in structure and tergite 10 is a narrow medially constricted strip; the cerci are simply setose without spines. The proctiger (Fig. 16) is well developed, as in *mallochorum*, with a bilobed epiproct closely associated with the cerci and bilobed hypoproct articulating basally; the lobes of both epiproct and hypoproct are slender with a single apical seta. The lateral parts of the gonocoxites (Figs 13–14) are more deeply bilobed apically with the better developed dorsal lobe bearing spines and the basal (ventral) lobe is slender and curved with long apical setae (Fig. 14). The aedeagus and parameres (Figs 13–14) are proportionally much larger. Sølvi has apparently misidentified, as parameres, the slender processes extending beyond the apical margin of the gonocoxites (Figs 13–14). These processes are actually outgrowths of the gonocoxal apodemes and occupy the position of the missing gonostyli.

Although the female of *C. mallochorum* is as yet unknown, females of *collaris* and *phoenix* are available. The ovipositor of *collaris* (Fig. 17) is short and dark coloured with yellow two-segmented cerci; sternite 8 bears a series of spinose setae on the straight-edged middle portion of its apical margin (the labia of Sølvi, 1997).

Additional material of *G. phoenix* from Israel was reported by Chandler (1994) and this species has also been found in Malta (Gatt & Chandler in preparation). Fresh examination of the Israeli material, from which the figures included here have been drawn, permitted the conclusions reached here. This species was assigned to *Grzegorzekia* on the basis of the wing venation (Fig. 3). The most obvious differences from *G. collaris* are the more distad position of R_4 , so that the radial cell is at least twice as long as broad, and the more basal position of the base of the posterior fork; distribution of setae on wing veins is similar to *collaris* except for absence of setae on Sc; the wing is uniformly yellowish without darker markings. The body is dark brown with the apical margins of abdominal tergites yellowish; the legs are yellowish and similar in structure to *collaris*, the male mid tibia (Fig. 12) lacking a "sensory" area and with stronger setae about as long as the tibial width.

The male genitalia of *G. phoenix* were figured by Väisänen in tergal, lateral and sternal views but not described by him. It was, however, obvious that gonostyli are absent, a character in common with *G. collaris*. Here tergite 9 and the associated structures (Fig. 19) have been removed to figure the gonocoxites and aedeagal complex in dorsal view (Fig. 18). Tergite 9 is simple in structure as in *collaris* but distinctly shorter than broad; tergite 10 narrow and weakly sclerotised; epiproct not clearly differentiated from cerci but hypoproct comprising a pair of apically tapered lobes bearing a single apical seta as in *collaris*. The gonocoxites are also more simple in structure than in *collaris* and *mallochorum*, with the basal part broadly rounded ventrally, lacking the basal lobe ventrally and with only a pointed dorsal lobe well developed apically. The relatively small aedeagus and slender apically broadened and internally pointed parameres are ventrally situated, enclosed within the broad basal lobes of the gonocoxites.

Although Väisänen (1984) described the female of *phoenix*, he did not figure it, so the ovipositor is figured here (Fig. 20). It is broadly similar in structure to that of *collaris*, but differs in many details, especially the form of sternite 8, which lacks spinose setae.

A new genus is proposed below for *G. phoenix*.

Phoenikiella gen. n.

A genus of Gnoristinae *sensu* Väisänen (1986) with wing venation resembling that of *Grzegorzekia* Edwards. Adult slender-bodied, with long antennae and legs, short proboscis and wings broad, but a little narrower than in *Grzegorzekia*.

Head with three ocelli, almost in line, with the lateral ocelli larger, ovate and situated their individual diameter from the eye margins. Antennae comprising 2 + 14 segments, with long slender flagellomeres. Palpi normally developed, five segmented, with third palpomere bearing a round sensory pit dorsally, fifth palpomere long and slender.

Thorax with long irregularly biserial acrostichals and dorsocentrals as well as long setae on sides of mesoscutum; long scutellar marginals and long setae on proepisternum; pleura including laterotergite, mediotergite and metepisternum bare.

Legs slender with all setulae irregular; mid and hind tibiae with some stronger setae on shaft. Mid tibia of male without "sensory" area differentiated. Hind tibia without apical comb. Tibial spurs 1:2:2. Empodium not developed.

Wing membrane devoid of setae and macrotrichia. Vein Sc ending in costa, not setose. Vein sc-r present and situated beyond middle of vein Sc. Vein R_4 present, vertical, forming a small trapezoidal radial cell, longer than broad. Vein R_5 downturned apically, costa exceeding its tip by a short distance. Crossvein r-m

oblique. Median fork with stem short but more than twice as long as r-m. Posterior fork with long stem, fork beginning level with or more usually basad of base of stem of median fork. Radial veins, veins of median and posterior forks, stem of posterior fork and A_1 setose; other veins including stem of median fork bare.

Male abdomen slender with sternites bearing a weakly sclerotised median furrow; segment 7 not much shorter than 6, its tergite almost as long as sternite, segment 8 shorter with tergite 8 narrow and about half length of tergite 7, but not constricted medially. Tergite 9 distinctly shorter than broad, covering less than basal half of genitalia. Tergite 10 narrow and weakly sclerotised; cerci not well differentiated from epiproct, both bearing several long simple setae; hypoproct bilobed, the lobes bearing an apical seta. Gonocoxites broadly rounded ventrally with a median cleft below aedeagus and no setose basal lobe; lateral lobes not bifid apically but tapered to a point; the long pointed processes of the gonocoxal apodemes, found in *Grzegorzekia collaris*, are lacking. Gonostylus absent. Aedeagus and parameres situated close to ventral surface of gonocoxites.

Female abdomen broader than in male, laterally compressed apically; segment 8 with tergite broad and narrow, about half length of tergite 7; sternite 8 longer, its apical margin with medial portion (labia) between rounded setose lobes (on ventral margin in Fig. 20) lacking spinose setae; tergites 9 and 10 short; cerci elongate, two segmented.

Etymology. The genus is named to signify the distribution of the known species in the Levant and parts of the Mediterranean region colonised by the Phoeniceans.

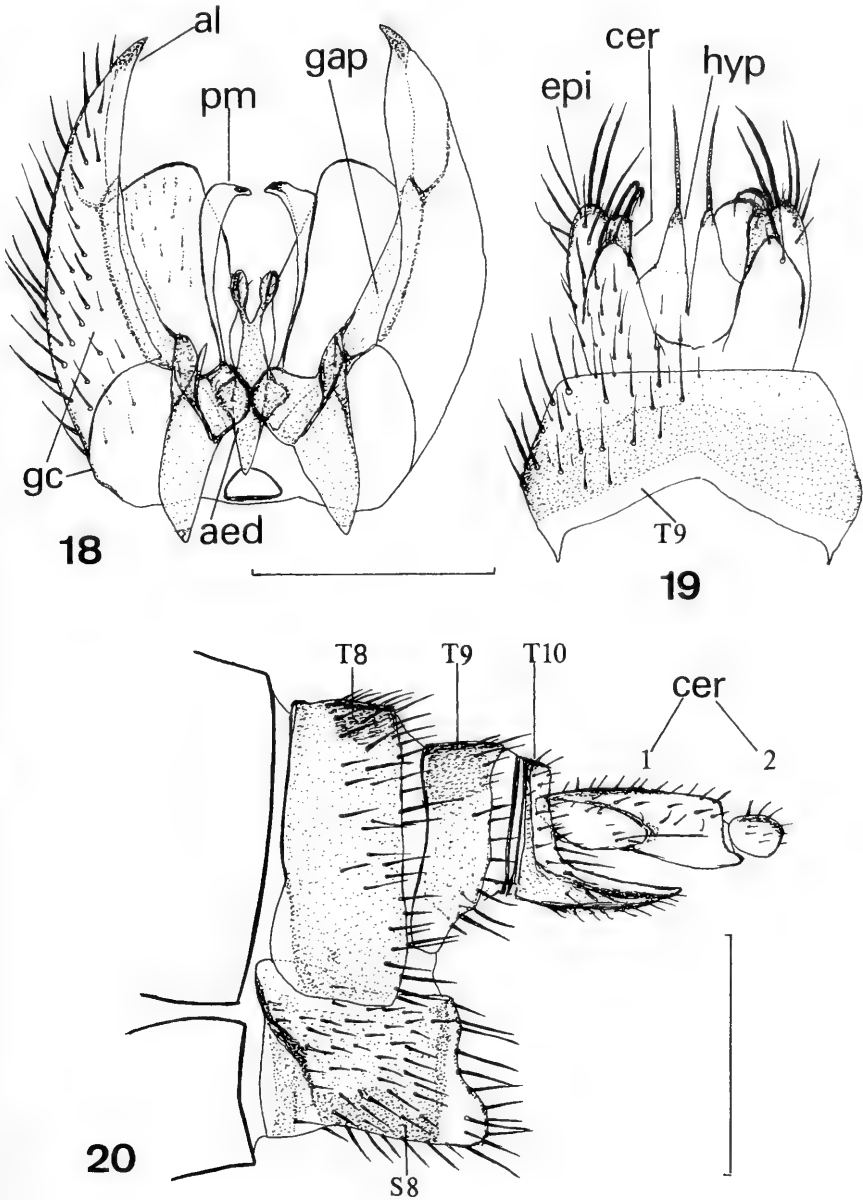
Type-species: *Grzegorzekia phoenix* Väisänen.

RELATIONSHIPS BETWEEN GENERA DISCUSSED HERE AND OTHER GNORISTINAE

When he described *phoenix*, Väisänen (1984) suggested that it was intermediate in some characters between *Grzegorzekia collaris* and the Nearctic genus *Aglaomyia* Vockeroth (1980), which was then monotypic and known only from the female. Characters in common between *Grzegorzekia* and *Aglaomyia*, which Väisänen considered to represent a monophyletic group, included all of the non-genital characters cited above as being in common between *Creagdhubhia* and *Grzegorzekia* with the exception of the absence of vein R_4 in *Aglaomyia*. More recently Zaitzev (1994) has referred the European species *Boletina ingraca* Stackelberg to *Aglaomyia* and the male of the Nearctic species *A. gatineau* Vockeroth has also been discovered. It is consequently now known that *Aglaomyia* has rather different male genital structure, with large gonostyli, and is probably not closely related to *Grzegorzekia*.

Phoenikiella and *Aglaomyia* share a bare vein Sc (as does *C. mallochorum*) but Väisänen considered this a parallelism. He suggested that a bare metepisternum was a synapomorphy of *collaris* and *phoenix*, while they also shared several characters considered plesiomorphous with respect to *Aglaomyia*.

These genera are placed in the Gnoristinae as defined by Väisänen (1986), which largely corresponds to the tribe Gnoristini of Edwards (1925), with transfer of some genera both ways with the Sciophilinae *sensu stricto*. As suggested by the phylogenetic analysis of Palaearctic genera by Söli (1997), this group is probably more paraphyletic than other similar groupings within Mycetophilidae and recognition of this subfamily may not be justified. As presently constituted it comprises a diverse assemblage of genera, which includes some of those with the most plesiomorphous wing venation in the family. Indeed, two genera transferred here from the Leiinae by Väisänen (1986), *Tetragoneura* Winnertz and *Ectrepethoneura* Enderlein, were concluded by Söli to represent the sister group of



Figs 18–20. Genitalia of *Phoenikiella phoenix* (Väisänen): 18, dorsal view of gonocoxites, aedeagus and parameres; 19, dorsal view of tergite 9, cerci and proctiger; 20, lateral view of ovipositor. Abbreviations: as Figs 4–6 and 13–17. Scale lines, Figs 18–19, 0.2 mm; Fig. 20, 0.33 mm.

Leiinae + Manotinae + Mycetophilinae, this entire group arising within the Gnoristinae. It was, however, unclear from his results whether the restricted Sciophilinae and/or Mycomyinae (which are more clearly monophyletic groups) also arose within a group comprising "gnoristine" genera and the other subfamilies, or had sister group relationships with this large grouping. Söli considered that *Paratinia* Mik, retained in Sciophilinae by Väisänen, was more closely related to some "gnoristine" genera, especially *Drepanocercus* Vockeroth. *Eudicrana* Loew, also considered by Väisänen to represent a subfamilial taxon, was not studied by Söli.

Most generic divisions in the Gnoristinae were initially based on wing venation, although many have been subsequently supported by other structures including the male genitalia. Many of the genera include relatively few species, the genus *Boletina* Staeger being the only gnoristine genus with a large number of known species. Söli (1997) provided a modern revision of the moderate-sized genus *Coelosia* Winnertz but many other genera, including *Boletina*, are in need of revision. It is clear that some currently recognised genera, especially *Dziedzickia* Johannsen and *Ectrepesthoneura*, are paraphyletic and further genera will need to be recognised in these groups.

Väisänen (1984) considered the proposal of a new genus for *phoenix*, as he recognised that the differences between *phoenix* and *collaris* were sufficient to warrant this. However, he did not adopt this approach for several reasons: the suggested monophyly of these species within a group also thought to comprise *Aglaomyia* and in such cases he considered that enlargement of the concepts of existing genera was better than establishing new monotypic genera; also, in cases where there was unresolved polychotomy (such as the suggested trichotomy in this case), establishment of a new genus could be construed as a confession of ignorance. He did, however, also state the counter-argument that following such a solution can lead to a species being forgotten in a genus, in which it has been perhaps wrongly placed, and also suggested that proposal of subgenera might be a useful interim solution.

I agree with the latter suggestions and it might have been appropriate for the taxa newly proposed here to be accorded subgeneric rank within a broadened concept of *Grzegorzekia*. This may prove to be an appropriate solution, in one or other case, when a thorough revision of "gnoristine genera" world-wide and of other "sciophilinae" genera as yet unstudied critically has been completed. However, as the differences between the three species considered in this paper are at least great enough to justify subgeneric status in a revised generic classification, I consider it desirable to provide names for them to draw attention to the need for them to be considered in such a revision.

Grzegorzekia in the sense considered by Söli (1997) excludes *mallochorum* and *phoenix* because the characters which define it include a setose vein Sc. In the possible phylogenies represented in his Figs 44–46, it either occupies an isolated position or is placed in proximity to *Drepanocercus* and *Paratinia*; *Aglaomyia* was not studied. Although genitalia characters were not utilised in the phylogenetic analyses, they are fully discussed in the text and the absence of gonostyli is evidently unique to *Grzegorzekia* among the genera studied (also applying to *Phoenikiella* as indicated here). As suggested above, the weak development of gonostyli in *Creagdhubhia* may indicate relationship with *Grzegorzekia* and *Phoenikiella*. Gonostyli are well developed in *Drepanocercus* and *Paratinia*, as in *Aglaomyia*; these genera also have R_4 present, *Drepanocercus* being distinguished by the plesiomorphous character of the posterior fork arising near the wing base and *Paratinia* by the presence of setae on the wing membrane.

Acomoptera Vockeroth, like *Aglaomyia* a Nearctic genus to which two Palaearctic species have now been referred, was also not included in Söli's analysis. This also has

R_4 present, but differs in the more basal position of sc-r and Rs so that the radial cell is longer and the posterior fork beginning a little beyond the base of the stem of the median fork and gonostyli are also well developed. The European species *D. spinistylus* Söli, assigned to *Drepanocercus* by Söli (1993), appears intermediate between the genotype *D. ensifer* Vockeroth and *Acomoptera*. The basal portion of CuA_1 is also weak and the posterior fork not so clearly forking basally in *spinistylus* as in *ensifer*.

Some species of *Synapha* Meigen also have R_4 present: the species dealt with in this paper run to the couplet including *Synapha* and *Aglaomyia* in the Nearctic key by Vockeroth (1981). *Synapha* differs from *Grzegorzekia* and *Creagdhubhia* by the characters used in the key by Hutson, Ackland & Kidd (1980), i.e. base of posterior fork well beyond base of stem of median fork, lateral ocelli less than their width from the eye margin and presence of a well developed empodium.

There are four other gnoristine genera with R_4 present, which differ from the above in having laterotergites setose: *Apolephthisa* Grzegorzek, which has Sc setose like *G. collaris* but sc-r absent and the posterior fork arising near the wing base, and three genera with Sc ending in R (probably due to the portion of Sc beyond the junction with sc-r being lost), *Dziedzickia* Johannsen, *Hadroneura* Lundström and *Syntemma* Winnertz, the second also with a long proboscis and the last also with the wing membrane bearing macrotrichia. *Ectrepesthoneura* mentioned above also has Sc ending in R and the posterior fork beginning near the wing base.

The character of the "sensory" area on the male mid tibia also requires discussion, as this is one of the distinctions of *Creagdhubhia* from *Grzegorzekia* and *Phoenikiella*. The significance of this character is unclear, as it appears variously developed in several apparently unrelated genera but always in the same position at about the basal third of the tibia. It was described for *Ectrepesthoneura* by Chandler (1980), who also figured it for some species of *Tetragoneura*, *Synapha*, *Coelophthinia* Edwards and *Polylepta* Winnertz. These genera all have a conspicuous broad ovate or elongate area. It was also mentioned that a narrower slit-like area is present in *Phthinia* Winnertz and *Speolepta* Edwards and it is these latter which more closely resemble *Creagdhubhia* in this respect. Söli (1997) cited this character for all of the above mentioned genera except *Tetragoneura* and *Synapha*, where it is present in some species of each genus only; however, the genera concerned were widely dispersed in his postulated phylogenetic trees except for that in Fig. 46, where *Speolepta*, *Coelophthinia*, *Phthinia* and *Polylepta* are nested progressively as sister groups at the base of the Sciophilinae grouping. In his other two postulated trees, *Coelophthinia* and in one case *Speolepta*, both former gnoristine genera transferred to Sciophilinae by Väisänen (1986) are associated with Mycomyinae.

It should also be mentioned that some characters used to define genera in the Gnoristinae are not always of generic significance, such as presence or absence of setae on the laterotergite, both conditions of this character being found in *Boletina*. Spinose setae are present on the male cerci in many but not all species of *Boletina*, so this character is not unique to *Creagdhubhia*. An analysis of all characters for the world fauna will be necessary for a natural generic classification to be achieved.

ACKNOWLEDGEMENTS

I am particularly grateful to Graham Rotheray and David Robertson for referring the new species to me and for introducing me to the site where it was found. Amnon Freidberg kindly enabled me to re-examine the Israeli specimens. Several specialists

on Mycetophilidae provided useful comments on figures circulated to them of the new species.

REFERENCES

- Chandler, P. J. 1980. The European and eastern Nearctic fungus-gnats in the genus *Ectrepesthoneura* (Mycetophilidae). *Systematic Entomology* **5**: 27–41.
- Chandler, P. J. 1993. New rearing records of fungus gnats (Diptera: Mycetophilidae and allied families). *Dipterists Digest* **13**: 29–35.
- Chandler, P. J. 1994. The fungus gnats of Israel (Diptera: Sciaroidea, excluding Sciaridae). *Israel Journal of Entomology* **28**: 1–100.
- Chandler, P. J. 1998. (Ed.) Checklists of Insects of the British Isles (New Series) Part 1: Diptera. *Handbooks for the Identification of British Insects* **Vol. 12, Part 1**: xx + 234 pp. Royal Entomological Society.
- Edwards, F. W. 1925. British fungus gnats (Diptera, Mycetophilidae). With a revised generic classification of the family. *Transactions of the Entomological Society of London* **1924**: 505–670.
- Hutson, A. M., Ackland, D. M. & Kidd, L. N. 1980. Mycetophilidae (Bolitophilinae, Ditomyiinae, Diadocidiinae, Keroplatinae, Sciophilinae and Manotinae) Diptera, Nematocera. *Handbooks for the Identification of British Insects* **Vol. 9, Part 3**: 1–111. Royal Entomological Society.
- Søli, G. E. E. 1993. The first Palaearctic record of the mycetophilid genus *Drepanocercus* Vockeroth (Diptera: Mycetophilidae). *Entomologica Scandinavica* **24**: 73–77.
- Søli, G. E. E. 1997. On the morphology and phylogeny of Mycetophilidae, with a revision of *Coelosia* Winnertz (Diptera, Sciaroidea). *Entomologica Scandinavica, Supplement* **50**: 1–139.
- Väisänen, R. 1984. A new Mediterranean species of *Grzegorzekia* (Diptera, Mycetophilidae). *Annales Entomologici Fennici* **50**: 55–57.
- Väisänen, R. 1986. The delimitation of the Gnoristinae: criteria for the classification of recent European genera (Diptera, Mycetophilidae). *Annales zoologici fennici* **23**: 197–206.
- Vockeroth, J. R. 1980. New genera and species of Mycetophilidae (Diptera) from the Holarctic Region, with notes on other species. *Canadian Entomologist* **112**: 529–544.
- Vockeroth, J. R. 1981. Mycetophilidae. pp. 223–247. In McAlpine, J. F. et al. (Eds). *Manual of Nearctic Diptera*. 1. *Agriculture Canada, Monograph* **27**, 674 pp. Ottawa.
- Zaitzev, A. I. 1994. [*Fungus gnats of the fauna of Russia and adjacent regions*]. Part 1. 287 pp. Moscow “Nauka” (in Russian).

ANNOUNCEMENT

CORNISH LARGE BLUE BUTTERFLY RECORDS—Appeal for information

As part of a study on the former occurrence of the large blue *Maculinea arion* (L.) in Cornwall for our County Millennium Butterfly Atlas, I came across an Edwardian record on the national database for “Portreath”, supplied by V. E. Shaw apparently from the private collection of A. Morton. This is the only record for the area, but is some 50 miles south of the normal range along the far north coast of Cornwall and round to Clovelly in Devon. Monk’s Wood have no further details on either name. In order that I can track this record down, I would be grateful for any information on either V. E. Shaw, or the whereabouts of A. Morton’s collection. I would also like to hear from anyone with information on Cornish Large Blues in old collections which have data labels showing specific locations other than Millook or Bude.

If you have any information on the above, please contact me on 01208 880106—MALCOLM LEE, Gullrock, Port Gaverne, Port Isaac, Cornwall PL29 3SQ.

THE ORANGE UPPERWING *JODIA CROCEAGO* (D.&S.) (LEP.: NOCTUIDAE) SURVEY—AUTUMN 1999/SPRING 2000

MARK PARSONS

Butterfly Conservation, PO Box 444, Wareham, Dorset, BH20 5YA

The orange upperwing is one of the UK government's Biodiversity Action Plan (BAP) priority species. Butterfly Conservation has been appointed the Lead Partner for this species. The initial aim of the Action Plan is to determine whether this moth is still present in Britain.

Currently searches are undertaken in an unco-ordinated fashion. There is no overall view of the sites that are being surveyed and those that are not. There is also no indication of the amount of recording effort being undertaken, or techniques being used, in an attempt to try and re-find this species.

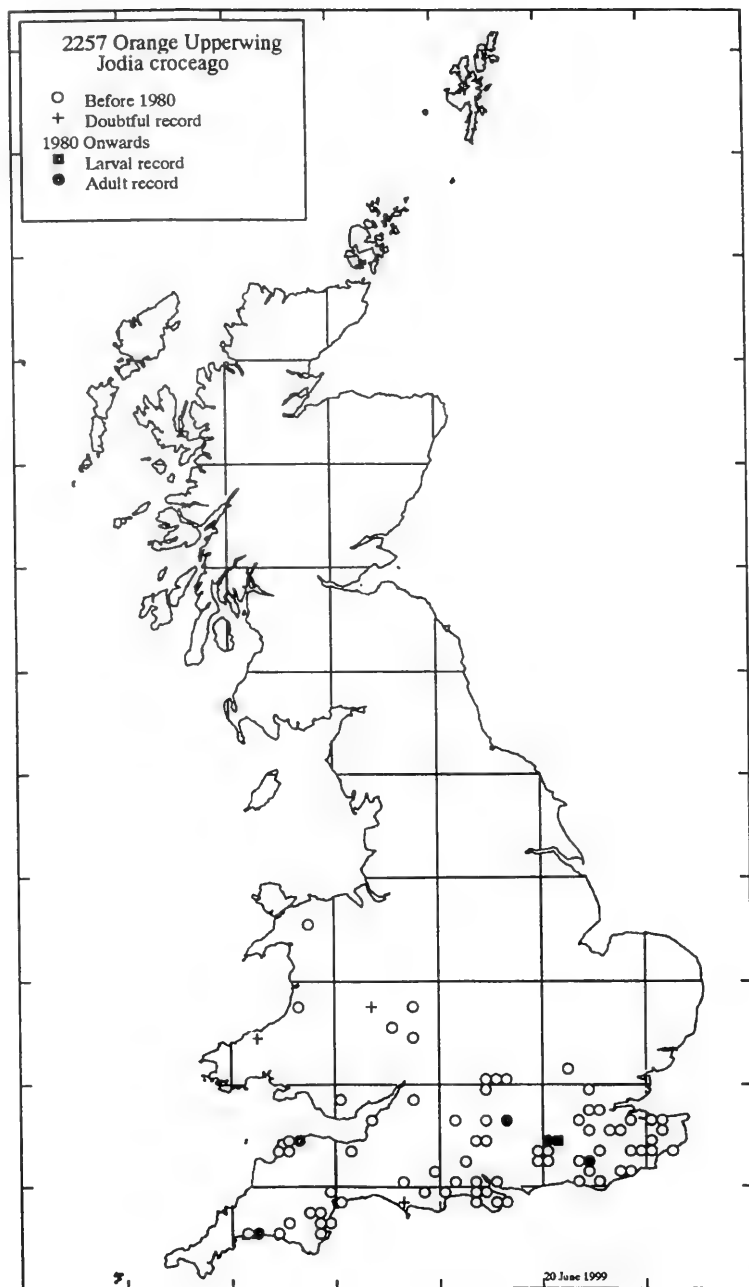
The orange upperwing is thought to be an open woodland or woodland edge species, the larva feeding on pedunculate oak and sessile oak (*Quercus robur* and *Q. petraea*). The species is considered to be associated with small or coppice trees that retain their leaves over winter. It occurs as an adult from September to mid May and has been found at ivy blossom in the autumn and at willow catkins in spring. It comes to light. The last definite record was from Sussex in 1984, although there is a more recent unconfirmed record from Hampshire. Other post-1980 reports are from Cornwall, Somerset, Surrey, Shropshire (unconfirmed) and Cardiganshire (unconfirmed), although records indicate a wider historic distribution in the southern half of England and in Wales (based on information from P. Waring, in prep., *Atlas of the Nationally Scarce and Threatened British Macro Moths*. Joint Nature Conservation Committee).

If you go looking for the orange upperwing this autumn or next spring, or are recording in an area where this species could appear, we would like to hear from you. **Negative results are important**, as this would give an indication of the amount of effort being undertaken and the sites being searched. Do not restrict yourself to the known localities or even habitats; for example heathland with scrubby oaks may be important for this species and it is a habitat that is comparatively under-worked at these times of year. Do not restrict yourself to light-trapping—try natural attractants, e.g. ivy or willow blossom, or use other attractants such as sugar or wine-ropes.

The data we would like to receive should be in the following format, giving all details where known:

1. Name of site
2. Six figure grid reference
3. Vice-county (and vice-county number)
4. Date of visit
5. Duration of visit (to the nearest hour)
6. Number of recorders
7. Techniques used (including number and type of traps; sugar; ivy blossom; willow catkins, broken down into number of hours spent on each, if possible)
8. Habitat (broad description only, e.g. deciduous or mixed woodland; heathland etc.)*
9. Weather conditions (max./min. temperature; overcast/clear; rain/dry; wind)

*If the species is found we would like as full details as possible of the habitat conditions and a description of any obvious site management.

Fig. 1. *Jodia croceago*. Recent distribution.

Please remember to get access permission to any site you are visiting. As there is a possibility of confusion with other species, take particular care over confirming the identification. If possible, take a photograph or retain the specimen.

We would also like to hear from you if you have had experience of this species abroad. In particular, we would like to know about its habitat preferences.

The results (including the important negative results) should be sent to Adrian Spalding at Tremayne Farm Cottage, Tremayne, Praze-an-Beeble, Camborne, Cornwall TR14 9PH (phone no. 01209 831517). If this survey proves successful and gives rise to interesting data, further species (particularly BAP species) may be targeted for similar surveys.

We would like to thank both JNCC and Paul Waring for permission to use information from the forthcoming *Atlas* and to publish the provisional distribution map.

Further information about this and other BAP priority species of moth, and how you can help, can be obtained by contacting Mark Parsons or David Green at Butterfly Conservation, UK Conservation Office, PO Box 444, Wareham, Dorset BH20 5YA.

SHORT COMMUNICATION

A breeding record of *Senometopia excisa* (Fallén) (Diptera: Tachinidae)—The tachinid *Senometopia excisa* is a rare species in Britain with only a doubtful breeding record. Belshaw (1993, *Handbook for Identification of British Insects*, Vol. 10, Part 4a(ii)) gives the known records as: Lynton, N. Devon, 29.vii.1895; and a further example as “?Painswick in Gloucs”. It would appear that it is the identification of the specimen that is in doubt rather than the locality, and that this individual was reared from the geometrid moth *Abraxas sylvata* (Scop.), a host species utilized by the tachinid’s congener *S. intermedia* (Herting) (Belshaw, loc. cit.).

On 11. ix.1998 I beat from wych elm (*Ulmus glabra*) a few larvae of *sylvata* in a wood near to Orpington, W. Kent, in a vain attempt to breed them. As on previous occasions the larvae died before pupation but one larva produced a single tachinid larva which gave rise to *S. excisa* later that autumn.

As far as I can determine, this Kent colony of *sylvata* is the only breeding colony in the whole of Kent, Surrey, Sussex and the London area, although isolated individuals of the moth turn up widely from time to time, and the moth was commoner in the past. Belshaw (loc. cit.) says that the fly parasitizes a range of lepidopterous larvae in Europe, although of what families and on what foodplants he gives no clues. The third species of *Senometopia*, *S. pollinosa* (Mensil), is a parasite of various geometer larvae feeding on pine, and the females are attracted to the scent of this plant; it is possible therefore that *excisa* may use other larvae feeding on elm, although it is fair to say that there are no other species restricted to elm at this time of year in the south-east of England. Lepidopterists rearing *sylvata* would perform a valuable service by retaining any parasites reared from its larvae so that we may better understand the biology of this rare species. I thank Peter Chandler for confirming the identity of the tachinid.—GRAHAM A. COLLINS, 15 Hurst Way, South Croydon, Surrey CR2 7AP.

OBSERVATIONS ON THE "GUEST ANT" *FORMICOXENUS NITIDULUS* NYLANDER IN NESTS OF THE WOOD ANTS *FORMICA RUFA* L. AND *F. LUGUBRIS* ZETTERSTEDT IN 1998

NEIL A. ROBINSON

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Abstract.—Observations made in 1997 on *Formicoxenus nitidulus* (Nyl.) were extended during 1998, including occurrence with *F. lugubris*. The behaviour of males attempting to mate with a worker, after an apparent mating emergence on a nest of *Formica rufa*, is described. It is concluded that the males, which are wingless, continue to appear on the surface of a nest for the rest of the season after a mating emergence has taken place. Therefore what was judged to have been a synchronized emergence of males on numerous nests in 1997 may simply have been the consequence of earlier, but not necessarily synchronized, emergences.

INTRODUCTION

Formicoxenus nitidulus is a small (c. 3 mm) myrmecine ant which lives as an inquiline within the large mound nests of the wood-ant *Formica rufa* and related species (e.g. *F. lugubris* Zett. and *F. aquilonia* Yarrow). It nests in small colonies within the host's nest and therefore is seldom seen except when workers, males or winged queens emerge onto the surface of the nest. In 1998 I extended the observations, which I made in 1997 (Robinson, 1998).

OCCURRENCE WITH *FORMICA RUFA*

On 23.iv.1998 at Gait Barrows NNR, Lancashire (SD483774), when Cedric Collingwood delved into a nest of *F. rufa* to confirm that it contained numerous queens (Collingwood & Robinson, 1999), I found 2 workers of *Formicoxenus* on the inner nest material. These were the first workers I had seen, since all the individuals I had found on nests in autumn 1997 were males or, rarely, dealate queens. The earliest date on which I saw males in 1998 was 2 August, on the nest where in 1997 I had seen them emerging onto a limestone slab, which they did again on 27 August. The last date was 18 October. By this time all the nests were very wet and mostly inactive, after which further rain terminated observations. Between these dates I saw males on 11 nests (as opposed to 16 in 1997), 8 of which were nests where I had not seen them before, though I was unable to find them on 5 nests where I had seen them in 1997. This supported my 1997 conclusion that they were present throughout the *F. rufa* population on the Reserve, but suggested that one could not rely on seeing them on the same nests every year.

On 29.viii.1998 at Arnside Knott, Cumbria (SD452772), I saw males on the nest where I had first seen them in October 1996, and on 3 September I found them on only a second nest. On 24 September I examined 30 nests, including the ones on which I had seen males in 1997, spending my customary 5 minutes at each site, without success. I have begun to search other *F. rufa* sites for *Formicoxenus*. I found males on one nest at Heathwaite, a National Trust area of calcareous grassland, scrub and woodland adjoining the lower slopes of Arnside Knott, and on one nest in Underlaid Wood, Cumbria (SD485789).

BEHAVIOUR OF *FORMICOXENUS MALES*

When examining the nests at Gait Barrows and Arnside Knott, I realized that the most likely explanation as to why I could usually rely on finding *Formicoxenus* males on nests where I had seen them earlier, while there were other nests where I did not see them at all, was that the males continue to appear on the surface of the nest after a mating emergence has taken place. The queens, which are winged, are believed to re-enter the nest after mating, or to fly other nests (Brian, 1977). The males however are wingless and are unlikely to leave the nest. My observations suggest that they continue to come out onto the surface of the nest, and run searchingly about, for the rest of the season. This has caused me to revise the conclusion I reached in 1997: that I had seen a synchronized emergence of males. It does appear that there had been a larger scale emergence of males in 1997 than in 1998, but the fact that I saw them on a large number of nests in the same period could have been the result of them continuing to appear after earlier, but not necessarily synchronized, emergences.

On 29.viii.1998 at Heathwaite, I witnessed what appears to have been a mating emergence. On this site the *F. rufa* nests are concealed in scrub, unlike Arnside Knott, where they are mostly on woodland edges or beside paths. On a very large nest in the dense shade of a hazel-ash-yew clump, where a chink of sunlight penetrated, I saw a glistening knot of *Formicoxenus*, which I seized and tubed with a large pinch of the surface nest material. At home I found that the tube contained 5 males, vigorously pursuing another individual, only slightly larger and similarly coloured, (orange thorax contrasting with red head and abdomen), which turned out to be a worker. I had found dealate queens in 1997 and they are noticeably longer than the males and uniformly red in colour. This worker was so like a male that it was not until it extruded its sting that I was quite sure of its identity. Holding the tube under a binocular microscope, I was able to watch the males' attempted mating behaviour. One would mount the worker, extending its lyre-shaped antennae over the worker's head, rapidly palpating her head and the inner sides of her antennae, while curling the tip of his abdomen round and under that of the worker, probing (unsuccessfully) with his everted genitalia. Quite often another male would mount on top of the first. The frenzied behaviour of the males suggested that a queen had originally been present, but evidently not in the sample which I had collected. I continued to see numerous *Formicoxenus* males on the surface of this nest on subsequent visits, until 27 September.

OCCURRENCE WITH *FORMICA LUGUBRIS*

In the north west of England *F. rufa* is now mainly confined to limestone sites in the Arnside-Silverdale AONB, which straddles the boundary between Lancashire and Cumbria. *F. lugubris* is an upland species which occurs in the Pennines, Scotland and in the Lake District where it has a very restricted distribution, being confined to woodlands in the Borrowdale and Duddon valleys. It closely resembles *F. rufa*, and is distinguished only by details of its hairiness (Bolton & Collingwood, 1975). However it has very different ecological preferences, being tolerant of wetter, and requiring cooler, conditions than *F. rufa* (Cedric Collingwood, *pers. comm.*). It also has a noticeably different colony structure, as its nests are much more commonly linked by trails into social complexes than those of *F. rufa*.

In Borrowdale *F. lugubris* nests can be seen in the oak-birch woodlands along the narrow road from Lodore to Watendlath. On 17 September I examined 3 nests near Ashness Bridge (NY270197) for *Formicoxenus*, and 10 nests in Lodore Woods

(NY269189) without success. *F. lugubris* is common in woodlands in the Duddon valley, right up to Seathwaite. Walking down the valley from Seathwaite on 19 September I saw numerous nests of *F. lugubris* in a great variety of situations, from sunny exposed slopes to damp shady woodlands, and found *Formicoxenus* males on one nest near Tongue Wood (NY225963) (VC69). At Wallowbarrow (NY219964) (VC70) I also found males or one nest, and a slightly larger individual which proved to be a worker. This confirms the presence of *Formicoxenus* in nests of *Formica lugubris* in both vice-counties of Cumbria.

REFERENCES

- Bolton, B. & Collingwood, C. A. 1975. Hymenoptera: Formicidae. *Handbooks for the Identification of British Insects*, VI (3) (C). Royal Entomological Society.
- Brian, M. V. 1977. *Ants*. The New Naturalist Series. Collins.
- Collingwood, C. A. & Robinson, N. A. 1999. *Stenammas debile* (Förster) and *Lasius sabularum* Bondroit (Hymenoptera: Formicidae) new to Lancashire. *British Journal of Entomology and Natural History*, 12: 92.
- Robinson, N. A. 1998. Observations on the "guest ant" *Formicoxenus nitidulus* Nylander in nests of the red wood ant *Formica rufa* L. in 1997. *British Journal of Entomology and Natural History*, 11: 125–128.

SHORT COMMUNICATIONS

Recent British records of *Gymmosoma nitens* Meigen (Diptera: Tachinidae) and some comments on its status in Britain—On 18.vi.1998 I swept a small yellow-bodied fly around the derelict yard of Woodlands Farm near Bexley (TQ446765, vice-county 16, West Kent). Although immediately recognizable as one of the globose tachinids (Phasiini) which parasitize heteropteran bugs, it wasn't until autumn that I got around to confirming its identity. Using the key by Belshaw (1993), it easily worked to a male of *Gymmosoma nitens*, a red data book 1 species.

Examining the Bexley specimen I thought it looked familiar and located two further specimens, both males, in my collection. They were collected by sweeping near White Downs, Surrey, 15.viii.1977, along with a third specimen, a female, now in the collection of my father, A. W. Jones. At the time they had been misidentified using the key by van Emden (1954) as the similar-sized *Cistogaster globosa* (Fab.) the key did not include *G. nitens*. Two specimens were exhibited under this incorrect name at the 1977 BENHS annual exhibition (Jones, 1978).

The single record for *G. nitens* listed by Belshaw (1993)—Happy Valley, near Boxhill, Surrey, 1956—has since been added to. Plant (1996) and Plant & Smith (1996) reported two specimens from Grays, South Essex and one from Sandwich, Kent. In addition, the fly has turned up on other Essex sites on the north bank of the Thames Estuary (C. W. Plant, personal communication) and Clemons (1999) reports finding it in 1985 and 1996 in Kent.

In a recent paper, Morris (1997) reviewed the status of *Gymmosoma rotundatum* (L.), and reported that it too had recently become more widely and more often recorded. It started to appear more regularly in the 1950s, and during the 1970s, 80s and 90s has increased tremendously. Morris suggested the increase may be linked to the recent spate of hot dry summers. He did not give any further climatic information; the data he reported were collated by decade and it would be difficult to match precise yearly weather to this scheme. But his suggestion seems entirely feasible.

The recent increase in *Gymnosoma nitens* might well be linked to the same weather factors, indeed, it is probably easier to link this species' increased occurrence to the climate. The recorded years of its capture, 1956, 1977, 1985, 1996, 1997 and 1998 were not necessarily just hot dry years in southern England, but perhaps more importantly they all followed very hot and dry years and subsequent mild winters. Our knowledge of the fly's life history is vague and patchy and it is based on only a handful of breeding records from the Continent. Nevertheless, these climatic elements fit what little we do know. It seems clear that hot dry summers ought to favour the host shieldbug, *Sciocoris cursitans* (Fab.), which judging from its ground-dwelling habits, its preferred chalky and sandy habitats and its southern and coastal distribution, is a warmth-loving species. Because *Gymnosoma* overwinters as a larva in its host bug, mild winters ought to occasion low mortality.

Incidentally, according to Kirby (1992) the North Downs near Box Hill are a stronghold for the nationally scarce (notable) *Sciocoris*, so it is not surprising that the fly was first found here. The only specimen of this bug that I have ever come across was on the sandhills at Deal, very close to Sandwich where Plant & Smith (1996) recorded *G. nitens*. Although I did not find *Sciocoris* at Woodlands Farm, I did find the closely related *Podops inuncta* (Fab.), another secretive ground-dwelling shieldbug. -RICHARD A. JONES, 135 Friern Road, East Dulwich, London SE22 0AZ.

REFERENCES

- Belshaw, R. 1993. Tachinid flies. (Diptera: Tachinidae). *Handbooks for the Identification of British Insects* **10(4a(i))**.
- Clemons, L. 1999. The Phasiinae (Dip.: Tachinidae) of Kent with a confirmed host for *Hemyda vittata* (Meigen, 1824). *Entomologist's Record and Journal of Variation* **111**: 27-35.
- Jones, R. A. 1978. [Exhibit at 1977 BENHS annual exhibition.] *Proceedings and Transactions of the British Entomological and Natural History Society* **11**: 16.
- Kirby, P. 1992. *A review of the scarce and threatened Hemiptera of Great Britain*. Peterborough: Joint Nature Conservation Committee.
- Morris, R. K. A. 1997. The status of *Gymnosoma rotundatum* (L.) (Diptera, Tachinidae) in southern England. *British Journal of Entomology and Natural History* **10**: 11-13.
- Plant, C. W. 1996. [*Gymnosoma nitens* exhibited at BENHS indoor meeting, 27 February 1996.] *British Journal of Entomology and Natural History* **9**: 170.
- Plant, C. W. & Smith, D. 1996. *Gymnosoma nitens* (Tachinidae, Phasiinae): second, third and fourth British records. *Dipterists Digest* **3**: 47-48.
- van Emden, F. I. 1954. Diptera Cyclorrhapha. Calyptrata (I). Section (a) Tachinidae and Calliphoridae. *Handbooks for the Identification of British Insects* **10(4a)**: 26-27.

***Nysius senecionis* (Schilling) (Hemiptera: Lygaeidae) in Norfolk**—Jones (1997, *Br. J. Ent. Nat. Hist.*, **10**: 2) urged the submission of notes on the expansion of this bug's range in Britain. Single specimens were found at two sites during the 1997 programme of biological survey: Brancaster Marsh (TF782451), one swept from sea wormwood *Artemisia maritima* L. and sea aster *Aster tripolium* L. at the dune-saltmarsh fringe, 2.ix.1997; and Little Eye, Salthouse Marshes (TG078443), one beneath a mat of sea campion *Silene maritima* With. over sand and pebbles, 8.ix.1997. I would like to thank Peter Kirby for confirming my identification. - KEITH N. A. ALEXANDER, Biological Survey Team, The National Trust, 33 Sheep Street, Cirencester, Gloucestershire GL7 1RQ.

1998 ANNUAL EXHIBITION

Imperial College, London SW7— 31 October 1998

The following account of exhibits has been compiled by A. M. Jones (British butterflies), G. A. Collins (British Macrolepidoptera), R. J. Heckford & M. R. Wilson (British Microlepidoptera), N. M. Hall (Foreign Lepidoptera), P. J. Chandler (Diptera), P. J. Hodge (Coleoptera), A. J. A. Stewart (Hemiptera), A. J. Halstead (Hymenoptera and other orders), 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.—Results of temperature experiments on larvae and freshly formed pupae. A series of *Vanessa atalanta* (L.) ab. *merrifieldi* Standfuss and a single extreme unnamed aberration, all from pupae chilled for 22–26 days; similar treatment with *Inachis io* (L.) has produced ab. *fischeri* Standfuss. *Cynthia cardui* (L.) with extended pale markings to the underside from pupae held at 37° for 3 days, and a series with strongly aberrant forewings and less aberrant hindwings (a reverse of the usual situation), believed to have been caused when fresh pupae were accidentally exposed to overheating in the sun and then chilled for 15–20 days. *Argynnis lathonia* (L.) with glomerate markings from late final instar larvae chilled for 2 days and the fresh pupae cold shocked. Also a series of extreme melanics (Plate 1, Fig. 11) from larvae reared slowly in cool conditions, then accelerated by warmth and the pupae given hot and cold shocks. This may help to explain the occasional clusters of *Argynnis* aberrations (especially in *A. paphia*) that can occur after a heatwave. Also shown from various cold shock regimes was a series of *Eurodryas aurinia* (Rott.) ab. *sebaldis* Schultz and a *Melitaea cinxia* (L.) similar to ab. *fulla* Quensel.

The results of breeding from a female *Aglais urticae* (L.) ab. *pseudocomnixa* Cabeau. Aberrations appeared in the F₁ generation and selected pairings gave stronger examples in the F₂ and a few obsolescent specimens. Some F₂ pupae were chilled for 20–28 days and resulted in *pseudocomnixa* with increased melanic tendencies. Amongst the F₂ was an extreme ground-colour aberration with pale forewings of a violet tint. The exhibitor believes that the frequency and depth of expression of *pseudocomnixa* in both generations indicate that it is due to a polygenic condition.

A female *Polygonia c-album* (L.) f. *hutchinsoni* Robson, taken out of season on 13.ix.1997 amongst many normal hibernating specimens. From eggs laid, 50+ type specimens were reared later the same year; the female did not die but entered hibernation on 25.x.1997 where she remained until 23.ii.1998. More eggs were laid and several adults reared. The exhibitor wonders if this is a bizarre response to global warming?

Also exhibited was a bred series of *Colias croceus* (Geoffroy) with reduced pale markings to the forewing borders in the F₂ from a Devon female taken vi.1998. Further examples of the recessive ab. *atratus* Bailey of *Eurodryas aurinia* (Rott.) and a male *Argynnis aglaja* (L.) ab. *post-fasciata* Blaichier, captured Devon vi.1998.

BARRINGTON, R. D. G.—Breeding experiments showing the multifactorial basis of three aberrations. *Maniola jurtina* (L.) ab. *fracta* Zweiglt, 2 females bred in an F₂ generation of 118 insects. The original female (Dorset, July 1995) was transitional to *fracta*. The F₁ of 80 produced a graded series from type to specimens with narrowed

hindwing median bands, but no *fracta*. The F_2 was similarly graded but with some specimens transitional to and a small number of fully developed *fracta*. *Pyronia tithonus* (L.) ab. *multicellata* Ober. a selection of specimens from the F_2 of a *multicellata* female from Devon, 1995. The F_1 of 49 graded from type to weak *multicellata*. The F_2 of 90 was similarly graded but with more extreme *multicellata*. Some females also showed ab. *lanceolata* Leeds on the underside hindwings. *Pieris napi thomsoni* (Warren) ab. *fasciata* Kautz bred in the F_2 – F_5 generations from an original female transitional to *fasciata* captured in the outer Hebrides in 1997. Inbreeding produced stronger marked specimens with each generation. From the F_2 onwards siblings showed a reluctance to pair and only one pairing was achieved each time to produce the F_3 , F_4 and F_5 generations. F_4 females were easily paired with wild type Dorset males. This subspecies is generally single brooded; however it was possible to bring most of each brood through by rearing under constant light.

Other bred specimens included an extreme *Melanargia galathea* (L.) ab. *nigricans* Culot (Plate 1, Fig. 10) exhibited with two wild-caught females similar to the original parent. 50% of the brood were *nigricans*. *Celastrina argiolus* (L.) ab. *lilacina-lata* Tutt, with darker blue shading and heavy dark borders, one of only 6 butterflies to emerge from 120 wild larvae, the remainder being parasitised.

Wild-caught specimens included an extreme, and mint, male *Argynnis aglaja* (L.) ab. *wimani* Holmgren (Plate 1, Fig. 12) captured in Ireland in 1998. The upperside largely black, the underside forewings rayed with black between the veins and the hindwings with the outer row of silver spots nearly obsolete, the median row almost black and the basal spots extended. This was spotted at about 6pm on a cool, breezy day as it was hawking up and down a bank looking for a place to roost for the night. Also from Ireland was a good series of *Polyommatus icarus mariscolore* (Kane), including a female ab. *post-obsolata* Gillmer and a male ab. *obsolata* Gillmer, being entirely devoid of underside spotting. Another important aberration was a male *Melanargia galathea* (L.) ab. *rubra* Mosley (Plate 1, Fig. 6), a rare albinistic form. A short series of *Maniola jurtina* (L.) from Dorset and Somerset in 1998, including 2 female ab. *postmultifidus* Lipscomb and ab. *fracta* Zweigl. A gynandromorph, left side female, right forewing male, right hindwing mixed. A curious female ab. *irregularia* Leeds, the right forewing larger than the left and with streaks and splashes of brown and grey-brown colouration on the underside, the apical spot being split and with a large pupiled spot below.

DENNIS, R. C.—A two-part exhibit, the first comprised of teratological specimens. Three *Lysandra coridon* (Poda) each with a reduced hindwing size. *Boloria selene* ([D & S.]) a male with both right-hand wings reduced in size by about a third. A female *Celastrina argiolus* (L.) with small hindwings. A *Maniola jurtina* (L.) with differing wing shapes and an apical spot missing. A *Cynthia cardui* (L.) with both left-hand wings about half the normal size and with aberrant venation and markings.

The second part comprised three good wild-caught *Aglais urticae* (L.), two ab. *semiichnusoides* Pronin from Sussex and an ab. *nigra* Tutt from Dorset.

FENSOME, B.—Various specimens bred and captured in 1998, including: *Anthocharis cardamines* (L.) 2 males with pale “orange tips” and a bred gynandromorph. *Pieris napi* (L.) 2 ab. *fasciata* Kautz and a dwarf female. *Pararge aegeria* (L.), a male lacking white spotting. *Coenonympha pamphilus* (L.), a pair of ab. *caeca* Ober. the female with unusual pale markings (Plate 1, Fig. 5). *Pyronia tithonus* (L.), 3 female ab. *anticrassipuncta* Leeds and a male ab. *obscurior* Schultz.

HARMER, A. S.—An interesting series of *Thymelicus acteon* (Rott.) ab. *alba* Bolton, or ab. nov?, comprised of 3 pairs caught in Dorset. Fresh specimens did not

accord with the descriptions of any known *acteon* aberrations; however one female kept for breeding in its worn state fits the description of ab. *alba* (no description exists for the male). It would seem highly likely that this series represents both male and female ab. *alba*. Further research is being undertaken.

Polyommatus icarus (Rott) ab. *radiata* Courv. a good pair, bred from the combined stock of R. C. Revels and the late L. D. Young. *Pararge aegeria* (L.) ab. *cockaynei* Goodson, bred ex Lymington female. The larvae kept indoors and given extended artificial daylight length.

Further results of breeding *Aphantopus hyperantus* (L.) ab. *lanceolata* Shipp showing F₃ specimens; these were not noticeably different to the F₂, despite selective pairings. An extreme female was captured in the garden from stock released in 1997. Also exhibited were 2 females being combined ab. *lanceolata* and ab. *arete* Müller. In 1996 pairings were taken between male *lanceolata* and female *arete*, the F₂ comprised of 120 specimens, 84 type, 24 *arete*, 12 *lanceolata* and the two combined *arete/lanceolata* which were amongst the last to emerge.

HALL, P. R. & KEMP, R. J. — A female specimen of the lycaenid *Virachola antalus* (Hopffer). This was reared January 1998 from one of a dozen larvae found during November 1997 in peaches imported from Mpumalanga, South Africa, at the airfreight handling depot, Colnbrook, Bucks. For further information see Foreign Lepidoptera section.

JONES, A. M. — *Eurodryas aurinia* (Rott.), specimens bred in 1998 from stock maintained for the last 6 years. A male ab. *melanoleuca* Cabeau, and an extreme female ab. *sebaldis* Schultz bred under normal conditions. A bilateral gynandromorph (Plate 1, Fig. 8), bred 1.vi.1998.

Quercusia quercus (L.), 2 gynandrous specimens, a male with a patch of female purple on the left forewing, and a female with streaks of male on the right forewing and left hindwing. Both bred vi.1998. A male *Argynnis paphia* (L.) ab. *confluens* Spuler, captured 13.vii.1998.

MEREDITH, S. L. — Photographs of two aberrant *Polygonia c-album* (L.), both taken in the same Northants. woodland. The first with suffused hindwings seen on the 19.vii.1998, the second an extreme ab. *reichenstettensis* Fettig, seen on the 21.vii.1998; this specimen had a strongly aberrant underside, the "comma" forming a malformed "D".

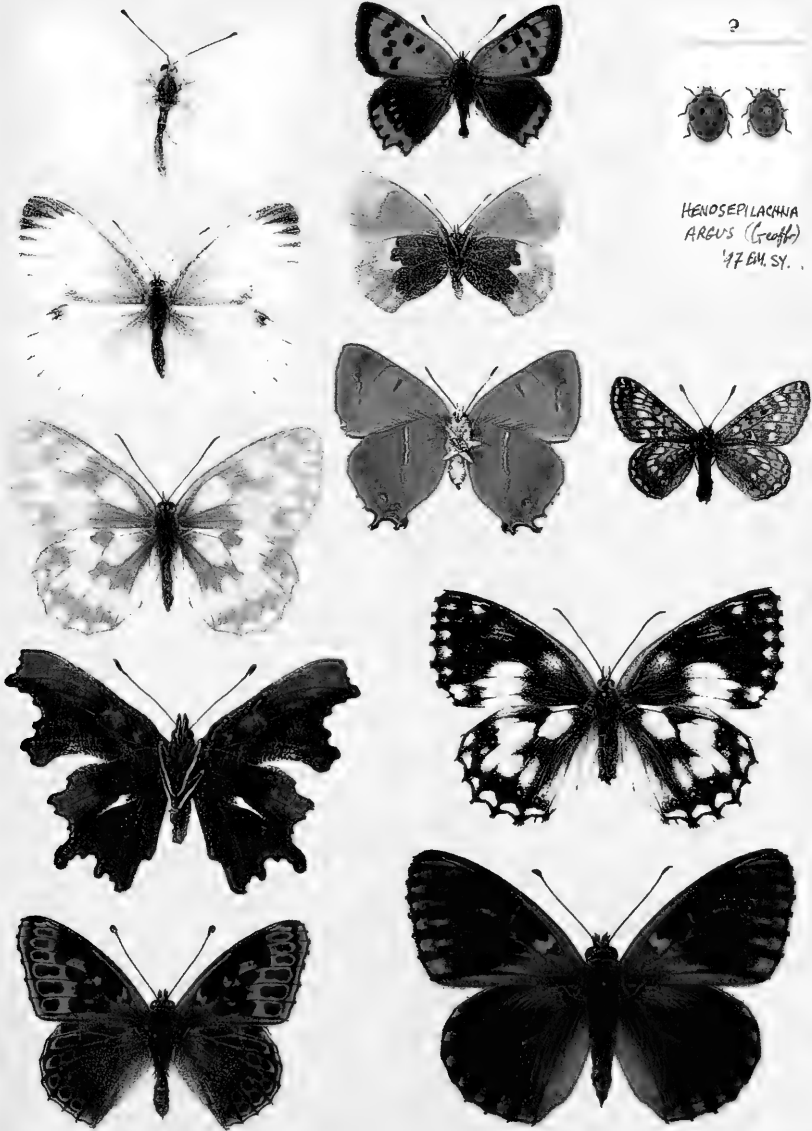
MCCORMICK, R. — A selection of butterflies taken at the Burren, Ireland between the 17 & 22.v.1998. *Erynnis tages baynesi* (Huggins), from Cappaghmore. *Leptidea sinapis juvernica* (Williams), from Loch Coolorta and Cappaghmore. *Anthocharis cardamines hibernica* (Williams), from Loch Coolorta. *Polyommatus icarus mariscicolore* (Kane), a pair taken at Flaggy Shore.

PARKER, M. — A female *Lycaena phlaeas* (L.) ab. *cuprinus* Peyer. taken 30.viii.1998 in the Hurn Forest area, Dorset.

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PLATE 1 ANNUAL EXHIBITION 1998

1: *Pieris napi*, bred, F₂, R. Revels. 2: *Lycaena phlaeas*, bilateral gyandromorph, bred, P. Tebbutt. 3: *Henosepilachna argus*, West Molesey, Surrey, 1997, I. S. Menzies. 4: *Pieris napi*, female, captured, D. Stokes. 5: *Coenonympha pamphilus* ab. *caeca*, captured, B. Fensome. 6: *Melanargia galathea* ab. *rubra*, captured 1998, R. D. G. Barrington. 7: *Thecla betulae* ab. *unistrigata*, bred, P. Tebbutt. 8: *Eurodryas aurinia*, bilateral gynandromorph, bred F6A. M. Jones. 9: *Polygonia c-album*, underside, temp. experiment. D. Stokes. 10: *Argynnis aglaja* ab. *wimani*, captured, Ireland, 1998, R. D. G. Barrington. 11: *Argynnis lathonia*, extreme melanica, temp. experiment, K. E. J. Bailey. 12: *Melanargia alathea* ab. *nigricans*, bred, R. D. G. Barrington.



HENOSEPI LACHNIA
ARGUS (Gruiff)
'77 EM. SY.

REVELS, R. C. — Continuing results of breeding *Aphantopus hyperantus* (L.) ab. *lanceolata* Shipp (originally from A. S. Harmer). About 15% of specimens bred showed an increased expression of the *lanceolata* characteristics, being more extreme than any others known to the exhibitor (this shows different results to those of A.S.H.).

Two examples of *Pieris napi* (L.) bred in an F₂ from a heavily marked female, taken 1997, showing a tendency towards albinism (Plate 1, Fig. 1). Further breeding is planned for 1999. A series of *Colias croceus* (Geoffroy) f. *helice* Hübner, showing a range of colours from normal yellow to pale yellow and white. These originated from a Beds. female taken in June 1998; the F₁ produced 50% *helice* in August.

Results of breeding *Melanargia galathea* (L.) ab. *craskei* Tubbs. A previously exhibited breeding experiment dating from 1974–79 and important in showing that *craskei* is caused by a dominant gene.

ROUSE, T. — A specimen of *Danaus chrysippus* (L.) taken in the exhibitor's garden at Densole, Kent on 16.viii.1998 and probably an escape. *Boloria euphrosyne* (L.) ab. *pittionii* Nitsche., a male taken in Kent 1997 and a less extreme specimen bred from a larva found at the same locality, emerging 14.v.1998. An *Argynnis lathonia* (L.), with heavy black upperside spotting, bred in an F₂ generation from a female taken in Southern France.

SOFTLY, R. A. — A specimen of *Greta morgane oto* (Hewitson), taken at Hill Garden, Hampstead Heath, by the gardener Mr Les Willis. This species is a resident of Central and South America, and is commonly bred in butterfly houses in this country; it is likely that it is an escapee. The specimen was identified by G. Beccaloni and W. J. Reynolds of the Natural History Museum.

STOKES, D. — An interesting selection of *Polygonia c-album* (L.) undersides, some with long white "comets" replacing the usual "comma" (Plate 1, Fig. 9); these had less extreme upperside markings than those that had retained the "comma", bred from heat shocked pupae. A pair of *Thecla betulae* (L.) from cold shocks, with reduced hair lines on the undersides. *Quercusia quercus* (L.), showing dark "striata" marks moving in towards the discoidal spots from the submarginal band, bred ex ova. A captured second brood female *Pieris napi* (L.) with the twin forewing spots missing (Plate 1, Fig. 4).

TEBBUTT, P. — Heat shocks on freshly formed pupae resulted in various named melanics. *Inachis io* (L.) ab. *prochnovi* Pronin., ab. *antigone* Fischer, ab. *exoculata* Weymer, and ab. *belisaria* Oberthur. *Polygonia c-album* (L.) ab. *obscura* Closs., ab. *suffusa* Frohawk and 2 ab. *reichenstettensis* Fettig. *Vanessa atalanta* (L.) specimens transitional to ab. *klemensiewiczzi* Schille. The highlight of wild-caught and naturally bred specimens was a bilateral gynandromorph of *Lycaena phlaeas* (L.) (Plate 1, Fig. 2), also an *Aphantopus hyperantus* (L.) with the right-hand hindwing underside predominantly black with yellow lines. A bred female *Thecla betulae* (L.) ab. *unistrigata* Schultz (Plate 1, Fig. 7), from wild ova.

Also exhibited were two all-blue *Plebejus argus caernensis* (Thompson) ab. *splendida* Thompson from North Wales. A short series of *Coenonympha tullia polydama* (Haworth) and *davus* (Fabr.) from Lake District sites showing a wide range of variation. Selected aberrations of *Pararge aegeria* (L.) bred from hibernating pupae brought indoors in December and emerging over a 3 month period, including ab. *parviocellata* Lempke, ab. *saturationis* Crumbrugge, and ab. *cockaynei* Goodson.

YOUNG, D. — *Colias croceus* (Geoffroy) from Berkshire, bred from a strong colony found in a large field of lucerne in 1996. *Coenonympha tullia scotica* (Staudinger) and *Erebia epiphron scotica* (Cooke) from Ben Lawers, and Trinafore, Perthshire, vii.1998.

BRITISH MACROLEPIDOPTERA

BAKER, B. R.—Lepidoptera recorded from a coastal marsh near Dunster, S. Som., including *Nonagria typhae* (Thunb.), *Archanara geminipuncta* (Haw.) and *A. sparganii* (Esp.); the latter species new to VC5. Aberrations from 1998 and earlier years: *Electrophaes corylata* (Thunb.), Exmoor, 1989; *Pseudopanthera macularia* (L.), Co. Clare, 1977; *Bupalus piniaria* (L.), Caversham, Berks., 1995; *Acronicta leporina* (L.), Exmoor, 1995; *Hada plebeja* (L.), Caversham, Berks., 1998; *Charanyca trigrammica* (Hufn.), Hartslock, 1998.

BAKER, P. J.—Aberrations and migrants taken in Devon including: *Eublemma parva* (Hb.), West Hill, S. Devon, 8.vii.1998.

BARNETT, R. & EVANS, M.—On behalf of the Bristol and district moth group: *Mythimna pudorina* ([D. & S.]), Max Bog, N. Som., 2.vi.1995; *Idaea dilutaria* (Hb.), Avon Gorge, N. Som. and W. Glos., 1994.

BROTHERIDGE, D.—Migrants taken in 1998, dates and localities not given: *Rhodometra sacraria* (L.) and *Mythimna albipuncta* ([D. & S.]).

BUTCHER, A. G. J.—*Synanthedon vespiformis* (L.), Sidney Wood, Surrey, 20.vi.1998, at mvl; *Synanthedon culiciformis* (L.) and ab. *flavocingulata* Spuler, reared from birch, Challock, E. Kent, iv.1998; *Discoloxia blomeri* (Curt.), typical and melanic, Tintern, Mon., 19.vi.1995 (Plate 2, Fig. 9). From Isle of Grain, W. Kent: *Chortodes elymi* (Treits.), 10.viii.1998; *Luperina nickerlii demuthi* Goater & Skinner, 1998.

CLANCY, S.—Lepidoptera from the Dungeness, Kent, area: *Aplasta ononaria* (Fuess.), New Romney, 20.vi.1998; *Cleorodes lichenaria* (Hufn.), Dungeness, 26.vii.1998; *Selenia lunularia* (Hb.), New Romney, 24.vii.1992, and Greatstone, 10.viii.1998, second brood examples of migrant status; *Lymantria dispar* (L.), Dungeness, 20.vii.1998; *Nola aerugula* (Hb.), New Romney, 20.vi. and 22.vii.1998; *Agrotis crassa* (Hb.), Dungeness, 13.viii.1998—new to Kent; *Deltote bankiana* (Fab.), Greatstone, 20.vi.1998. *Hecatera dysodea* ([D. & S.]), reared from larvae found at Gravesend, W. Kent, 31.vii.1998. Aberrations: *Orthonama obstipata* (Fab.), a male lacking forewing band, Greatstone, 10.viii.1998; *Cyclophora linearia* (Hb.), banded female, near Gloucester, 15.vii.1998 (R. Thomas); *Arctia villica britannica* (Ob.), Dungeness, 28.v.1998 (Plate 2, Fig. 7); *Mythimna unipuncta* (Haw.), melanic, Lizard, W. Corn., 24.iii.1998 (M. Tunmore).

CLARKE, J.—Lepidoptera taken or reared in 1998, including: *Conistra rubiginea* ([D. & S.]), St. Briavels, W. Glos., 1.iv.1998; *Eublemma ostrina* (Hb.) ab. *carthami*, reared from larva, Slapton Ley, S. Devon, 22.viii.1998; *Axyليا putris* (L.), albinistic form, Bodmin Moor, E. Corn.; *Diaphora mendica* (Cl.), cross between f. *rustica* Hb. and typical English form.

COOK, R. R.—Lepidoptera caught or reared in 1998: *Pelosia obtusa* (H.-S.), Cromes Broad, E. Norf., 19 and 20.vii.1998; *Sedina buetneri* (Hering), Dorset, 28.ix.1998; *Orgyia recens* (Hb.), reared from larvae from Blaxton, Yorks, 24.v.1998; *Chortodes elymi* (Treits.), Caister Dunes, E. Norf., 18 and 22.vii.1998; *Lygephila cracca* ([D. & S.]), reared from larvae from Hartland Point, N. Devon, 17.vi.1998. *Ematurga atomaria* (L.) ab. *unicoloraria* Stdgr., Seckar Wood, Yorks., 23.v.1998 (Plate 2, Fig. 8).

DAWSON, J.—Moths from Cambridgeshire, dates and localities mostly not given: *Phibalapteryx virgata* (Hufn.) and *Eupithecia pimpinellata* (Hb.), south Cambs. chalk area; *Xestia rhomboidea* (Esp.), throughout; *Cryphia muralis* (Forst.) f. *impar* (Warren), Cambridge; *Lithostege griseata* ([D. & S.]), Fulbourn, Cambs., 26.v.1997; *Idaea rusticata atosignaria* Lempke; *Scopula marginepunctata*

(Goeze); *Spaelotis ravida* ([D. & S.]), 9.viii.1997; *Polymixis lichenea* (Hb.), 6.x.1998.

DOBSON, A. H. — *Orthonama obstipata* (Fab.), Bramley Frith Wood, Hants, 13.x.1998; *Macdunnoughia confusa* (Steph.), Greywell, N. Hants, 2.x.1998 — new to VC12; *Cerastis leucographa* ([D. & S.]), Bramley Frith Wood, Hants, n.d.; *Thera cupressata* (Geyer), Hants, reared from larva beaten 17.iv.1998; *Agrochola haematidea* (Dup.), eastern New Forest, 10.x.1998. From Minsmere, E. Suffolk (B.E.N.H.S. field meeting), 1.viii.1998: *Apamea oblonga* (Haw.); *Celaena leucostigma* (Hb.) ab. *fibrosa* Hb.

GILL, N. — Moths taken in 1998: *Pelosia obtusa* (H.-S.), Norfolk Broads, 20.vii.1998; *Sedina buettneri* (Hering), Dorset, 25.ix.1998; *Hecatera dysodea* ([D. & S.]), W. Kent, larvae viii.1998.

HALL, N. M. — *Rhodometra sacraria* (L.), Earley, Berks., 6.ix.1998; *Orthonama obstipata* (Fab.), Avon Valley, Salisbury, S. Wilts., 27.vii.1998; *Mythimna albipuncta* ([D. & S.]), Hastings Country Park, E. Sussex, 29.viii.1998; *Abraxas sylvata* (Scop.), Hastings Country Park, E. Sussex, 29.viii.1998; *Idaea rusticata atrosignaria* Lempke, Hastings Country Park, E. Sussex, 9.viii.1998; *Mythimna albipuncta* ([D. & S.]), Rye Harbour, E. Sussex, 31.viii.1998.

HALSEY, J. — *Autographa gamma* (L.), four examples from a migration in v.1998 showing unusual Y markings.

HALSTEAD, A. J. — Larvae of *Cossus cossus* (L.) from Wisley Gardens, Surrey, ix.1998. Those exhibited had been found in a planted birch, and were very likely to have been imported, possibly from Germany. Two full grown larvae were also found which had emerged from an oak and were considered native — the first Wisley records for at least 26 years.

HARMAN, T. W. — *Hyles livornica* (Esp.), Herne Bay, E. Kent, 20.ii.1998 (B. Matlock).

HART, C. — *Thysanoplusia orichalcea* (Fab.), Lizard, Corn., late ix.1998; *Archanaa sparganii* (Esp.), Buckland, Surrey, 9.ix.1998.

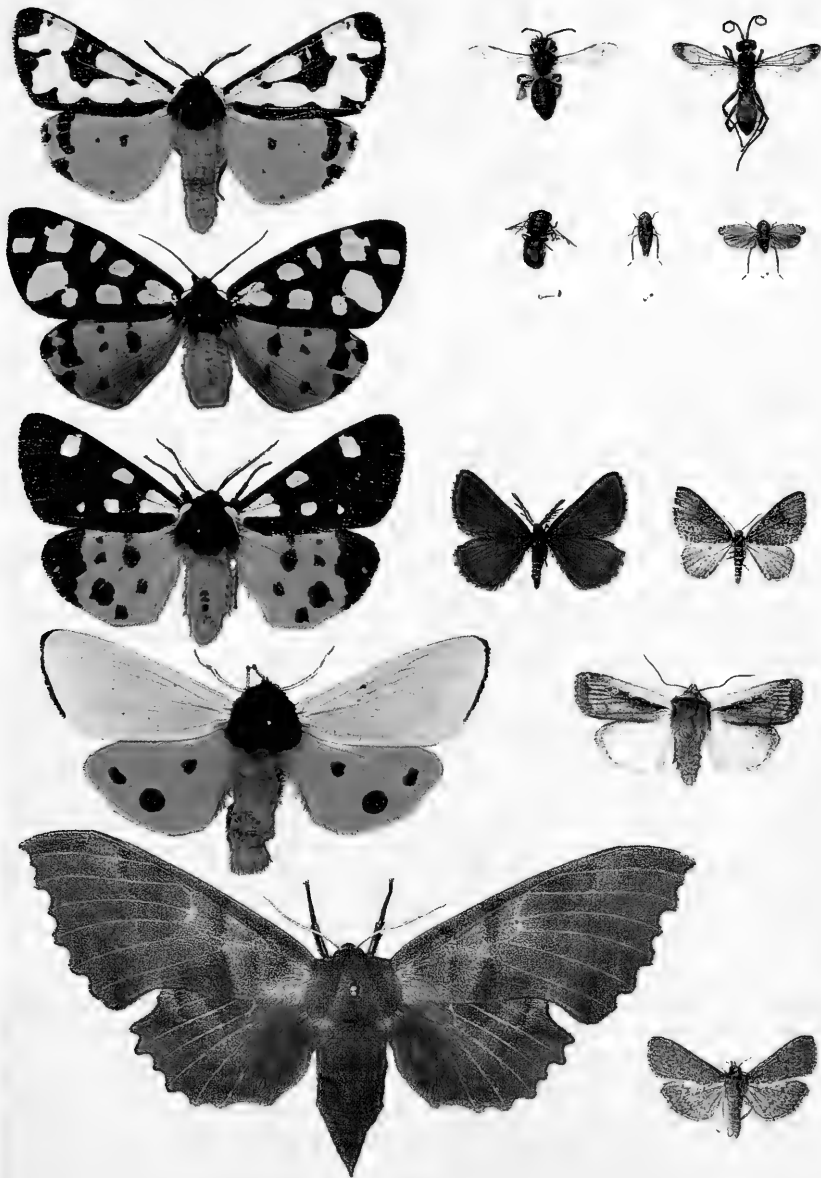
HARVEY, M. — *Entephria flavicinctata* (Hb.), Snowdon, Caer., 18.ix.1998 (det. M. R. Honey) — possibly first confirmed record from Wales; *Archanara geminipuncta* (Haw.), Maidenhead, Berks., viii.1998 (D. White); *Idaea straminata* (Borkh.), Upper Basildon, Berks., 30.vi.1998; *Cyclophora porata* (L.), Windsor Forest, Berks., 14.viii.1998.

HAYWARD, R. Lepidoptera taken in 1998 including: *Rhodometra sacraria* (L.), Slough, Bucks., 4.ix.1998; *Orthonama obstipata* (Fab.), Slough, Bucks., 14 and 20.viii.1998; *Meganola albula* ([D. & S.]), Slough, Bucks., 20.vii.1998; *Hypena rostralis* (L.), Slough, Bucks., 6.vi.1998. Aberrations including: *Arctia villica britannica* (Ob.), reared from Kent larva (Plate 2, Fig. 4).

PLATE 2 ANNUAL EXHIBITION 1998

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1: *Arctia villica britannica*, Folkestone Warren, E. Kent, 23.v.1998, T. Rouse. 2: *Andrena ferox*, Brockenhurst, Hants, 7.v.1998, G. A. Collins. 3: *Cryptocheilus notatus*, Bagmoor Common, Surrey, 19.vii.1998, G. A. Collins. 4: *Arctia villica britannica*, Kent, R. Hayward. 5: *Chrysis fulgida*, Bagmoor Common, Surrey, 19.vi.1998, R. D. Hawkins. 6: *Fieberiella* sp. (2 specimens), Park Royal, Middx, 16.ix.1998, P. J. Hodge. 7: *Arctia villica britannica*, Dungeness, 28.v.1998, S. Clancy. 8: *Ematurga atomaria* ab. *unicoloraria*, Seckar Wood, Yorks, 23.v.1998, R. Cook. 9: *Discoloxia blomeri*, melanic form, Tintern, Mon, 19.vi.1995, A. G. J. Butcher. 10: *Arctia caja* ab., Kennack Sands, W. Cornwall, 1.viii.1998, B. Herwood. 11: *Ochropleura plectra*, J. Owen. 12: *Laothoe populi*, Thorpeness, E. Suffolk, A. Jenkins. 13: *Herpetogramma licarsosalis*, Algarve, Portugal, 1.x.1998, M. F. V. Corley.



HENWOOD, B. *Spodoptera exigua* (Hb.), Abbotskerswell, S. Devon, 2.x.1998. An aberration of *Arctia caja* (L.), Kennack Sands, W. Corn., 1.viii.1998 (Plate 2, Fig. 10).

JENKINS, A. — Moths taken in 1998 including: *Lygephila cracca* ([D. & S.]), at mvl, N. Devon; *Crocallis elinguaris* (L.), Thorpeness, E. Suff., an aberration superficially resembling *Crocallis dardoinaria* Donz. (Skinner, 1998, plate 43); *Bembecia muscaeformis* (Esp.), reared from pupa, S. Devon; *Diaphora mendica* (Cl.) f. *rustica* Hb., *Hadena caesia mananii* (Gregs.), *Triphosa dubitata* (L.), *Calamia tridens occidentalis* Cock., *Hadena perplexa capsophila* (Dup.), *Odontognophos dumetata hibernica* Forder, all from the Burren, Co. Clare; *Hecatera dysodea* ([D. & S.]), reared from larvae from north Kent; *Sedina buettneri* (Hering), flying at dusk, Dorset; *Laothoe populi* (L.), orange aberration, Thorpeness, E. Suff. (Plate 2, Fig. 12).

KNILL-JONES, S. A. Lepidoptera from Freshwater, I.o.W. including: *Eupithecia satyrata* (Hb.), 5.vi.1998—new to VC10; *Oligia versicolor* (Borkh.), 1 and 6.vii.1997 new to VC10; *Thaumetopoea processionea* (L.), 1 and 6.ix.1998—new to VC10; *Thera cupressata* (Geyer), four in x.1998; *Orthonama obstipata* (Fab.), 14.v. and 19.vi.1998; *Rhodometra sacraria* (L.), 20.vii.1998; *Agrius convolvuli* (L.), 3.x.1998; *Catocala fraxini* (L.), 4.x.1998; *Heliothis peltigera* ([D. & S.]), 23.vi.1998; *Mythimna vitellina* (Hb.), 8.ix.1998; *Mythimna unipuncta* (Haw.), 20.ix.1998; *Helicoverpa armigera* (Hb.), five from 26–28.ix.1998; *Spodoptera exigua* (Hb.), 9.v.1998; *Idaea sylvestraria* (Hb.), 9.vii.1998.

MCCORMICK, R. F. — *Hecatera dysodea* ([D. & S.]), W. Kent, 1998, voucher specimens of the adult and photographs of the larvae. Moths from the Burren, Co. Clare, in May 1998, including: *Hadena caesia mananii* (Gregs.); *Hadena perplexa capsophila* (Dup.); *Diaphora mendica* (Cl.) f. *rustica* Hb.; *Hemaris tityus* (L.); *Odontognophos dumetata hibernica* Forder; *Chiasmia clathrata hugginsi* (Baynes); *Eupithecia vulgata clarensis* Huggins; *Eupithecia venosata plumbea* Huggins; and *Lithosia quadra* (L.), reared from larvae, Loch Coolorta. Moths recorded by the Devon moth group in 1998, including: *Idaea sylvestraria* (Hb.), Colaton Raleigh Common, S. Devon, 20.vi.1998; *Discoloxia blomeri* (Curt.), Ashcombe, S. Devon, 9.viii.1998, Rousden, S. Devon, 2.vii.1998, and Lyd Valley, 18.vii.1998; *Abraxas sylvata* (Scop.), Lyd Valley, 18.vii.1998; *Acherontia atropos* (L.), in a bee hive, 12.vii.1998; *Standfussiana lucerneae* (L.), Hartland Point, N. Devon, 25.vii. and 5.viii.1998; *Aporophyla lutulenta* ([D. & S.]), Exeter, S. Devon, x.1998; *Conistra rubiginea* ([D. & S.]), Stover Park, S. Devon, 31.iii.1998; *Moma alpium* (Osbeck), Great Torrington, N. Devon, 4.vii.1998; *Amphipyra berbera svenssoni* Fletcher, Stoke Woods, S. Devon, 29.viii.1998; *Amphipoea lucens* (Freyer), Dartmoor (det. B. Henwood); *Eublemma parva* (Hb.), Lyd Valley, 20.vi.1998, and Teignmouth, S. Devon, 20.vii.1998; *Thysanoplusia orichalcea* (Fab.), Bere Alston, S. Devon, 24.ix.1998 (R. Bogue); *Macdunnoughia confusa* (Steph.), Prawle Point, S. Devon, 28.ix.1998, *Acontia lucida* (Hufn.), Thorverton, S. Devon, 10.vii.1998—probably imported with plants from Cyprus; *Lygephila cracca* ([D. & S.]), Hartland Point, N. Devon, 25.vii. and 5.viii.1998.

NASH, S. — Migrant moths from Fernham, Berks: *Catocala fraxini* (L.), 26.ix.1998; *Agrius convolvuli* (L.), two, 30.ix.1998; *Helicoverpa armigera* (Hb.), two, 27.ix.1998; *Mythimna vitellina* (Hb.), 27.ix.1998; *Rhodometra sacraria* (L.), ten between 30.viii. and 25.ix.1998; *Orthonama obstipata* (Fab.), 31.viii.1998; and from Durlston Head, Dorset: *Agrius convolvuli* (L.), five, 18–24.ix.1998; *Helicoverpa armigera* (Hb.), 24.ix.1998; *Mythimna albipuncta* ([D. & S.]), 22.viii.1998; *Mythimna vitellina* (Hb.), four, 26.ix.1998. *Helicoverpa armigera* (Hb.), reared from a larva

found in a supermarket. Melanic forms of: *Cryphia domestica* (Hufn.) and *Acronicta megacephala* ([D. & S.]), Swindon, N. Wilts.; *Idea aversata* (L.), Durlston Head, Dorset, and extreme aberrations of *Xanthorhoe fluctuata* (L.), Swindon, N. Wilts., all n.d.

NATURAL HISTORY MUSEUM — Some extreme varieties from the National Collection (R.C.K.): *Tethea or* ([D. & S.]), ab. *albingensis* Warnecke, Sunderland, 1913, and ab. *permarginata* Hasebroek, Bromley, 1930; *Archicaris parthenias* (L.), ab. *luteata* de Hennin, Chingford, and ab. *obscura* Prout, north Kent, 1908; *Cyclophora annularia* (Fab.), ab. *obsoleta* Riding, Honiton, 1899, and ab. *sertaria* Dannehl, Dover, 1877; *Lampropteryx suffumata* ([D. & S.]), ab. *porrittii* Robson & Gardner, Dover, 1896, and ab. *piceata* Steph., Barnard Castle, 1917; *Chiasmia clathrata* (L.), ab. *obsoletissima* Cock., Gibraltar Point, 1971, and ab. *fasciata* Prout, Hazeleigh, 1902; *Cepphis adenaria* (Hb.), ab. *fulva* Gillmer, east Surrey, 1928; *Pseudopanthera macularia* (L.), ab. *quadrimaculata*, Highgate, ab. *fuscaria* Stdgr., Abbots Wood, 1886, and an asymmetrical aberration, West Wickham Wood, 1877; *Ematurga atomaria* (L.), ab. *praeclara* Cock., Lancing, Sussex, 1939, ab. *unicoloraria* Stdgr., Burnley, Lancs., 1914, and ab. *dentaria* Stauder, east Kent, 1920; *Gnophos obscurata* ([D. & S.]), ab. *bicinctata* Fuchs, Lewes, 1909, ab. *obscuriata* Prout, New Forest, 1900, ab. *argillacearia* Stdgr., Babbacombe, S. Devon, 1903, ab. *fasciata* Prout, Folkestone, 1921; ab. *saturata* Prout, New Forest, 1899; and ab. *calceata* Stdgr., Lewes, 1921; *Clostera curtula* (L.), ab. *webbiana* Rebel, nr. Faversham; *Lymantria monacha* (L.), approaching ab. *atra* Linstow, New Forest, 1903 (possibly cross-bred); *Xestia c-nigrum* (L.), ab. *albinotica* Cock., Harpenden, Herts., 1950, and an asymmetrical aberration, Rye, Sussex, 1954; *Dichonia aprilina* (L.), ab. *semivirgata* Cock., Elgin, 1895, and ab. *brunneomixta* Culot, Yorkshire, 1917; *Conistra rubiginea* ([D. & S.]), ab. *modestissima* Ob., Camberley, 1899; *Polychrysis moneta* (Fab.), ab. *maculata* Lempke, Boxmoor, 1912; *Catocala nupta* (L.), ab. *brunnescens* Warren, Mitcham, 1892.

OWEN, J. — Lepidoptera from Dymchurch, E. Kent: *Scopula nigropunctata* (Hufn.), 12.viii.1996, 9.viii.1997, and 23.vi.1998; *Apamea ophiogramma* (Esp.), melanics, 27.vi. and 14.vii.1998; *Conistra erythrocephala* ([D. & S.]), 30.iii.1998; *Hydraecia osseola hucherardi* Mab., 11.ix.1998 first here since 1974; *Cleorodes lichenaria* (Hufn.), 5.vi.1998; *Hypena crassalis* (Fab.), 9.vii.1998; *Notodonta tritophus* ([D. & S.]), 23.vii.1998. *Ochropleura plectra* L., 17.v.1998, unusual form (Plate 2, Fig. 11).

PARSONS, M. S. — *Heterogenea asella* ([D. & S.]), Raynes Park, Surrey, 7.viii.1998 — only Surrey record this century; *Parascotia fuliginaria* (L.), Raynes Park, Surrey 20.vii.1998; *Hecatera dysodea* ([D. & S.]), Gravesend, W. Kent, 15.vii.1998, and Swanscombe, W. Kent, 18.vii.1998; *Hypena obsitalis* (Hb.), Atherington, W. Sussex, 6.xi.1997 — new to VC13. Also from Westcott Downs, Surrey: *Catarhoe rubidata* ([D. & S.]), 20.vi.1998; *Setina irrorella* (L.), 20.vi.1998; *Xestia rhomboidea* (Esp.), 7.viii.1998.

PLANT, C. W. — An exhibit of *Aprostola* spp. Four species occur in Europe: *A. tripartita* (Hufn.), *A. triplasia* (L.), *A. asclepiadis* ([D. & S.]), and *A. agnorista* Dufay; of which examples of the first three were shown. It was suggested that either of the latter two might occur in Britain, examination of the male genitalia being the most reliable method of certain identification. Moths captured in 1998: *Alcis repandata* (L.) ab. *conversaria* Hb., Froxen Copse, Arne, Dorset, 7 & 28.vi.1998; *Xylena vetusta* (Hb.), Stanmore Common, Middx., 16.x.1998, captured by J. Hollingdale — the first VC21 record since 1880; *Euphyia biangulata* (Haw.), M.o.D. training area, Kirk., 5.vii.1998 — new to Scotland. *Hecatera dysodea* ([D. & S.]), examples from Kent, Spain, and France.

ROUSE, T. - Migrant moths: *Helicoverpa armigera* (Hb.), one of ten, Portland, Dorset, 27.ix.1998; *Heliiothis peltigera* ([D. & S.]), Folkestone, E. Kent, 29.viii.1998; *Mythimna albipuncta* ([D. & S.]), one of 28 taken in Kent between 13.v. and 10.x.1998; *Rhodometra sacraria* (L.), Densole, E. Kent, 1.ix.1998; *Hyles gallii* (Rott.), Sandwich Bay, E. Kent, 26.viii.1998 (R.A.B. Morton); *Spodoptera exigua* (Hb.), Torquay, S. Devon, 11.viii.1998. Aberrations: *Arctia villica britannica* (Ob.), Folkestone Warren, E. Kent, 23.v.1998 (Plate 2, Fig. 1); *Aporophyla lutulenta* ([D. & S.]) ab. *sedii* Guen., Folkestone Warren, E. Kent, 15.x.1998; *Synanthedon culiciformis* (L.) ab. *flavocingulata* Spuler, reared from larva, Orlestone Forest, E. Kent, ii.1998. Other Kentish moths: *Rheumaptera cervinalis* (Scop.), Densole, E. Kent, 19.viii.1998; *Hadena albimaculata* (Borkh.), Folkestone Warren, E. Kent, 25.ix.1998; *Hecatera dysodea* ([D. & S.]), Gravesend, W. Kent, adult netted at dusk, 16.vii.1998, and examples reared from ova found 26.vii.1998.

SMITH, I. F. A photograph of *Eilema complana* (L.) from Ravenshall, Kirk., 4.viii.1997, accompanied by a set specimen.

WARING, P. — An exhibit of ear moths, *Amphipoea* spp., comprising the four British species with notes on distribution and distinguishing features. Dissection of the genitalia is necessary for accurate identification.

WARNE, B. J. — Moths from the Isle of Wight including: *Mythimna l-album* (L.), Binstead, 4.vii.1998; *Cepphis advenaria* (Hb.), 14.v.1998, "woodland"; *Meganola albula* ([D. & S.]), 5.vii.1998; *Elaphria venustula* (Hb.), 19.vi.1998; *Hadena compta* ([D. & S.]), 25.vi.1998 — new to VC10.

WEDD, D. J., Specimens taken or reared in England, Scotland, Ireland & Wales, 1997–1998: (i) *Cyclophora albipunctata* Hufn. A series of the large Scottish form from Loch Rannoch. (ii) *Enargia paleacea* Esp. A typical male and a short series from a crippled female found on a tree near Kincaig. (iii) *Eriopygodes imbecilla* F. Size reduction after 6 generations bred from a Monmouthshire female. (iv) *Odontoglyphos dumetata hibernica* Forder. A typical pair and a fourth generation bred from a very small Burren female. (v) *Diaphora mendica* Cl. f. *rustica* from the Burren, darkening after six generations in captivity, compared with two intermediate males from Rosslare. (vi) *Furcula bicuspis* Borkh. Two specimens bred from a new (private) Buckinghamshire locality. (vii) *Noctua comes* Hb. A bred series from the Findhorn, Morayshire, showing something of the colour-range in this species over two generations. The original parents (found in cop.) were male blackish, female reddish.

YOUNG, D. — Moths caught or reared in 1998: *Semiaspilates ochrearia* (Rossi), Greenham Common, Berks.; *Miltochrista miniata* (Forst.) ab. *flava* Bigneau, Orlestone Forest, E. Kent, 17.vii.1998; *Rheumaptera hastata nigrescens* (Prout), Trinafour, Mid-Perth; *Noctua orbona* (Hufn.), reared from larvae, Icklingham, W. Suff.; *Xanthia gilvago* ([D. & S.]), reared from larvae, Charing, E. Kent, and an adult taken at Dungeness, E. Kent, 27.ix.1998; *Catocala sponsa* (L.), found resting on the ground amongst dead leaves.

BRITISH MICROLEPIDOPTERA

[Nomenclature and classification follows the checklist of Bradley 1998]

BARNETT, R. & EVANS, M. — An exhibit on behalf of the Bristol & District Moth Group. *Calamatropha paludella* (Hübner), Keynsham, Bristol, ST6569, A. Bone, vii.1996. *Salebriopsis albicilla* (H.-S.), Leigh Woods, Bristol, ST5573, M. Evans/E. Dean, 28.vi.1995, confirms the presence of the species at this locality, reported in 1969. *Pediasia aridella* (Thunb.), Gordano Valley NNR, North

Somerset, ST436729, M. Evans/E. Dean, 12.vii.1995. *Hellula undalis* (Fab.), Whitchurch, Bristol, ST67, R. Andrews, 13.x.1995. *Blastobasis decolorella* (Woll.) Whitchurch, Bristol, ST67, R. Andrews 1995. *Commophila aeneana* (Hübner) Bristol, ST613704, M. Evans, 26.v.1998. *Morophaga choragella* (D. & S.), Leigh Woods, ST5573, R. Barnett/A. Pym, 26.vii.1996. *Ancylosis oblitella* (Zell.), Slimbridge, SO7204, N. Woodward, 24.v.1995.

BLAND, K. P.—*Psychoides filicivora* (Mey.) Reared from *Phyllitis scolopendrium* on wall in Stockbridge, Edinburgh (NT2474; VC83). Collected on 15.viii.1998, emerged 27.ix.1998. New to Scotland. *Ochsenheimeria taurella* (D. & S.) taken at Flanders Moss, Perthshire (NS6397; VC87) on 1.viii.1998. First confirmed Scottish record. *Coleophora trochilella* (Dup.) reared from cases on *Achillea millefolium* collected at Kincaig Point, Fife (NT4699; VC85) on 28.iii.1998. Imagines emerged 6–28.vi.1998. New to VC85 and third Scottish site. *Mompha ochraceella* (Curt.) appears to be becoming more common in S. E. Scotland. Two taken at light this year at Blackford, Edinburgh (NT2571; VC83); one on 9/10.viii.1998 and the other on 6/7.ix.1998.

BRITTON, M. R.—*Phyllonorycter leucographella* (Zell.), mines found in several localities in York and in Leeds and appearing to be more prevalent on sheltered bushes; *Cacoecimorpha pronubana* (Hübner), several males seen in September 1998 in York, a female caught Haworth, York, 24.ix.1998 and males seen several days later. *Cataplectica profugella* (Staint.), bred from larvae found on 14.viii.1997, emerging 11.vi.1998. Larva was pale ground colour with reddish-brown markings and louse-shaped. It was found while searching for *Eupithecia pimpinellata* (Hübner) larvae on burnet saxifrage near Askham Bog, York.

BROTHERIDGE, D. Five species from Wiltshire: *Coleophora trigeminella* Fuchs; *C. salicorniae* Wocke; *Dasystoma saliciella* (Hübner); *Isophrictis striatella* (D. & S.); *Euleioptilus carphodactyla* (Hübner).

CLANCY, S. P.—*Psammotis pulveralis* (Hübner) from the Dungeness area of Kent, 4 examples (out of 6 taken) 19.vii–20.vii.1998; *Sciota hostilis* (Steph.), female, New Romney, 21.vi.1998, the second migrant example of the species in the area; *Euzophera cinerosella* (Zell.), male at light, Lydd, 6.vi.1998; *Euchromius ocella* (Haw.), Rye Harbour, East Sussex, P. Philpott, 24.ii.1998; *Phlyctaenia stachydalis* (Germ.), Rye Harbour, East Sussex, P. Philpott, 30.vi.1998.

DAWSON, J.—a series of species local to the south Cambridgeshire (VC29) chalk area; *Phlyctaenia perlucidalis* (Hübner) and *Nascia ciliialis* (Hübner) from the spring-fed fens within the chalk area. Also exhibited an unusual species to the county, *Platytes alpinella* (Hübner) on 10.viii.1998.

DOBSON, A. H.—*Phyllonorycter leucographella* (Zell.): specimens bred from mines collected from *Pyracantha* in the Brighton Hill district of Basingstoke (VC12) on 17.i.1998. New county record for Hampshire.

GILL, N.—A selection of plume moths taken or bred during 1997/98. *Stenoptilia zophodactylus* (Dup.) Allerthorpe Common, Yorks. (first Yorks. record since 1948); *Merrifieldia leucodactyla* (D. & S.), Wharram, Yorks., 19.vii.1997 (new to VC61); *Marasmarcha lunaedactyla* (Haw.), Wharram, Yorks., 19.vii.1997; *Stenoptilia millieridactyla* (Bruand), now widespread in gardens in many parts of Yorks.; *Hellinsia chrysocoma* (Rag.) bred from Thornden Wood, Kent.

HALL, N.M.—An unidentified scythridid taken by day at Greenham Common, Berks, 27.vi.1998. *Pediasia contaminella* (Hübner), Hastings Country Park, East Sussex, 9.viii.1998.

HART, C.—*Stenoptilia islandicus* (Staud.) reared from mossy saxifrage (*Saxifraga hypnoides*) collected in Ben Lawers area. The foodplants of *S. islandicus* in Iceland

and Scandinavia are considered to be *Saxifraga cespitosa* and *S. adscendens*. However, only *S. cespitosa* occurs in Britain and does not appear to occur in the Ben Lawers area where the moth is found. Three days of searching, together with Bernard Skinner, resulted in a single pupa attached to the tip of mossy saxifrage at about 800 m. The surrounding plant was damaged to the extent that the terminal buds of surrounding shoots had been eaten out, which is typical of the feeding pattern of this larva. A small very pale, female specimen emerged.

HARVEY, M. C.—*Eudonia delunella* (Staint.) m.v., Lord's Mead, Lower Kingcombe, Dorset, SY553994, 11.vii.1997.

HECKFORD, R. J.—*Rhigognostis incarnatella* (Steud.), Speybank VC96 10.ix.1998 (with M. R. Young); *Biselachista serricornis* (Staint.), Trowlesworthy Warren, Devon VC3 bred from stems of *Eriophorum angustifolium* 12 & 22.vii.1998, new to Devon. British literature states the larva mines leaves of *Carex* sp.; this is probably wrong and these are probably the first British bred specimens; *Schiffermuelleria grandis* (Desv.), nr. Canonteign Barton, Devon VC3 bred from dead stems of *Hedera helix* 20.iv. & 4.v.1998; *S. subaquileia* (Staint.), Haytor, Devon VC3 bred from cocoon amongst dead *Vaccinium myrtillus* 16.v.1998, never previously bred before as foodplant/life history had been unknown; *Monochroa hornigi* (Staud.), Elstead, Surrey VC17 bred from *Persicaria* sp. 22.v.1998 (with J.R. Langmaid), larva not previously found in the British Isles; *Gelechia senticetella* (Staud.) Canvey Island, Essex VC18 and Crayford, Kent and Dartford, Kent both VC16 bred from *Chamaecyparis lawsoniana* 8.vi.1998, 29.vi.1998 and 3.vi.1998 respectively, larva not previously found in the British Isles; *Oegoconia caradjai* Popescu-Gorj & Căpușe, Plympton, Plymouth, Devon VC3 (exhibitor's garden) bred from dead leaves of *Juniperus* sp. 23.vi.1998; South Benfleet, Essex (VC18) bred from dead *Quercus* leaf 15.vii.1998; *Olethreutes aurofasciana* (Haw.), Hembury Woods, Devon VC3 24.vii.1998, at light (with B.P. Henwood); *Lobesia botrana* (D. & S.), Marsh Mills, Plymouth, Devon VC3 bred from plum bought at local supermarket 6.viii.1998, moth emerged 2.ix.1998, new to Devon; *Bactra lancealana* (Hübner), Trowlesworthy Farm, Devon VC3 bred from stem of *Eriophorum angustifolium* 29.vi.1998, previously unrecorded British foodplant; *Crambus perlella* (Scop.), specimen close to ssp. *monochromella*, Aviemore VC95. 9.ix.1998; *Eudonia truncicolella* (Staint.), Brisworthy Burrows, Devon VC3 bred from *Campylopus* sp. 5.vi.1998; Trowlesworthy Warren, Devon VC3 bred from *Dicranum scoparium* 23.vii, 29.vii and 7.viii.1998; Ditsworthy Common, Devon VC3 bred from *Dicranum scoparium* 1.viii.1998; Gutter Mire, Devon 26.viii.1998. These are areas of Dartmoor with a few *Crataegus* bushes and no woodland. Specimens determined as *E. murana* (Curt.) from similar habitats in southern England may well be misidentified *truncicolella*; *Stenoptilia zophodactylus* (Dup.), Tulloch VC96 10.ix.1998 (with M.R. Young) new to VC96.

HENWOOD, B. *Tebenna micalis* (Mann) reared 10.viii.1998 ex pupa on *Pulicaria* Porthallow, Cornwall. *Sitochroa palealis* (D. & S.) Abbotskerswell, Devon 28.vii.1998. *Palpita unionalis* (Hübner) Abbotskerswell, Devon 21.ix.1998. *Palpita unionalis* (Hübner) Kennack Sands, Cornwall 2.viii.1998. *Olethreutes aurofasciana* (Haw.) Hembury Woods, Devon 14.viii.1998.

HIGGS, G. E. *Amblyptilia acanthadactyla* (Hübner) and *A. punctidactyla* (Haw.) bred from larvae feeding on the flowers of hedge woundwort (*Stachys sylvatica*) at sites in Yardley Chase and Pitsford Nature Reserve, Northants.

HODGE, P. J.—A specimen of *Mecyna flavalis* (D. & S.), flying over short grassland near the cliff-top at Afton Down near Freshwater, Isle of Wight, SZ3685 on 26.vii.1998.

KNILL-JONES, S. A. —A selection of microlepidoptera from Freshwater, Isle of Wight.

LANGMAID, J. R.—*Coleophora wockeella* Zell. Larval cases, and one specimen bred from *Stachys officinalis*, Petworth, W. Sussex. Cases found 1.x.1997, moth emerged 13.vi.1998. *Monochroa hornigi* (Staud.). One specimen bred from *Persicaria* sp., Elstead, Surrey. Larva found 16.xi.1997, moth emerged 24.v.1998. *Caryocolum blandelloides* Karsholt. Six specimens bred from *Cerastium fontanum*, two from Embo (VC107), two from Littleferry (VC107) and two from Rosmarkie (VC106). Larvae found 27 & 28.vi.1998, moths emerged vii.1998. *Cosmopterix scribaella* Zell. Two specimens bred from *Phragmites australis*, one from Portsmouth and one from Gosport, Hants. Mines found 29 & 30.ix.1997, moths emerged 18.v.1998. New to Hants. *Scythris empetrella* K. & N. Two specimens taken at Findhorn, Morayshire 26.vi.1998. *Bactra lacteana* Caradja. A series of six specimens taken at Plaitford, VC8, 31.vii. & 6.viii.1998. Second known locality in England, and new to VC8.

MANNING, D. V. & RICHARDSON, J. A.—*Pterophorus galactodactyla* (D. & S.), autumn and spring feeding of the larvae on *Arctium minus* spp. *minus* (lesser burdock), a newly recorded host plant.

MCCORMICK, R.—1. Devon records. *Tebenna micalis* (Mann), larvae, pupae and empty pupa cases from Dawlish Warren, 18.viii.1998. *Pseudotelphusa scalella* (Scop.), at light, Hembury Woods, 16.vi.1996, new to Devon. *Ptycholomoides aeriferanus* (H.-S.), at light, Colaton Raleigh Common, 26.vii.1997, new to Devon. *Crambus uliginosellus* Zell., seen in numbers at Colaton Raleigh Common, 20.vii.1998 (also seen July 1997). *Sitochroa palealis* (D. & S.), All Hallows School, nr Rousden, 13.viii.1998, and Thatcher Point, Torquay, 18.viii.1998; there are few records of this species in Devon. *Phlyctaenia stachydalis* (Germ.), seen commonly at Bramble Wood nr Holsworthy, 30.vi.1998 (larvae found on 12.ix.1998), Great Torrington area, 4 & 5.viii.1998, and seen near the Lyd Valley on 18.vii.1998. *Oncocera semirubella* (Scop.), All Hallows School, nr. Rousden, 2.vii.1998 and 13.viii.1998. *Pempelia genistella* (Dup.), one taken at All Hallows School, 13.viii.1998; attempts to find the larvae at Dawlish Warren, where a number of adults have been seen, have so far failed.

2. Species taken or bred from the Burren, Ireland 17–22.v.1998. *Aethes piercei* Obraz. one of a number seen in Kinvara; *Crambus lathoniellus* (Zinck.), the brown Burren form of this species was seen at most localities visited. *Microstega pandalis* (Hüb.), two of the three specimens that came to light at Kinvara; *Anania funebris* (Ström.), the Irish form was taken at Cappaghmore and Loch-na-Bron, 22.v.1998.

NASH, S.—Immigrant Pyralidae taken at Durlston Country Park, Swanage, Dorset including nine *Palpita unionalis* Hübn., 18–26.ix.1998 and *Sitochroa palealis* (D. & S.), 22.ix.1998. An aberration of *Pyrausta aurata* (Scop.), Swindon, Wilts, 10.viii.1998.

O'KEEFE, D.—*Celypha woodiana* (Barr.), reared ex larvae on *Viscum album*, Stoke Orchard, Gloucs., collected 13.vi.1998, emerged 7–9.vi.1998. *Eucosma metzneriana* (Treats.), Wilmington, Kent, 6–12.vi.1998. Apparently established in this locality. Only 5 previous records for Britain. *Ancylis tineana* (Hüb.), reared ex larvae on *Betula pubescens*, Rannoch, Perthshire, collected 22.ix.1997, emerged 10–17.vi.1998. *Athrips tetrapunctella* (Thunb.), Tulloch Moor, Inverness-shire, 24.v.1998. *χystophora pulveratella* (H.-S.), Tulloch Moor, Inverness-shire, 24.v.1998. *Coleophora wockeella* Zell., reared ex cases on *Betonica officinalis*, nr Dunsfold, Surrey, collected 14.x.97, emerged 27–29.vi.1998. *Dialectica imperialella* (Zell.), reared ex mines in *Symphytum*., Wicken Fen, Cambridgeshire, collected 15.ix.1997, emerged 10–13.iv.1998. *Parectopa ononidis* (Zell.), reared ex mines in *Trifolium repens*, Beltinge,

Kent, collected 22.iv.1998, emerged 11–14.v.1998. *Antispila treitschkiella* (F. v. R.), reared ex mines in *Swida*, Shoreham, Kent, collected 4.ix.1997, emerged 16–25.v.1998. *Acanthopsyche atra* (L.), female bred from a case fixed to a pine trunk, Normandy, Surrey, emerged 18.v.1998. The female was taken to the site on 20.v.1998 at about 7 pm when she was 'calling' and a male assembled shortly after. First Surrey record this century. *Phyllocnistis xenia* Hering, reared ex mines in *Populus canescens*, Sandwich, Kent, collected 12.viii.1998, emerged 17 28.viii.1998. Now locally abundant in East Kent. *Mompha divisella* H.-S., reared ex galls on *Epilobium montanum*, St Ives, Cornwall, collected 5.viii.1998, emerged 23.viii–4.ix.1998.

PARSONS, M. S. Dorset (VC9): *Tebenna micalis* (Mann), Charmouth, larvae coll. 3.ix.1998. West Sussex (VC13): *Tebenna micalis* (Mann), Atherington, larvae coll. 4.x.1998. East Sussex (VC14): *Choreutis pariana* (Clerck), foot of Beachy Head, Eastbourne, larvae coll. 6.ix.1998; *Adoxophyes orana* (F. v. R.), Icklesham, 28.vii.1998, coll. I. Hunter; *Diasemiopsis ramburialis* (Dup.), Icklesham, 29/30.viii.1998, coll. I. Hunter; *Cryptoblabes gnidiella* (Haw.), Bexhill, larvae December 1997, ex-pomegranates. Surrey (VC17): *Monopis fenestratella* (Heyden), Ashtead Common, 19.vi.1998; *Argyresthia trifasciata* Staud., Raynes Park, 20.v.1998–23.v.1998 (2nd to 5th British records); *Argyresthia sorbiella* (Treitschke), Denbies hillside, 20.vi.1998; *Olethreutes bifasciana* (Haw.), Raynes Park, 6.vii.1998; *Eucosma conterminana* (Guen.), Raynes Park, 6.viii.1998; *Strophedra nitidana* (Fab.), Ashtead Common, 19.vi.1998; *Cydia conicolana* (Heylaerts), Raynes Park, 20.v.1998; *Elegia similella* (Zinck.), Ashtead Common, 19.vi.1998; *Cnaemidophorus rhododactyla* (D. & S.), Denbies hillside, larvae coll. 25.v.1998 (first vice-county record); *Merrifieldia baliodactylus* (Zell.), Denbies hillside, larvae coll. 25.v.1998. Middlesex (VC21): *Psychoides filicivora* (Meyr.), Natural History Museum gardens, larvae coll. 30.iii.1998, found amongst decaying London plane leaves (first time the larva has been found in the wild in the British Isles).

PLANT, C. W. *Tebenna micalis* (Mann) examples from among many seen flying on SW coastline nr Kirkcudbright. First records for Scotland.

ROUSE, A.—*Psammotis pulveralis* (Hübner) male and female at m.v., Dungeness, Kent, 20.vii.1998. *Sciota adelphella* (F. v. R.), Densole, Kent, 14.vii.1998; *Dioryctria schutzeella* Fuchs, Orlestone, Kent, 8.vii.1998; *Ephestia kuehniella* Zell. Folkestone Warren, Kent, 2.xii.1997.

SHARPE, P.—Plume moths from Northants.

SIMPSON, A. N. B.—*Caryocolum blandelloides* Karsholt, Loch Fleet, E. Sutherland, reared from larvae in seedheads of *Cerastium fontanum* coll. 27.vi.1998. *Batrachedra pinicolella* (Zell.) beaten from *Pinus sylvestris*, Hartlebury Common, Worcs., 29.vi.1998, first record VC37; *Metzneria aprilella* (H.-S.) bred from seedhead *Centaurea scabiosa*, Bredon Hill, Worcs., 2.vii.1998, confirms now resident in VC37. *Stenoptilia zophodactylus* (Dup.), Knightsford Bridge, Worcs., 1.ix.1998, first record VC37. *Cydia humulana* (D. & S.), 24.v.1998, Knightsford Bridge, Worcs., first record VC37. *Scythris empetrella* K. & N., beaten from *Calluna* 26.vi.1998, Findhorn dunes, Morayshire.

SIMS, I.—*Micropterix tunbergella* (Fab.) adults from beech (*Fagus sylvatica*) trunks, Homefield Wood, Medmenham, Marlow, Bucks, 27.iv.1998. *Eriocrania chrysolepidella* Zell. adults ex larvae in hazel (*Corylus avellana*), Unhill Wood, Streatley, Berks, 5.v.1997, moths emerged 8.iii.1998. *E. salopiella* (Staint.) adults ex larvae in birch (*Betula pendula*), Bear Wood, Wokingham, Berks., 27.iv.1997, moths emerged 2.iii.1998. *Stigmella ulmariae* (Wocke) adults and cocoon in mine in meadowsweet (*Filipendula ulmaria*), Medmenham, Bucks, 18.ix.1997, moths emerged 6.iv.1998, new vice-county record. Also, mine in meadowsweet, Pensthorpe Nature

Reserve, Fakenham, Norfolk, 19.viii.1998. New vice-county record. *S. hybnerella* (Hübner.) adult ex larva mining hawthorn (*Crataegus monogyna*), River Loddon, Lower Earley, Reading, Berks., 30.ix.1995, moths emerged 10.v.1996. *Adela cuprella* (D. & S.) adult at mv light, Ashley Hill Forest, Knowl Hill, Berks., 29.iii.1998, new vice-county record. *Monopis obviella* (D. & S.) adult to house lights, Lower Earley, Reading, Berks., 23.vii.1998 and 21.ix.1998. *M. crociocapitella* (Clem.) adults by day, in flat, Whitley, Reading, Berkshire, 23.viii.90 and 20.vi.98. *Tinea pellionella* (L.) males -F2 generation ex female, my house, Lower Earley, Reading, Berkshire, 16.vii.1997. Larvae fed on fur, feathers and wool, moths emerged 1.vii.98. Females F1 generation, ex same female, moths emerged 20.ii.1998. Larval cases and pupal exuvia F1 generation. *Bucculatrix albedinella* Zell. adult and cocoon ex larva on wych elm (*Ulmus glabra*), Homefield Wood, Medmenham, Bucks., 23.vii.1997, emerged 15.v.1998. *B. cidarella* Zell. adult and cocoon ex larva, alder (*Alnus glutinosa*), River Loddon, Lower Earley, Reading, Berks., 16.ix.1997, emerged 6.v.98. *Caloptilia populetorum* (Zell.) adults, cocoon and pupal exuvia ex larvae on *Betula*, Hainault Forest, Chigwell Row, Essex, 22.viii.1998, emerged 9.ix.1998. Larval fold in leaf, Bear Wood, Wokingham, Berks., 29.viii.1998. *C. elongella* (L.) adults, larval fold, cocoon and pupal exuviae ex larvae on *Alnus*, Medmenham, Marlow, Bucks, 15.ix.1992, emerged 26.ix.1992. *C. betulicola* (Hering) adults, larval fold, cocoon and pupal exuvia ex larva on *Betula*, Syderstone Common, Syderstone, Norfolk, 15.viii.1998, emerged 7.ix.1998. *Parornix carpinella* (Frey) adult, larval folds and cocoon ex larvae on hornbeam (*Carpinus betulus*), Hainault Forest, Chigwell Row, Essex, 4.x.1997, moths emerged 22.ii.1998. *Callisto denticulella* (Thunb.) adult, cocoon, larval workings and parasites on crab apple (*Malus sylvestris*), Medmenham, Bucks., 20.vii.1996, emerged 15.iv.1997. *Leucospilapteryx omisella* (Staint.), adults, mines and cocoons ex larvae in mugwort (*Artemisia vulgaris*), River Loddon, Lower Earley, Berks., 16.ix.1997, moths emerged 8.ii.1998. *Phyllonorycter muelleriella* (Zell.) adults ex larvae in oak (*Quercus robur*), Whitecroft, Forest of Dean, Glouc., 16.xi.1997, moths emerged 24.ii.98; mines in oak, Cirencester Park, Cirencester, Glouc., 16.xi.1997. *P. lantanella* (Schr.) adults and mine ex larvae in wayfaring tree (*Viburnum lantana*), Cirencester Park, Cirencester, Glouc., 16.xi.1997, moths emerged 10.iii.1998. *P. viminalis* (Staint.) adult and mine ex larva in osier (*Salix viminalis*), reed bed, Woolhampton, Berks., 26.x.1997, emerged 16.iii.1998. *P. strigulatella* (Zell) adults (2), and first mine ex larvae in grey alder (*Alnus incana*), Medmenham, Marlow, Bucks, 27.xi.1997, moths emerged 12.ii.1998. First sighting here in six or seven years. Adults (5) ex larvae in grey alder, Baynes Wood Nature Reserve, Greenham Common, Berks., 16.xi.1997, moths emerged 1.ii.1998. Adult (1) and second mine ex larvae in alder (*Alnus glutinosa*), an unusual food plant, Blacknest Wood, Brimpton, Berks., 10.xi.1997, moth emerged 24.11.1998. Appears to be spreading, perhaps by using the commoner *A. glutinosa*. Also reared from grey alder on western edge of Swindon, Wiltshire, Feb. 1998. *P. anderidae* (Fletch.) adults ex larvae in birch, Litchet Plain, Blackbush, Hants., 8.xi.1997, emerged 20.ii.1998; adults and mine ex larvae in birch, Upper Common, Bucklebury, Berks., 16.xi.1997, emerged 18.ii.1998. *P. emberizaepenella* (Bouché) adult, and mine, ex larva in honeysuckle (*Lonicera periclymenum*), Oldpond Copse, Reading, Berks., 7.x.1997, emerged 28.ii.1998. *Ypsolopha sequella* (Clerck.), adult, mv light, Ashley Hill Forest, Knowl Hill, Berks., 30.vii.1996. *Coleophora laricella* (Hübner.), adults and cases, on larch (*Larix decidua*), Pinewood Studios, Iver, Bucks., 23.iv.1998, emerged 8.v.1998. *C. anatipennella* (Hübner.) adult, and case, on sloe (*Prunus spinosa*), River Loddon Lower Earley, Reading, Berks., 28.v.1989, emerged 13.vi.1989; adult and case on lime (*Tilia vulgaris*), Oaken Grove,

Medmenham, Berks., 11.vi.1998, emerged 27.vi.98. *C. ibipemella* Zell. adult and case on oak sapling, River Loddon, Lower Earley, Reading, Berks., 30.v.1998, emerged 20.vi.1998. *C. artemisicolella* Bruand. adults, larval feeding sites and cases on mugwort (*Artemisia vulgaris*), River Loddon, Lower Earley, Berks., 26.ix.1997, emerged 15.vii.1998. Also recorded at Burnham Beeches, Slough, Berks. (VC24) and Homefield Wood, Medmenham, Bucks (VC24). *Elachista humilis* Zell. adult, and pupal exuvium, ex larva mining grass, Stoke Row, Oxon., 9.v.1998, emerged 10.vi.1998. *E. bisulcella* (Dup.) adult and pupal exuvium ex larva mining grass, Stoke Row, Oxon., 9.v.1998, emerged 10.vi.1998.

SMITH, I. F.—Photographs of larvae, pupae and imagines of: *Bedellia sommulentella* (Zell.), first records from VCs Cheshire and Derbyshire. *Epermenia chaerophyllella* (Goeze), first post-1866 record from VC Derbyshire. *Cochylidia implicitata* (Wocke), first record from Scotland: Wigtownshire. *Stenoptilia millieridactyla* (Bruand), first larva found in a non-garden site on *Saxifraga hypnoides* in mainland Britain. *Hellensia osteodactylus* (Zell.), larvae found on *Senecio jacobaea*. *Emmelina monodactyla* (L.) two generations of larvae in 1998: May and August.

WARNE, B. J. Pyralidae from Binstead, Isle of Wight: *Sitochroa palealis* (D. & S.) 23.vii.1998; *Palpita unionalis* (Hübner) 25.ix.1998. *Nephoterix angustella* (Hübner) 2.vii.1998; *Elegia similella* (Zinck) 20.vi.1998 (third IOW record). *Homoeosoma sinuella* (Fab.) 9.vii.1998.

YOUNG, M. R. 1. Some scarce Scottish species. *Lampronia capitella* (Clerck): the Aberdeenshire locality for this species was destroyed in 1997. Are there any other current British sites for the species? *Olethreutes olivana* (Treits.), examples of the typical Scottish form compared with a smaller darker Yorkshire form. *Achroia grisella* (Fab.) Purgavie, Angus, 7.vii.1998, coll. R. Knill-Jones. This species has recently been very scarce in Scotland.

2. Scarce species from the Inner Moray Firth coast. The coastal area running from Findhorn past the Black Isle to Golspie has a favourable climate, varied natural habitats and a range of interesting species. *Stigmella spinosissima* (Waters), reared, Embo Links, Dornoch, emerged v.1997; *Coleophora mayrella* (Hübner), Littleferry Dunes, Golspie, 27.v.1998; *Agonopterix carduella* (Hübner), Rosemarkie Coast, Black Isle, reared 1.viii.1998; *Scythris empetrella* K. & N., Findhorn Dunes, Moray, 26.vi.1998; *S. picaepennis* (Haw.), Littleferry Dunes, Golspie, 27.vi.1998; *Epiblema tetragonana* (Stephens), Rosemarkie Coast, Black Isle, 28.vi.1998.

FOREIGN LEPIDOPTERA

BAILEY, K. E. J.—*Danaus chrysippus* L. taken near Kyrenia, North Cyprus, 10.x.1998. The exhibitor stayed in the area from 6.x to 16.x. A single example was noted on 8.x followed by increasing numbers along the north coast over several days. In some areas it became the most prolific butterfly. It was seen from the Kyrenia area as far east as the Kantara Pass. By 14.x it was becoming scarce, although several were seen in the Famagusta area on the south coast. They appear to have been part of a southward migration from Turkey. During this period there were frequent strong northerly winds. The exhibitor was resident in Cyprus during 1960–1962, and travelled widely, yet never saw a single example.

CORLEY, M. F. V.—(1) *Herpetogramma licarsisalis* Walker, a Pyralid new to Europe (Plate 2, Fig. 13). A single specimen of this species was taken near Mexilhoeira Grande in Algarve, Portugal, in x.1997 by Adrian Gardiner, and subsequently named by Michael Shaffer at the Natural History Museum.

H. licarsisalis is a widespread species in the Old World tropics. The specimen was assumed to be a casual migrant. However, in ix.1998, MFVC found the moth to be frequent in a number of sites in central and western parts of Algarve; the eastern part was not visited. Single specimens were subsequently taken at Santo André on the west coast south of Lisbon, and in the Serra de Sao Mamade on the border with Spain, almost directly east of Lisbon. The larval foodplant in Portugal is not known. Since it was clearly well established in Southern Portugal, MFVC predicted that it would soon be found in Spain and Britain. In fact, Spanish specimens were being exhibited simultaneously by Hall (q.v.) and a single *licarsisalis* soon turned up in Britain.

(2) Portuguese Sterrhinae. This subfamily of the Geometridae is one of the groups of Lepidoptera which show the greatest contrast between Britain and southern Europe. At present 96 species (including 59 *Idaea*) are known from Portugal compared with 42 (including 20 *Idaea*) from Britain, and this British total can only be reached by the inclusion of rare migrants, adventives and doubtful records. These moths thrive in the hot dry summers of southern Europe. The larvae can live on withered leaves, which are virtually the only leaves of herbaceous plants to be found in the southern summer. During the hottest and driest part of the year, from June to mid-September, temperatures can reach 40 °C. Few noctuids are flying but small flimsy geometers are abundant.

Some species are very common and are found almost anywhere, but others are more local and are clearly ecologically specialised, though it is usually difficult to see what the requirements are. Some species are univoltine, but others have two or more generations in the year, giving rise to successively smaller and smaller moths as the pabulum desiccates. Some species vary very little, but a number have two colour forms and some show greater variation. Presence or absence of a median shade between two cross-lines occurs in a few species, as in British *aversata*. *I. belemiata* Mill., although not varying greatly in Portugal, is of a quite different form from those found in most of Spain and France, which resemble *dimidiata*.

New species continue to be described from the Iberian Peninsula. Six Portuguese species of Sterrhinae were described in the 1970s or 1980s, and six other species have been added to the Portuguese list in the last eight years. More could await discovery. There is uncertainty about the taxonomic status of a few species. *I. minuscularia* Ribbe may be only a subspecies of *I. seriata* Schrank, and the position of *I. vulpinaria* H.-S. (supposed to be a synonym of *I. rusticata* D.&S.) remains in question.

The identification of species in such a large genus as *Idaea* can be a problem. The examination of genitalia is often necessary, not just for certainty, but to get a pointer to possible identification. The genitalia of many species have not been figured, or are incompletely figured, even for males, and few females are figured at all. Culot is still useful for identification of the more distinctive species, but cannot be relied upon as so many species have been described since it was published. However, they do get easier to identify as the number of species one has not yet seen diminishes.

35 *Idaea* species and 18 other Sterrhinae were exhibited: *Idaea litigiosaria* Boisd., *I. lusohispanica* Herb., *I. sardonata* Homberg, *I. mediaria* Hb., *I. sericeata* Hb., *I. antiquaria* H.-S., *I. ochrata* Scop., *I. vulpinaria* H.-S., *I. attenuaria* Ramb., *I. alyssumata* Mill., *I. circuitaria* Hb., *I. incisaria* Stdgr, *I. calunetaria* Stdgr, *I. belemiata* Mill., *I. elongaria* Ramb., *I. obsoletaria* Ramb., *I. blaesii* Lenz & Hausmann, *I. lutulentaria* Stdgr, *I. bigladiata* Herb., *I. longaria* H.-S., *I. minuscularia* Ribbe, *I. carvalhoi* Herb., *I. dimidiata* Hufn., *I. subrufaria* Stdgr, *I. subsericeata* Haw., *I. cervantaria* Mill., *I. infirmaria* Ramb., *I. eugeniata* Mill., *I. predotaria* Hartig, *I. exilaria* Guen., *I. ostrinaria* Hb., *I. aversata* L., *I. degeneraria*

Hb., *I. straminata* Borkh., *I. deversaria* H.-S., *Cleta ramosaria* Vill., *Anthometra plumularia* Boisd., *Cyclophora puppillaria* Hb., *C. hyponoea* Prout, *C. suppunctaria* Zell., *Timandra comae* A. Schmidt, *Scopula ornata* Scop., *S. nivellearia* Ob., *S. decorata* D.&S., *S. decolor* Stdgr, *S. marginepunctata* Goetze, *S. imitaria* Hb, *S. emutaria* Hb, *S. minorata* Boisd., *Glossotrophia annae* Mentzer, *G. asellaria* H.-S., *Rhodostrophia calabra* Petagna, *Rhodometa sacraria* L.

(3) Portuguese Momphidae. Until recent times the family Momphidae included a number of groups of genera which are now treated as separate families. These families are Batachedridae, which is not represented in Portugal, although *Batachedra parvulipunctella* Chrétien was recorded erroneously, Agonoxenidae, with only two species in Portugal, Momphidae in the strict sense, which is also poorly represented, mainly because of the scarcity of the willowherb family (Onagraceae), and Cosmopterygidae, which is relatively well represented.

(i) Agonoxenidae: *Tetanocentria buvati* Baldizzone, an autumn-flying species found in evergreen oak-woods. The foodplant is unknown, but all Agonoxenidae species for which the pabulum is known have larvae living in bark, in twigs or in berries. *T. albanica* Rebel, known from a single disjunct site in Portugal, but otherwise found very locally in Central and Eastern Europe.

(ii) Momphidae: *Urodeta hybernella* Stdgr, a cistus-feeding species. *Mompha miscella* D.&S., which appears to be attached to *Halimium* rather than *Helianthemum*, and *M. epilobiella* Roemer, which feeds exactly as it does in Britain. Besides the three species exhibited, *M. subdivisella* Bradley is recorded, but requires confirmation.

(iii) Cosmopterygidae: This is the largest family with 17 species recorded.

Although many of them have metallic markings, the majority are night-flying. The exhibitor reported that one of them, *Alloclita recisella* Stdgr, appeared in small numbers at torch-light as soon as his mercury vapour light was turned off, whereas none had been seen before. 15 of the species were exhibited: *Gisilia stereodoxa* Meyr., larva on *Acacia*. *Alloclita recisella* Stdgr, life history unknown. *Vulcaniella grabowiella* Stdgr, larva in a case on leaves of *Lavandula*. *V. rosmarinella* Wals., a leaf-miner on *Rosmarinus*. *V. fiordalisa* Petry, larva possibly on *Helichrysum*. *Eteobalea beata* Wals. & *E. intermediella* Riedl, which as a group are reported from roots of *Linaria* & *Antirrhinum*. *E. dohrnii* Zell., larva in the roots of *Plantago albicans*. *Isidiella divitella* Const., larva in spun leaves of *Helichrysum*. *Coccidiphila ledereriella* Zell., larva reported from a number of plants, perhaps feeding on dead leaves. Reared by the exhibitor from pupae in seed capsules of *Cistus*. *C. gerasimovi* Danilevsky, larva on eggs of coccids. *Pyroderces argyrogrammos* Zell., larva in seed-heads of various thistles. *Cosmopteryx crassicervicella* Chrétien, life history unknown & *C. pulcherrimella* Chambers, a leaf-miner on *Parietaria* (Urticaceae). The two species not available for exhibiting were: *Cosmopteryx zieglereella* Hb., a leaf-miner on *Humulus* (Urticaceae), and *Pancalia latreillella* Curtis, mining petioles and rootstocks of *Viola*.

HALL, N. M. (1) A comparison of *Menophra abruptaria* Thunb., *M. japygiaria* Costa & *M. nythemera* Geyer, three of the commoner *Menophra* species in Europe. The display included upper sides and undersides of normal and melanic specimens of *abruptaria*.

(2) Moths from France: (i) From Ile d'Olonne, Vendée, 21.v.1998: *Hyphoraia testudinaria* Geoffroy. *Lacanobia blenna* Hb. (A very dark form, with two "normal" *blenna* for comparison). (ii) From Ondres Plage, Landes, 14.vi.1998: *Agrotis ripae* Hb. (A very weakly marked form), *Cucullia gnaphalii* Hb.

(3) Moths from Spain: (i) Pays Basque: From Parque Garaio, Vitoria, Alava, 26.v.1998: *Hyphoraia dejeani* Godart (a Spanish endemic, which is in the red list for Spain,

but was nevertheless very common at Garaio), compared with *testudinaria* which is a much commoner species looking very similar to *dejeani* in the resting position when the hindwings are invisible. *Oligia versicolor* Borkh. (an attractive form). From Arminza, Vizcaya, 13.vi.1998: *Pharmaeus fusconebulosa* DeGeer (an unusually patterned form). (ii) Aragon: From Ontiñena, Huesca, 28 & 29.v.1998: *Cucullia xeranthemi* Boisds., *Hadena rivularis* Fab. (a form with a thickened subterminal white line). From Biel, Zaragoza: *Dicycla oo* L., bred from gravid female. (iii) Cataluña: From El Hospitalet del Infant, Tarragona: *Pseudozarma bipartita* H.-S., 5.6 & 8.v.1998 (an uncommon noctuid moth; Calle, in Noctuidos Españoles, states that there is a single generation in August/September, but these are clearly a spring brood). *Eublemma himmighoffeni* Millière, 1-4 & 9.vi.1998 (a rare noctuid about which little is known). *Helicoverpa armigera* Hb. (bred from *Antirrhinum*). *Idaea degeneraria* Hb. (second brood, bred from gravid female). *Idaea sardontata* Homberg. 12-13.vi.1997, 31.v & 3.vi.1998. (iv) Castilla y Laón: From Cebreros, Avila: *Idaea lulentaria* Stdgr (bred from a gravid female; the larvae fed slowly over the winter on decaying dock leaves). (v) Andalucía: From Vera Playa, Almería: *Idaea alicantaria* Reisser, 22.v.1996 & 19.vi.1997. *Zebeeba falsalis* H.-S. 18.x.1998 (a form with a different jizz to "normal" Spanish *falsalis*). From Mini-Hollywood, Almería: *Hyperlais biskralis* Chrétien 17.v.1993 (new to Spain & Europe). From Playa de los Genoveses, Almería: *Spodoptera exigua* Hb. (a total melanic, compared with an unusually bright and colourful *exigua* from Gran Canaria).

(4) Moths from Fuerteventura, Canary Islands: From Oliva Beach Apartments, Corralejo: *Eudonia parviangusta* Nuss.Karsholt & Meier, iii.1998 (Not in the Klimesch & Arenberger checklist for the Canary Islands [K & A]). *Lamoria anella* D.&S., iii.1998 (not in K&A). *Dolicarthria bruguerialis* Dup., iii.1998 (Not in k&A). *Ancylosis arenosella* Stdgr, *Ancylosis imitella* Hampson, *Ancylosis convexella* & other *Ancylosis* spp. still to be identified. ii.1997 & iii.1998 (Species of *Ancylosis* were extremely common at the apartments. Most were *arenosella*, a narrow-winged species which is very variable with many beautiful forms. Most of the *Ancylosis* species that were not *arenosella* were *imitella*. The *imitella* were slightly smaller and had a black central stripe on the thorax which made them easy to pick out. The range of patterns was at least as great as those of *arenosella*. K&A list nine *Ancylosis* spp. for the Canary Islands most of which have variable wing patterns). *Agdistis bifurcatus* Agjo, ii.1997. *Agdistis pseudocanariensis* Arnbrgr, ii.1997. *Amblyptilia acanthadactyla* Hb., ii.1997. *Lantanophaga pusillidactylus* Walker, ii.1997 (Plume moths were well represented at Corralejo in ii.1997, though hardly any were found in iii.1998).

(5) *Herpetogramma licarsisalis* Walker from the Canary Islands & Spain. These were displayed as "An unidentified Pyralid moth, presumably close to *ruralis* (Spilomelinae)". It was first encountered at Corralejo, Fuerteventura, xi.1997, where it was common and frequently found indoors, and then at Vera Playa, Almería, 18.x.1998. However, M. Corley (q.v.) displayed what was clearly the same species found in Portugal in 1997, new to Europe, and his specimens had been identified at the BM (Nat.Hist). The species looks like a small dark *ruralis*, and males have a distinctive brush of black scales on the forewing costa, usually hidden on the underside.

(6) An unidentified noctuid moth: 3 specimens from Oliva Beach Apartments, iii.98. They appeared to be a species of *Powellinia*.

KEMP, R. J. & HALL, P. R. — A "Playboy" new to Britain. The first record of the South African Lycaenid butterfly *Virachola antalus* Hopffer. Peaches air-freighted to the UK from Mpumalanga (formerly part of the Transvaal) in South Africa during xi.1996 arrived at a handling depot in Colnbrook, Buckinghamshire. Inspection of the produce revealed frequent large entry holes originating at the calyx end of the

fruit and ending internally around the stone. Around a dozen larvae were recovered from these fruits. One pupated and finally hatched in i.1997 and was identified as a female of the lycaenid butterfly *Virachola* (formerly *Deudorix*) *antalus* (Hopffer, 1855). *V. antalus* is common in bush country throughout most of Africa except the southern tip. Its larval foodplants are varied and include bean pods and fruits of Leguminosae, Myrtaceae, Olacaceae, Umbelliferae and Rosaceae. In the case of the latter it can be a minor pest in orchards feeding on fruits of the peach and nectarine (*Prunus persica*). In South Africa its vernacular name is Brown Playboy presumably referring to the darker brown colour of the male and its fast and elusive habit. As far as the exhibitors are aware this is the first record for this species in Britain.

LANGMAID, J. R. — (i) *Coleophora cornutella* H.-S. One specimen, bred from *Betula pubescens*, with its larval case, from Valkenswaard, Holland. Case found 24.iii.1998, moth emerged 18.v.1998. (ii) *Denisia similella* Hb. One specimen bred from a larva found under bark of *Cupressus* sp., from Malle, Belgium. Larva found 25.iii.1998, moth emerged 15.iv.1998. (iii) *Denisia albimaculea* Haw. One specimen from larva found under bark of *Larix*, from Valkenswaard, Holland. Larva found 24.iii.1998, moth emerged 22.iv.98. (iv) *Harpella forficella* Scop. One specimen bred from a rotting fallen branch of oak, from Malle, Belgium. Larva found 25.iii.1998, moth emerged 14.v.1998.

LUCKENS, C. J. — Butterflies from Sicily, 12–26.v.1998.

The butterfly fauna of Sicily is especially interesting as it is Mediterranean with Afroiberian and Balkan affinities, and also provides a refuge for alpine species which normally occur much further north. (i) *Melitaea aetheriae* Hb. (Afroiberian). (ii) *Anthocharis damone* Boisd. & *Spialia orbifer* Hb., both "Balkan". *damone* was found almost wherever *Isatis tinctoria* (Woad) flourished in the Etna, Peloritani and Nebrodi ranges. *orbifer*, which appeared to be local and scarce, is a skipper which occurs eastwards from Austria and in the Balkan Peninsula, but is replaced by *Spialia sertorius* in Western Europe, including the whole of mainland Italy. (iii) *Cyaniris semiargus* Rott., an "alpine" species, from the Madonie Mountains which rise to nearly 2000m. (iv) *Cupido minimus trinacriae* Verity, *Melanargia occitanica pherusa* Bosd. & *Hipparchia aristaeus blachieri* Fruhstorfer, three distinct Sicilian endemic subspecies. (v) *Melicete athalia celadussa* Fruhstorfer & *Boloria euphrosyne* L., which reach their southernmost limits in Sicily. (vi) *Maniola jurtina* L., a splendid very large form.

MARTIN, G. — Lepidoptera from Madeira, 20.vii.98 to 2.viii.1998.

The main intention of the visit was to survey the Lepidoptera of the Ecological Parque of Funchal. The base was Casa do Barreiro (970 m) from where one to three 125 Watt mv traps were run every night. An mv trap was also used at Casa de Ariero (1593 m) for one night and in the Botanical Gardens in Funchal for two nights. Other records were obtained on day trips. 44 species of macrolepidoptera, 26 species of pyrale and two species of plume moth were recorded which is just over half the total for the island (142 to date). Although the fauna of Madeira is small, many species or subspecies are endemic to either Madeira or Macaronesia (Azores, Madeira, Canaries & Cape Verdes). All identified species were exhibited: (Abbreviations: ME = Madeiran Endemic, MacE = Macaronesian Endemic B.-B. = Bethune-Baker)

Pterophoridae: *Amblyptilia acanthadactyla* Hb., *Gypsochares nielswolffi* Arenberger & Gielis (ME). Pyralidae: *Cryptoblabes gnidiella* Mill., *Pempeliella lundbladi* Rebel (ME), *Pararotruda nesiotica* Rebel (MacE), *Agriphila atlanticus* Woll. (ME), *Eudonia angustea acuminatella* Stt. (ME ssp.), *E. decorella maderensis* Rebel (ME ssp.), *E. scoriella wollastoni* B.-B. (ME ssp.), *Udea atlanticum* B.-B. (ME), *U. ferrugalis* Hb., *U. numeralis* Hb., *U. maderensis* B.-B. (ME), *Pyrausta sanguinalis* L.,

Uresiphita gilvata F., *Botyodes diniasalis* Walk., *Mecyna asinalis* Hb., *Palpita unionalis* Hb., *Spodolea recurvalis* F., *Duponchelia fovealis* Zell., *Herpetogramma bipunctalis* F., *Nomophila noctuella* D.&S. Geometridae: *Xenochlorodes nubigena* Woll. (ME), *Cyclophora puppillaria* Hb., *C. maderensis* B.-B. (ME), *Scopula irrorata* B.-B. (ME), *Idaea maderae* B.-B. (ME), *Rhodometra sacaria* L., *Xanthorhoe ruplicola* Woll. (ME), *X. centrostrigaria* Woll. (Also found in N. America & Canaries), *Eupithecia latipennata* Prout (ME), *Gymnoscelis insulariata* Stt. (MacE), *G. lundbladi* Prout (ME), *Menophra maderae* B.-B. (ME), *Ascotis fortunata* Blachier (MacE). Sphingidae: *Acherontia atropos* L. Noctuidae: *Cryphia maderensis* B.-B. (ME), *Hyphenalidalis* Hb., *Autographa gamma* L., *Cornutiplusia circumflexa* L., *Thysanoplusia orichalcea* F., *Ctenoplusia limbirena* Guen., *Chrysodeixis chalcites* Esp., *Galgula partita* Guen. (Also found in N. America & Canaries), *Paradrina clavipalpis* Scop., *Spodoptera exigua* Hb., *S. cilium* Guen., *Euplexia dubiosa* B.-B. (ME), *Phlogophora wollastoni* B.-B. (ME), *Methorasa latreillei* Dup., *Mniotype albostigmata* B.-B. (ME), *Mesapamea maderensis* Pinker (ME), *Mythimna loreyi* Dup., *M. unipuncta* Haw., *M. serradaguae* Wolff (ME), *Ochropleura leucogaster* Freyer, *Noctua pronuba* L., *N. teixeirai* Pinker (ME), *Xestia c-nigrum* L., *Peridroma saucia* Hb., *Agrotis trux maderensis* Pinker (ME ssp.), *A. atrux* Pinker (ME), *A. rutae* Rebel (ME), *A. segetum* D.&S.

REVELL, R. J. — A selection of Pyralidae captured at tungsten light at Bo, Sierra Leone, West Africa: *Syllepte butleri* Dewitz, *S. sarronalis* Walk., *S. balteata* F., *S. retractalis* Hamps., *S. polycymalis* Hamps., *Dichocrocis fuscoalbalis* Hamps., *Pardomima margarodes* Martin, *P. phalaromima* Meyr., *Pyrausta ferrugalis* F., *Zebronia phenice* Cramer, *Macrogaster tyres* Cramer, *Ghesquillerana hirtusalis* Walk., *Botyodes asialis* Guen., *Conogathes polystidzalis* Hamps., *Eporidia dariusalis* Walk., *Palpita pudoraria* Hb., *Phostria hesualis* Walk., *Ulopeza latiferalis* Walk., *U. unigeralis* Zell., *U. flavicepsalis* Hamps., *Diaphania alealis* Walk., *Maruca testulalis* Geyer (The "Mung Moth", a cosmopolitan pest species which has been recorded in Britain on several occasions. The larva attacks the pods of various legumes.), *Hymenia recurvalis* F. (A tropical pest species which has been recorded in Britain on a few occasions.).

TENNENT, J. — Aberrant European and North African Butterflies: Two cases containing aberrant individuals collected during long periods in the field in 1991-1995 (without looking for aberrations), together with normal individuals for comparison. The exhibit consisted of some quite extreme examples of normally variable species and aberrant specimens of species in which variation is infrequent or unrecorded.

Hesperiidae: *Pyrgus malvae* L. A male with upperside forewing white spots extended and rayed (f. *taras*) (France 1995). Papilionidae: *Zerynthia rumina africana* Stichel Two specimens, one with extended black markings, the other asymmetrical with the left hindwing lacking black pigment (both Morocco, 1992). Pieridae: *Colias hecla sulitelma* Aurivillius A male with the orange-yellow upperside colour replaced by lemon yellow and a female with upperside submarginal markings reduced, giving it the superficial appearance of a lightly marked male (both Arctic Sweden, 1991).

Gonepteryx cleopatra cleopatra L. A sexual mosaic, primarily female but with a band of male coloration on the left upperside forewing costal margin (Morocco, 1993). Although sexual mosaics and gynandromorphs are rare in nature, a surprisingly large number have been reported among *cleopatra*. *Zegris eupheme maroccana* Bernardi A male with pigment lacking from the upperside forewing apical orange patch (Morocco, 1992). Lycaenidae: *Agrodiaetus thersites* Cantener A sexual mosaic with the left side female and the right side female washed with male coloration (Spain, 1993). *Arctia agestis cramera* Eschscholtz A male with most underside spots obsolete (Morocco, 1992). *Cigaritis zohra monticola* Riley A female with underside

spots reduced or obsolete, and white ground colour extended (Morocco, 1992). Variation in this species is rare. *Cyaniris helena* Stdgr One male with underside forewing spots obsolete (Greece, 1991). *Glaucopsyche melanops algerica* Heyne A male with basal spot of underside forewing series elongated to form a bar and a second male with underside forewing spots reduced and unh spots obsolete (both Algeria, 1993). *Heodes alciphron melibaeus* Stdgr A male with most submarginal and postmedian spots obsolete (Greece, 1995). *Lysandra coridon caelestissima* Verity A male with underside spots obsolete. *L. punctifera* Ob. A series of five males and three females, with variation in underside spotting, ranging from "rayed" examples to a specimen with all spots except the upperside forewing discal spot obsolete (Morocco, 1991 4). *Plebejus argus hypochionus* Ramb. A male with underside submarginal spots elongated (rayed) (Spain, 1994). *P. idas lapponicus* Gerhard Two males with most underside spotting obsolete, and a female with all spots elongated (rayed) (Arctic Sweden, 1993). *P. martini martini* Allard A male with underside forewing spots reduced and unh spots obsolete (Algeria, 1992). *Plebicula atlantica* Elwes One male and two females with underside spots enlarged (Morocco 1992-3). Variation in this species is not often reported and females are rare in collections. *Pseudophilotes barbaggioae* de Prins & van der Poorten Three males with most underside spots obsolete (Sardinia, 1991). *P. baton* Bergsträsser A male with underside spots obsolete (Corsica, 1991). *Zizzeria karsandra* Moore Two males with some underside spots joined (rayed) (Tunisia, 1992). Nymphalinae: *Boloria napaea* Hoffmannsegg A female with the orange upperside markings dull and all black markings extended (Switzerland, 1995). *Eurodryas desfontainii* Godart A series of eight specimens exhibiting variation, often asymmetrical, mainly in respect of the confluence or absence of the upperside forewing median bands (Morocco, 1992-3), and a pair with the distinctive bright orange-red ground colour replaced by pale orange-yellow (Morocco, 1992). *Melitaea cinxia* L. Two males, one with upperside forewing black markings reduced and uph black markings extended and one with upperside black markings extended (Greece, 1991). *M. deserticola* Ob. A male in which many of the underside black markings are reduced or obsolete and the underside hindwing white ground colour extensive (Tunisia, 1993). *M. phoebe occitanica* Stdgr A male with the underside forewing median markings absent and the underside hindwing median band obscured with black spots (Morocco, 1992). *Mesoacidalia aglaja lyautevi* Ob. A male with upperside black submarginal and postmedian markings extended (Morocco, 1993). Satyrinae: *Erebia palarica* Chapm. Two females, one with upperside postmedian ocelli enlarged and joined, the other with upperside ocelli obsolete and uph ocelli reduced to black spots in spaces 2 & 3 (Spain, 1994). *Maniola jurtina* L. A male with slightly deformed wings in which orange upperside markings are asymmetrical and replaced by off-white (Spain, 1993). *M. nurag* Ghiliani A male with orange upperside markings replaced by pale yellow (Sardinia, 1991). *Melanargia galathea lucasi* Ramb. A male with upperside dark markings extended (Algeria, 1992).

WEDD, D. J. — Species found during two visits to Jersey, Channel Islands, in late x.1997 and early viii.1998, both times in brilliant sunny weather: (i) *Dryobota labecula* Esp. Widespread on *Quercus ilex* in late x.97 Captives laid numerous ova, but only after 5 or 6 days feeding on sugar water. Eggs were laid in neat rows along the veins of the leaves of potted *ilex* saplings. They hatched but did not feed successfully. Clearly, very soft new leaves are required. (ii) *Trigonophora flammaea* Esp. One of the commonest species in x.1997 to light everywhere, even to street lamps. (iii) *Eumichtis lichenea* Hb. Very numerous and with little variation. (iv) *Lasiocampa trifolii* D. & S. Many males at MV on the west coast; fewer elsewhere. Very similar to the form found in SW England. No females seen. (v) *Tethea ocularis*

Hb. A distinctive second brood, viii.1998. (vi) *Idaea degeneraria* Hb. Newly emerged specimens, viii.1998, suggesting a second brood. (vii) *Jodis lactearia* L. Definite second brood; numerous. (viii) *Lomaspilis marginata* L. Very variable and very numerous. (ix) *Selenia lunularia* Hb. A distinctive second brood. (x) *Thaumetopaea processionea* L. Resident on Jersey, flying mainly in August. Burrow took 3 females on 15.viii.1998, but none would lay. Perhaps, like *castrensis* L., the female only flies after laying. (xi) *Coscinia cribraria trivittata* South. Numerous in several areas on the west coast. (xii) *Euplagia quadripunctaria* Poda 25–30 to MV every night, and also flying at dusk and by day. Less than 5% were of the yellow form, and the intermediate salmon coloured form was rarer still. (xiii) *Agrotis vestigialis* Hufn. A distinctive form; common. (xiv) *Trachea atriplicis* L. Resident on Jersey; almost certainly double-brooded. (xv) *Agrotis crassa* Hb. More than 400 came to MV in 4 nights in the Grouville area, yet *crassa* had previously been seldom seen on Jersey. Smaller numbers were seen elsewhere. The literature suggests that *crassa* likes marshy ground, yet the main locality for it on Jersey is the Grouville Golf Course. It is a lazy moth, flying little when captured. Several pairings were observed in the trap. (xvi) *Ochropleura plecta* L. An unusual ab.; abundant. (xvii) *Mythimna albipuncta* D. & S. One of the most abundant species with at least 3 broods a year; newly emerged imagines were flying in x.1997 and viii.1998. *M. vitellina* Hb. is also resident and numerous. (xviii) *Acontia lucida* Hufn. One to Gorey Castle Light, the other to MV at Grouville, mid viii.1998. Both of these sites are on the east coast. A third specimen was photographed on the west coast, at the place where Burrow took the only other specimen to be recorded on Jersey in 1995. Hence, possibly resident. (xix) *Orthonama obstipata* F. Very numerous in viii.1998 to MV, but also flying by day in gardens. (xx) *Evergestis extimalis* Scop. Recorded in four different localities in viii.1998. In numbers at Grouville. Previously only recorded twice from Jersey. (xxi) *Hypena obsitalis* Hb. Everywhere on Jersey; only one seen at MV, but flying at dusk and even in daylight. 40+ in a German bunker on the west coast, and larvae at all stages on pellitory (*Parietaria*) near the entrance. The Jersey specimens were decidedly larger than those of mainland England. (xxii) *Cethosia hypsea* Doubleday Captured in bright sunlight at the edge of woodland at Rozel Bay, 10.viii.1998. Identified by Mark Parsons & Phil Ackery at the BM (Nat.Hist.). An Indonesian species!

DIPTERA

There was an increase in the number of exhibitors this year and fewer exhibits in common with the annual meeting of Dipterists Forum, which was held two weeks later, for the first time in Cardiff. Several species recently recognised as new to the British fauna were included and the dead-wood-associated craneflies of the genera *Ctenophora* and *Tanyptera* appeared in several exhibits. Observations were made on the little-known *C. ornata* Meig., rarely recorded outside Windsor and New Forests, in both these areas.

ALEXANDER, K. N. A. — (1) Two nationally scarce flies found in Gloucestershire in 1998: *Zodion notatum* (Meigen) (Conopidae), Snows Farm, Slad, limestone grassland, 25.v; *Dioxyna bidentis* (Rob.-Des.) (Tephritidae), Ashleworth Ham, swept from *Bidens tripartita*, 13.ix.

(2) Highlights from the National Trust's Biological Surveys in 1998: *Solva marginata* Meig. (Xylomyiidae), Leith Hill Place, Surrey, on *Liriodendron* trunk, 16.vii; *Haematopota grandis* Meig. (Tabanidae), Mwche saltmarshes, Carm., 17.viii.

CHANDLER, P. J. — The British species of *Anapausis* (Scatopsidae): examples of six species now known from Britain, with the addition of *A. rectinervis* Duda (from Dinton Pastures Country Park, Berks., male in fen/carr at south end of Mortimer's Meadows, 27.v.1993, and Woodwalton Fen, Hunts., 24.v.1980, both sexes) and recognition that "*A. soluta* (Loew)" of previous authors comprises three species, of which both sexes can only be recognised by the structure of the terminalia, of which sketches of the salient features were also exhibited (these species are fully characterised and keyed by Chandler, 1999, *Dipterists Digest* (Second Series) 6: 1–19).

COLLINS, G. A. — (1) Craneflies (Tipulidae) associated with dead wood: *Ctenophora flaveolata* (F.), Ridley Plain, New Forest, Hants., 7.v.1998; *Tanyptera atrata* (L.), female ovipositing in a long-dead birch (*Betula*) stump, Bagmoor Common, Surrey, 27.v.1998, and male, Pamber Forest, N. Hants., 13.v.1995; *T. nigricornis* (Meig.), Blatchford Downs, Surrey, 1.vi.1998.

(2) Other RDB species found in 1998: *Thyridanthrax fenestratus* (Fall.) (Bombyliidae), Hankley Common, Surrey, 19.viii; *Myemnis octopunctata* (Coquebert) (Ulidiidae), Beddington Sewage Farm, Surrey, 22.viii; *Myopites inulaedysentericae* Blot (Tephritidae), a mainly coastal species found more widely in recent years, Ashtead Common, Surrey, reared from galls on fleabane (*Pulicaria dysenterica*), emerged 24.ii.

DOBSON, J. R. — The two species of Braulidae now known to occur in the British Isles: *Braula coeca* Nitzsch, a ubiquitous species in honey-bee (*Apis mellifera* L.) colonies, and *B. schmitzi* Örösi-Pál, an addition to the British list, from a pooled sample—England and Wales, autumn 1994–spring 1995; its status is presently unknown.

FORMSTONE, B. — Diptera from Wales, including some new national and county records: *Prionocera subsericornis* (Zett.) (Tipulidae), Gresford, Denb., lowland mire, 13.viii.1998, new to Wales; *Nephrotoma cornicina* (L.) (Tipulidae), Gresford, Denb., plentiful at edge of an old sand quarry, some males resting on gorse, 2.viii.1998, new to North Wales; *Tipula livida* Wulp (Tipulidae), Marford Quarry, Denb., old sand quarry, 2.vi.1997, new to Wales; *T. melanoceros* Schumm. (Tipulidae), Gresford, Denb., several in lowland mire, 15.ix.1998; *T. helvola* Loew (Tipulidae), Gresford, Denb., pine plantation at site of a sand quarry, 29.vii.1998, new to Denbighshire; *T. grisescens* Zett. (Tipulidae), Esclusham Mountain, Denb., a pair *in copula* on an upland bog, 7.iv.1998, second Welsh record; *Tabanus cordiger* Meig. (Tabanidae), Erddig Park, Denb, on bog by a stream in woodland, 9.vi.1992, new to Denbighshire; *Haematopota grandis* Meig. (Tipulidae), Whiteford Burrows and Oxwich Burrows, Glam., 15.viii.1998; *Pamponerus germanicus* (L.) (Asilidae), Pwllheli, Caern., several in dunes, 24.v.1994; *Dialineura anilis* (L.) (Therevidae), Morfa Harlech, Mer., on dunes, 10.vii.1997; *Platycheirus discimanus* Loew (Syrphidae), Gresford, Denb., at sallow (*Salix*) blossom in disused sand quarry, 30.iii.1998, new to North Wales; *Chetostoma curvinerve* Rond. (Tephritidae), Clyne Park, Swansea, Glam., wing flicking on *Rhododendron* foliage, 18.viii.1998, new to Wales (further details of this and other recent records are given by Chandler, P.J., 1998, *Dipterists Digest* (Second Series) 5: 107–108); *Oestrus ovis* L. (Oestridae), Llanerchaeron, Card., on wall of National Trust property, 14.viii.1997.

HALSTEAD, A. J. — Some scarce or local Diptera found in 1998: *Stratiomys potamida* Meig. (Stratiomyidae), St Gabriel's Farm, Golden Cap, Dorset, 30.vi; *Chrysops sepulchralis* (F.) and *Atylotus fulvus* (Meig.) (Tabanidae), Oakers Wood Bog, near Affpuddle, Dorset, 3.vii; *Thereva handlirschi* Kröber (Therevidae), Linn of Dee, S. Aber., 8.ix, on fence post; *Dioctria cothurnata* Meig. (Asilidae), Loscombe Nature

Reserve, Loscombe, Dorset, 28.vi; *Choerades marginatus* (L.) (Asilidae), Whitmoor Common, Surrey, on pine (*Pinus*) trunk, 9.viii; *Brachypalpoidea lentus* (Meig.) (Syrphidae), RHS Garden, Wisley, Surrey, 5.vi, on wild rose (*Rosa*) flower; *Psilota anthracina* Meig. (Syrphidae), Warburg BBONT Reserve, Oxon., 9.v; *Vohicella zonaria* (Poda) (Syrphidae), Wisley Village, Surrey, emerging from *Vespa vulgaris* (L.) nest in ground, 4.ix; *Myopa fasciata* Meig. (Conopidae), Horsell Common, Surrey, 9.viii; *Zodion cinereum* (F.) (Conopidae), Tadnoll Nature Reserve, near Tadnoll, Dorset, heathland edge, 3.vii; *Acanthiophilus helianthi* (Rossi) (Tephritidae), Knaphill, Surrey, 23.vi, on *Iris* leaf by garden pond; *Tephritis comura* (Loew) (Tephritidae), River Ardle at Enochdhu, Perth., male 6.ix and female 11.ix; *Megamerina dolium* (F.) (Megamerinidae), Powerstock Common, Dorset, 28.vi; *Ochthera mantis* (De Geer) (Ephydriidae), Albury Bottom, Chobham Common, Surrey, boggy pools, 15.viii.

HARVEY, M. C. — (1) *Ctenophora ornata* Meig. (Tipulidae), Highstanding Hill, Windsor Forest, Berks., SU936744, 14.viii.1998, a photograph of a male found in a mercury vapour trap; while in captivity awaiting photography, it appeared to actively seek moisture from damp wood when provided with a decaying log; the fly was released on the next day, onto a beech (*Fagus sylvatica*) trunk, where it sat for about ten minutes before flying off into the undergrowth and coming to rest on shaded damp leaf litter.

(2) Diptera from Berks. and Oxon in 1998: *Metalimnobia quadrimaculata* (L.) (Limoniidae), Highstanding Hill, Windsor Forest, Berks., SU936744, 14.viii, feeding at sugar-rope applied to attract moths; *Rhagio strigosus* (Meig.) (Rhagionidae), male at Upper Basildon, Berks., SU58427610, 3.vii, male at Ashampstead Common, Berks., SU578748, 2.viii, and female at North Unhill Bank, Berks., SU562832, 8.vii — altogether over 150 individuals seen, mostly at Upper Basildon site, from 3.vii to 3.ix, males congregating on tree trunks in "downlooker fly" fashion, females less easy to find but two occurred on house windows (the common *R. scolopaceus* (L.) was exhibited for comparison); *Platycheirus occultus* Goeldlin de Tiefenau, Maibach & Speight (Syrphidae), Cholsey Marsh, Berks., SU598854, 5.viii; *Chetostoma curvinerve* Rond. (Tephritidae), Kingwood Common, Oxon, SU695825, 21.vi (further details are published elsewhere as indicated under Exhibit by B. Formstone above).

HAWKINS, R. D. — A selection of the more spectacular and interesting flies collected during 1998 at Bagmoor Common, Surrey (SU9242), a Wildlife Trust reserve consisting mostly of birch and pine woodland, acid grassland, bracken and restored heathland. *Tanyptera atrata* (L.) (Tipulidae), 15.v, black and brown forms of male flying around stump of dead birch; *Asilus crabroniformis* L. (Asilidae), 2.viii, female; *Dioctria oelandica* (L.) (Asilidae), 23.v; *Eutolmus rufibarbis* (Meig.) (Asilidae), 2.viii, female; *Pipiza bimaculata* Meig. (Syrphidae), 23.v, female beaten from hawthorn; *Cheilosia scutellata* (Fall.) (Syrphidae), 29.viii, female hovering over mushroom believed to be *Boletus scaber*; *Eupeodes latihumulatus* (Collin) (Syrphidae), 29.viii, female at flowers of heather, *Calluna vulgaris*; *Gymnosoma rotundatum* (L.) (Tachinidae), 23.v, male.

HODGE, P. J. — Eleven species of Diptera from southern England in 1998: *Paracrocera orbiculus* (F.), *Ogcodes gibbosus* (L.) and *O. pallipes* Latr. (Acroceridae), Little Langford Down, Wilts., SU0434, 4.vii, all three British species of the family swept from chalk grassland; *Platypalpus luteolus* (Collin) (Hybotidae), Llangua, Gwent, SO388254, swept off bank of River Monnow, 3.vi; *Rhamphomyia gibba* (Fall.) (Empididae), Eelmoor Marsh SSSI, N. Hants, SU841534, 28.vi; *Hilara lugubris* (Zett.) (Empididae), Fleet Pond LNR, N. Hants., SU8254, 16.vi, female

swept from tree foliage above shaded stream; *Pelecocera tricincta* Meig. (Syrphidae), Eelmoor Marsh SSSI, N. Hants, SU840535, 28.vi, swept off bog myrtle (*Myrica gale*) in wet heathland, and Parkhurst Forest, Isle of Wight, SZ4790, 29.vi, heathy ride in young conifer plantation; *Trypeta artemisiae* (F.) (Tephritidae), The Moors NR, Bishop's Waltham, S. Hants, SU559169, 18.vi, female swept off osier (*Salix* species); *Urophora spoliata* (Hal.) and *Terellia vectensis* (Collin) (Tephritidae), Afton Down, Isle of Wight, SZ3685, 26.vii, on saw-wort (*Serratula tinctoria*) near cliff-top; *Terellia winthemi* (Meig.) (Tephritidae), Colley Hill, Reigate, Surrey, TQ2452, 12.vi, on welted thistle (*Carduus acanthoides*).

KNILL-JONES, S. A. — *Volucella zonaria* (Poda) (Syrphidae), Freshwater, Isle of Wight, 14.ix.1998.

MCLEAN, I. F. G. — Platypezidae from the autumn field meeting of Dipterists Forum in Heref., x.1998, eight species from Haugh Wood and Conigree Wood, 12.x: *Agathomyia woodella* Chandler, *A. cinerea* (Zett.), *A. unicolor* Oldenberg, *Platypeza hirticeps* Verrall and *P. consobrina* Zett. from Haugh Wood; *Agathomyia unicolor*, *Protoclythia modesta* (Zett.), *P. rufa* (Meig.) and *Platypeza aterrima* Walker from Conigree Wood; this was the third confirmed British record for *A. cinerea*, which had earlier been confused with other species.

PARKER, M. — Diptera from Dorset in 1998: *Atylotus fulvus* (Meig.) (Tabanidae), Oakers Bog, male taking nectar from *Juncus acutiflorus*, 25.vii; *A. latistriatus* Brauer (Tabanidae), Newton Bay, Isle of Purbeck, 2.viii, male taking nectar from *Limonium vulgare*; *Eutolmus rufibarbis* (Meig.) (Asilidae), Merritown Heath, 2.vii, male in dry acid grassland and Newton Bay, Isle of Purbeck, 26.vii, saltmarsh edge; *Machimus rusticus* (Meig.) (Asilidae), Hod Hill, 5.vii, swept from long grass; *Cheilosis semifasciata* Becker (Syrphidae), Piddles Wood, 9.v, female at *Ranunculus ficaria* flower; *C. griseiventris* Loew (Syrphidae), Wether Hill, male, 23.v; *Chrysotoxum octomaculatum* Curtis (Syrphidae), Isle of Purbeck, Newton Bay, 26.vii, female at *Limonium vulgare* flowers, and Grange Heath, 16.viii, female hovering over bare sand; *Pipiza lugubris* F. (Syrphidae), Warmwell Heath, female, 21.vi; *Platycheirus splendidus* Rotheray (Syrphidae), newly described by G. E. Rotheray (1998, *Entomologist's Gaz.* 49: 271–276), Mostertown Down, W. Dorset, two females on a wooded bank, 15.v and 24.vii.

PERRY, I. — Uncommon Diptera found in 1998: *Hilara hybrida* Collin (Empididae), Ballinluig Island, River Tummel, Perth, 5.vi; *Syntormon filiger* Verrall (Dolichopodidae), Snettisham, Norf., 25.vii, swept from brackish marsh; *Cephalops perspicuus* (de Meijere) (Pipunculidae), Holme Dunes, Norf., 8.viii, swept from *Phragmites australis* in dune slack; *Cheilosis griseiventris* Loew (Syrphidae), Holme Dunes, Norf., 8.viii, edge of dune slack, and Snettisham, Norf., 15.viii; *Sphegina sibirica* Stackelberg (Syrphidae), Black Wood of Rannoch, Perth, 2.vi, and Balnaught, Inv., 10.vi; *Goniglossum wiedemanni* (Meig.) (Tephritidae), Holme Dunes, Norf., 18.vii, swept from *Bryonia dioica*; *Myopites inulaedyssestericae* Blot (Tephritidae), Holme Dunes, Norf., 8.viii, swept from *Pulicaria dysenterica* at edge of dune slack; *Campiglossa producta* (Loew) (Tephritidae), Holkham, Norf., 2.viii, and Studland, Dorset, 29.vi, both swept from dunes; *Parochthiphila coronata* (Loew) (Chamaemyiidae), Holme Dunes, Norf., 11.vii and 8.viii, swept from dunes; *Platycephala umbraculata* (F.) (Chloropidae), The Spittles, Dorset, 28.vi, swept from *Phragmites australis*; *Fannia tuberculata* (Zett.) (Fanniidae), Linn of Dee, S. Aber., 31.v.

PLANT, C. W. — (1) Possible mimicry between hoverflies (Syrphidae) and other flies; possible cases of mimicry where neither partner is apparently a danger to

predators, but the apparent mimicry extends beyond coloration to include behavioural traits: (a) *Lejops vittatus* (Meig.) common around Lake Balaton, Hungary, 17.v.1997, and an unidentified sarcophagid fly from the same site, which behaves similarly and in flight looks almost identical to the hoverfly; (b) *Eristalis arbustorum* (L.) and *E. horticola* (De Geer), British specimens, and *Ectophasia crassipennis* (F.) (Tachinidae), Razac d'Eymet, France, 21.v.1996, common on road verges with both *Eristalis* species and it was necessary to net the flies to tell them apart; (c) *Eristalinus sepulchralis* (L.), a British specimen shown with an unidentified calypterate from southern France, ix.1997, both species abundant on white umbels and the calypterate also observed to hover well.

(2) Some common Hungarian hoverflies (Syrphidae), including some considered uncommon or rare in Britain, which are commonly encountered in suitable habitat in Hungary: *Anasimyia interpuncta* (Harris), abundant in flood-plains of the Danube; *Brachyopa dorsata* Zett., common in ancient forest; *Brachypalpoidea lentus* (Meig.); *Brachypalpus valgus* (Panz.); *Caliprobola speciosa* (Rossi), very common in beech forest where it exhibits a territorial display flight in rays of sunlight above beech stumps, also taken in a Malaise trap amongst *Salix*-invaded reeds at the edge of Lake Balaton; *Chalcosyrphus eunotus* (Loew), in damp ancient woodland; *Cheilosia canicularis* Panz., frequent in woodland; *Chrysotoxum elegans* Loew; *C. festivum* (L.); *C. vernale* Loew; *Ceriana conopsoides* (L.), at sap runs on beech trunks; *Criorhina asilica* (Fall.), common on leaves of trees at edges of woodland rides when it is raining; *Eupeodes* (subgenus *Lapposyrphus*) species A sensu Stubbs, female at edge of beech forest by a lake; *Helophilus trivittatus* (F.); *Lejops vittatus* (Meig.), very common about reeds in ditches with scrub down one side but not the other, the flies being found opposite gaps in the scrub, flying about six inches below the tops of last year's dead reed stems in a characteristic manner; *Merodon armipes* Rond., abundant on calcareous grassland; *Microdon analis* (Macq.), about cut stumps and associated ant nests on recently cleared woodland slope on calcareous soil; *M. mutabilis* (L.), very common in dry calcareous grassland, absent from wetter areas; *Neoscia unifasciata* (Strobl); *N. annexa* (Müller); *Pipiza fasciata* Meig.; *P. festiva* Meig.; *Pipizella annulata* (Macq.); *Sphiximorpha subsessilis* (Illiger), at sap runs on beech trunks; *Tropidia scita* (Harris); *Volucella inflata* (F.), in almost every oak (*Quercus*) woodland.

SOFTLY, R. A. — *Conops quadrifasciatus* De Geer (Conopidae), Hampstead Heath, Middx.

WARING, P. — *Ctenophora ornata* Meig. (Tipulidae), a female from Whitley Wood, near Brockenhurst, New Forest, Hants., on the BENHS Field Meeting on the afternoon of 22.viii.1998. Three males were captured in light traps soon after dusk the same day at Anses Wood in the north-west of the New Forest.

COLEOPTERA

ALEXANDER, K. N. A. — Three Red Data Book beetles found by members of the Gloucestershire Invertebrate Group during 1998. *Ampedus rufipennis* (Steph.) (Elateridae), Nottingham Hill, 26.iv.1998, from decaying ash pollard (A. Taylor); *Hypulus quercinus* (Quens.) (Melandryidae), Pinbury Park, 21.vi.1998, in old oak stump (J. Harper), new to Glos; *Osphya bipunctata* (F.) (Melandryidae), Alderley Wood, 23.v.1998, knocked off hawthorn blossom (K.N.A.A.).

ALEXANDER, K. N. A., FOSTER, A. P. & GODDARD, D. G. — A selection of the more interesting beetles found during the work of the National Trust's Biological

Survey Team in 1998. *Abraeus granulum* Er. (Histeridae), Blickling Park, E. Norfolk, 26.vi.1998, in old decayed beech stump; *Scydmaenus rufus* Müller, P. W. J. & Kunze (Scydmaenidae), Leith Hill Place, Surrey, 16.vii.1998, one beneath bark on old stump; *Dytiscus circumcinctus* Ahrens (Dytiscidae), Berrington Hall, Hereford, 4.viii.1998, in parkland pond; *Omalopia ruricola* (F.) (Scarabaeidae), Figsbury Ring, Wiltshire, 12.vi.1998, the scarce black form swept from calcareous grassland; *Gnorimus nobilis* (L.) (Scarabaeidae), Croft Ambrey, Hereford, 6.viii.1998, beaten off foliage of ancient oak containing red rot; *Agrilus viridis* (L.) (Buprestidae), Witley Common, Surrey, 8.vi.1998, beaten off foliage of young oak; *Cardiophorus vestigialis* Er. (Elateridae), Salcombe, S. Devon, 21.vi.1998, on flowers of *Smyrniun olusatrum* along coastal footpath; *Epiphaniis cornutus* Esch. (Eucnemidae), Blickling Park, E. Norfolk, 22.vi.1998, one at rest on exposed heartwood on side of live oak; *Hylis olexai* (Palm) (Eucnemidae), Reigate Hill, Surrey, 20.vii.1998, swarming about cut end of beech trunk felled after Great Storm of 1987; *Trinodes hirtus* (F.) (Dermestidae), Hanbury Park, Worcs, 17.vi.1998, from dry rot hole in old dying oak; *Lymexylon navale* (L.) (Lymexylidae), Hatchlands Park, Surrey, 17.vii.1998, ovipositing in exposed heartwood on side of live oak; *Uleiota planata* (L.) (Cucujidae), Croft Castle Park, Hereford., 4.viii.1998, beneath sappy bark on recently fallen oak trunk; *Mycetophagus populi* F. (Mycetophagidae), Studley Park, Mid West York, 22.iv.1998, beneath sappy bark on recently fallen lime; *Synchita humeralis* (F.) (Colydiidae), Selborne Common, N. Hants, 9.vii.1998, beating oak bough; *Pseudocistela ceramboides* (L.) (Tenebrionidae), Hanbury Park, Worcs, 17.vi.1998, inside hollow oak trunk; *Lissodema cursor* (Gyll.) (Salpingidae), Berrington Hall Park, Hereford, 4.viii.1998; *Abdera biflexuosa* (Curtis) (Melandryidae), St. Helens Duver, Isle of Wight, 2.vi.1998, from oak at woodland/saltmarsh transition; *Phaedon concinnus* Steph. (Chrysomelidae), Mwche saltmarshes, Carmarthen, 17.viii.1998, common by suction sampling; *Trachyphloeus asperatus* Boh. (Curculionidae), Cley Hill, S. Wilts, 30.vi.1998, common by suction sampling; *Rhinocyllus conicus* (Froelich) (Curculionidae), Melbury Down, Wilts, 9.vi.1998, on spear thistle *Cirsium vulgare*; *Cionus nigritarsis* Reitter (Curculionidae), Haresfield Hill, E. Gos, 28.vii.1998, on *Verbascum nigrum*; *Trachodes hispidus* (L.) (Curculionidae), Gentle's Copse, Ludshott, N. Hants, 10.vii.1998, commonly by beating oak boughs; *Rhynchaenus pratensis* (Germar) (Curculionidae), Wicken Fen, Cambs, 12.viii.1998, swept from open ride with devil's-bit scabious *Succisa pratensis*; *Taphrorychus bicolor* (Herbst) (Scolytidae), Hatchlands Park, Surrey, 17.vii.1998.

ALLEN, A. J. W. — Some beetles found during 1997 and 1998. New vice-county records are marked with an asterisk (*). Carabidae: *Bembidion nigropiceum* (Marsh.), Durdle Door, Dorset, viii.1998; *B. virens* Gyll., near Oykel Bridge, Sutherland, viii.1998; *Pterostichus lepidus* (Leske), Alderholt, Dorset, vii.1998; *Harpalus honestus* (Duft.), St. Bee's Head, Cumberland, viii.1998; *H. tenebrosus* Dejean, Durdle Door, Dorset, viii.1998; Dytiscidae: *Graptodytes bilineatus* (Sturm), Cogden Beach, Dorset, ii.1998; *Oreodytes alpinus* (Payk.), Loch More, Caithness, viii.1998; Leiodidae: *Leiodes picea* (Panz.), Dorback, Nethy Bridge, Elgin, viii.1998; Staphylinidae: *Bledius arcticus* Sahlb., Dorback, Nethy Bridge, Elgin, viii.1998; **B. dissimilis* Er. near Ringwood, S. Hants, v.1998; *Rugilus geniculatus* (Er.), Alderholt, Dorset, x.1998, in tussock; *Pseudopasilia testacea* (Bris.), Grain, W. Kent, v.1998, near shore; Elmidae: *Oulimnius rivularis* (Rosen.), TL49, Cambs, v.1998; *Stenelmis canaliculata* (Gyll.), Water Newton, Cambs, ix.1998; Coccinellidae: *Nephus quadrimaculatus* (Herbst), West Molesey, Surrey, xi.1997; Chrysomelidae: *Calomicrus circumfusus* (Marsh.), Alderholt, Dorset, vii.1998; *Longitarsus quadriguttatus* (Pont.), Barton Mills, W. Suffolk, ix.1998; Curculionidae: *Magdalis barbicornis* (Lat.), East Hemsey,

Oxon, vii.1998; *Baris analis* (Ol.), Eype's Mouth, Dorset, vi.1998; Scolytidae: *Trypophloeus asperatus* (Gyll.), Alderholt, Dorset, vii.1998.

BOOTH, R. G.—(1) Three species of Coleoptera new to Britain. *Placusa complanata* Er. and *Phloeopora nitidiventris* Fauvel (Staphylinidae), Brentmoor Heath NR (a Surrey Wildlife Trust Reserve), Lightwater, SU9361, 30.xi.1997, several specimens from frass under bark of felled scots pine *Pinus sylvestris* trunk attacked by *Ips sexdentatus* (Boerner) (Scolytidae) (taken in company with *Placusa depressa* Mäklin and *Phloeopora testacea* (Mann.) which were shown for comparison); *Tychius brevisculus* Desb. (Curculionidae), Eype's Mouth, Dorset, SY4491, 3.vi.1993, a single male swept.

(2) A selection of rare or notable Coleoptera, including new county or vice-county records. *Agathidium confusum* Bris. (Leiodidae), Burnham Beeches, Bucks, SU9584, 25.vi.1994, one male; *Halacritrus punctum* (Aubé) (Histeridae), Crymlyn Burrows, Glamorgan, SS7192, 16.v.1998, four specimens under strandline debris; *Ptenidium brenskei* Flach (Ptiliidae), Bossington, S. Somerset, SS893484, 6.vii.1997, one in river shingle, new to Somerset and the most southerly British record; *Ptinella britannica* Matt. (Ptiliidae), Thompson Common, W. Norfolk, TL9396, 8.iv.1998, sieving sedge litter; *Acrotrichis lucidula* Rossk. (Ptiliidae), Thompson Common, W. Norfolk, TL9396, 8.iv.1998, sieving sedge litter; *Scopaeus laevigatus* (Gyll.) (Staphylinidae), edge of Bayfield Pond, Bookham Common, Surrey, TQ1255, 28.vii.1996, one female; *S. minutus* Er. (Staphylinidae), Pignal, New Forest, SU313036, 10.iv.1997, one male landed on sieving sheet in late afternoon, new to Hampshire; *Rugilus geniculatus* (Er.) (Staphylinidae), Brentmoor Heath NR (a Surrey Wildlife Trust Reserve), Lightwater, SU9361, 30.xi.1997, one male sieved from *Formica rufa* L. (Hymenoptera: Formicidae) nest material; *Ocyopus nero* (Fald.) (Staphylinidae), Bradenham, Bucks, SU8297, 16.ii.1998, one female from pitfall trap on set-aside land at edge of cereal field, probably new to Bucks; *Gnypeta ripicola* (Kies.) (Staphylinidae), Dinefwr Park, Carmarthen, SN6022, 16.v.1998, one female from soft wet mud, new to Wales; *Atheta hybrida* (Sharp) (Staphylinidae), Haddenham, Cambs, TL4676, 13.vii.1997, one female from fallen rotting elm trunk; *Brachygluta pandellei* (Saulcy) (Pselaphidae), Ardrhu Onich, Westerness, NN0161, 16.viii.1995, one male by sieving old seaweed; *Laricobius erichsoni* Rosen. (Derodontidae), Loch an Eilein, Easternness, NH8808, 22.viii.1995; Abernethy Forest NR, Easternness, NH91 and NJ01, 24.viii.1995 and vi.1996; Loch Vaa, Moray, NH91, 19.vi.1996; abundant by beating pine *Pinus*, alder *Alnus glutinosa* and birch *Betula*; *Dorcatoma dresdensis* Herbst (Anobiidae), Ashtead Common, Surrey, TQ1659, 13.ii.1998, several larvae in old *Ganoderma* bracket on beech tree, adults emerged v-vi.1998; *Atomaria lohsei* Johnson & Strand (Cryptophagidae), Ashtead Common, Surrey, TQ1659, 18.vi.1995, one female; and Esher Common, Surrey, TQ1362, 17.i.1998, two females sieved from mouldy *Formica rufa* L. (Hymenoptera: Formicidae) nest material; *Atomaria scutellaris* Mots. (Cryptophagidae), Pegwell Bay, Ramsgate, E. Kent, TR372640, 29.ix.1996, two males by searching at base of cliff; *Nephus quadrimaculatus* (Herbst) (Coccinellidae), Hackbridge, Surrey, TQ2866, 24.ix.1977, several by beating ivy-covered garden fence; *Anaspis septentrionalis* Champ. (Scraptiidae), Abernethy Forest NR, Easternness, NH998178, 16.vi.1996, one female beaten off pine *Pinus*, first Scottish record for over 100 years; *Saperda carcharias* (L.) (Cerambycidae), Grantown-on-Spey, Elgin, NJ0226, 23.viii.1995, one male beaten off aspen *Populus tremula* sapling at dusk; *Oberea oculata* (L.) (Cerambycidae), Cambs, vii.1998, recent larval borings in willow branch; *Longitarsus nigerrimus* (Gyll.) (Chrysomelidae), near Hurn, S. Hants, SZ19, 1996, a small colony, the first British record for over 60 years; *Bagous puncticollis* Boh. (Curculionidae), Thompson Common, W. Norfolk,

TL9396, 8.iv.1998, sieving sedge litter; *Ramphus oxyacanthae* (Marsh.) (Curculionidae), Ardrhu Onich, Westernness, NN0161, 16.viii.1995, several beating alder *Alnus glutinosa* and rowan *Sorbus aucuparia*.

(3) A selection of Coleoptera from a flight-interception trap at Silwood Park, Berks, vi.viii.1998: *Choleva glauca* Britten (Leioididae), *Catopidius depressus* (Murray) (Leioididae), *Neuraphes talparum* Lokay (Scydmaenidae), *Euconmus duboisi* Mèq. (Scydmaenidae), *Hypomedon debilicornis* (Woll.) (Staphylinidae), *Xantholinus angularis* Gangl. (Staphylinidae), *Atheta parens* (Muls. & Rey) (Staphylinidae), *Euplectus bonvouloiri* Reitter (Pselaphidae), *E. duponti* Aubé (Pselaphidae), *E. infirmus* Raffay (Pselaphidae), *E. karsteni* (Reich.) (Pselaphidae), *E. kirbyi* Denny (Pselaphidae), *E. nanus* (Reich.) (Pselaphidae), *E. piceus* Mots. (Pselaphidae), *Trichonyx sulcicollis* (Reich.) (Pselaphidae), *Aulonothroscus brevicollis* (de Bonv.) (Throscidae), *Hylis olexai* (Palm), (Eucnemidae), *Lymexylon navale* (L.) (Lymexylidae), *Phalacrus brunnipes* Bris. (Phalacridae), *Latridius consimilis* Mann. (Latridiidae), *Synchita separanda* (Reitt.) (Colydiidae), *Anoplodera scutellata* (F.) (Cerambycidae).

BOWDREY, J. P. — Nests of a solitary bee *Megachile* sp. (Hymenoptera: Apidae, Megachilinae), constructed from yellow hollyhock *Althea* petals and lined with sections of rose *Rosa* leaves, collected from behind an outdoor security light at Mill End, Bradwell-on-Sea, Essex, TL9905, by Mr & Mrs T. White and brought to Colchester Museum for identification. After overwintering in a cool room around 60 *Cryptophagus populi* Paykull emerged during May 1998.

CUMMING, N. St. J. — Some recent notable Coleoptera from north-east Essex and south-east Suffolk. Carabidae: *Harpalus servus* (Duft.), Thorpeness, E. Suffolk, TM4760, 9.v.1998, under stones on upper beach area; *Odacantha melanura* (L.), Old Hall, N. Essex, TL9911, 24.viii.1986, reed litter in reed-bed; *Masoreus wetterhalli* (Gyll.), Colne Point, N. Essex, TM1012, 21.vi.1995, under beach debris; *Demetrias imperialis* (Germar), Old Hall, N. Essex, TL9612, 12.iii.1998, hibernating in *Typha latifolia* stems; *Lionychus quadrillum* (Duft.), Colne Point, N. Essex, TM1012, 10.iv.1997, running on sand on upper beach; *Microlestes minutulus* (Goeze), Fingringhoe, N. Essex, TM0419, 9.v.1997, on sparsely vegetated set-aside arable land; *Brachinus crepitans* (L.), Old Hall, N. Essex, TL9612, 8.v.1998, under concrete blocks; Silphidae: *Aclypea opaca* (L.), Sizewell, E. Suffolk, TM4761, 5.vii.1998, on sand above high water mark, also on a sandy track between arable crops; Anobiidae: *Caenocara bovistae* (Hoff.), Sizewell, E. Suffolk, TM4764, 16.ix.1998, emerged from earth-ball *Bovista plumbea*; *Caenocara* sp., Sizewell, E. Suffolk, TM4764, 24.ix.1998, emerged from earth-ball *Bovista plumbea* (much smaller than normal *C. bovistae* (1.5 mm) with piceous brown elytra); Cleridae: *Opilo mollis* (L.), Old Hall, N. Essex, TL9512, 14.ii.1998, under bark of elm infected with Dutch Elm Disease; Cucujidae: *Uleiota planata* (L.), Friday Wood, Colchester, N. Essex, TL9920, 11.ii.1998, under bark of a recently wind-blown oak; Colydiidae: *Synchita humeralis* (F.), Aldringham, E. Suffolk, TM4661, 17.vi.1998, on sawn birch log; *Cicones undatus* (Guér.), Friday Wood, Colchester, N. Essex, TL9920, 10.i.1998, under bark of dead fallen sycamore *Acer pseudoplatanus* infected with Sooty Bark Disease; Chrysomelidae: *Plateumaris braccata* (Scop.), Minsmere, E. Suffolk, TM4766, 1.vii.1998, on marsh mallow *Althea officinalis*; Curculionidae: *Notaris scirpi* (F.), Fingringhoe, N. Essex, TM0419, 9.ii.1998, hibernating in *Juncus* tussock; *Magdalis cerasi* (L.), Fingringhoe, N. Essex, TM0419, 9.v.1997, on silver birch *Betula pendula*; *Baris scolopacea* Germar, Old Hall, N. Essex, TL9512, 15.vii.1998, swept off sea wormwood *Seriphidium maritimum*, possibly new to N. Essex; *Trichosirocalus barnevillei* (Bris.), Colchester, N. Essex, TM0124, 16.vii.1997, swept off yarrow *Achillea millefolium*.

EVERSHAM, B. C. — Three scarce species of ground beetle (Carabidae) from man-made habitats near Peterborough. *Amara curta* Dej. and *Badister dilatatus* Chaud., Bainton Pits (a gravel-pit complex north of Peterborough), Cambs, 19.iv.1998 and 3.vi.1998; *Harpalus ruficola* Sturm, Orton Pits, south of Peterborough, Cambs, 16.vi.1998.

EVERSHAM, B. C. & SHARPE, P. R. — Recent finds of scarce, rare or unusual ground beetles (Carabidae) at Pitsford Reservoir, Northants in 1998: *Blethisa multipunctata* (L.), *Bembidion quadripustulatum* Serv., *Pterostichus anthracinus* (Panz.), *P. gracilis* (Dej.), *Agonum piceum* (L.), *Badister unipustulatus* Bonelli, *Dromius angustus* Brullé.

HACKETT, D. — (1) A selection of scarce beetles. *Bembidion quadripustulatum* Serv. (Carabidae), Fryent Park, Middx, TQ389880, 30.vi.1996, on bare cracking clay beside pond; *Panagaeus bipustulatus* (F.) (Carabidae), Dagenham Brook, S. Essex, TQ373866, 9.ix.1998, under litter on river bank; *Ochthebius exaratus* Muls. (Hydraenidae), Rainham Marsh SSSI, S. Essex, TQ515812, 20.v.1998, in reed *Phragmites* litter in ditch; *Saprosites mendax* Black. (Scarabaeidae), Highgate Wood, Middx, TQ283887, 26.vi.1998, in low-level flight-interception trap; *Priocoryphon serricornis* (Müller, P. W. J.) (Scirtidae), Highgate Wood, Middx, TQ283887, 6.vii.1998, in low-level flight-interception trap; *Melasis buprestoides* (L.) (Eucnemidae), Highgate Wood, Middx, TQ283887, 3.vi.1998, ovipositing in dying hornbeam *Carpinus betulus*; *Malthinus frontalis* (Marsh.) (Cantharidae), Highgate Wood, Middx, TQ283887, 26.vi.1998, walking up oak *Quercus* trunk; *Ptinus subpilosus* Sturm (Ptinidae), Croft Castle, Hereford, 4.iv.1998, in sap mixture in hollow oak; *Korynetes caeruleus* (Degeer) (Cleridae), Rainham Marsh SSSI, S. Essex, TQ515812, 20.v.1998, in reed *Phragmites* litter in ditch; *Aplocnemus pini* Redtenb. (Melyridae), Highgate Wood, Middx, TQ283887, 13.v.1998, swept off oak; *Glischrochilus hortensis* (Fourc.) (Nitidulidae), Croft Castle, Hereford, 4.iv.1998, in sap mixture in hollow oak; *G. quadriguttatus* (F.) (Nitidulidae), Croft Castle, Hereford, 4.iv.1998, in sap mixture in hollow oak; *Pediacus dermestoides* (F.) (Cucujidae), Croft Castle, Hereford, 4.iv.1998, in sap mixture in hollow oak; *Silvanus bidentatus* (F.) (Silvanidae), Highgate Wood, Middx, TQ283887, 31.vii.1998, between sections of cut oak logs; *Oxytaenus variolosus* Dufour (Colydiidae), Highgate Wood, Middx, TQ283887, 19.x.1998, in Owen Hypogean Trap; *Tetratoma ancora* F. (Tetratomidae), Broxbourne Woods, 16.v.1998, beaten off dense honeysuckle *Lonicera*; *Abdera biflexuosa* (Curtis) (Melandryidae), Wolves Wood, S. Essex, 6.vi.1998, on coppice logs; *Phloiotrya vaudoueri* Muls. (Melandryidae), Highgate Wood, Middx, TQ283887, 22.vii.1998, in sap mixture trap; *Rhynchites cavifrons* Gyll. (Attelabidae), Wolves Wood, S. Essex, 6.vi.1998, beaten off oak *Quercus* near car park; *Rhynchites nanus* (Payk.) (Attelabidae), Black Park, Slough, Bucks, 18.vii.1998, beaten; *Rhynchites olivaceus* Gyll. (Attelabidae), Black Park, Slough, Bucks, 18.vii.1998, beaten.

(2) Progress of 'The Great Stag Hunt' organised by the Peoples Trust for Endangered Species. Display included a summary of the number of records received, draft maps, and a literature review by Andrew Tullet, University of East Anglia.

HALSTEAD, A. J. — (1) Some scarce or local Coleoptera taken in 1998. *Cicindela sylvatica* L. (Carabidae), Sopley Common, Hurn, Dorset, 2.vii.1998, on bare sandy soil; *Anomala dubia* (Scop.) (Scarabaeidae), Whitmoor Common, Surrey, 9.viii.1998, taken in flight; *Selatosomus bipustulatus* L. (Elateridae), Melcombe Park Wood, Melcombe Bingham, Dorset, 1.vii.1998; *Hylis olexai* Palm (Eucnemidae), Horsell Common, Surrey, 9.viii.1998, on dead standing pine; *Dermestes murinus* L. (Dermestidae), RHS Garden, Wisley, Surrey, 13.v.1998, on honeybee combs containing dead bee larvae; *Cryptolaenus montrouzieri* Muls. (Coccinellidae), RHS

Garden, Wisley, Surrey, 11.ii.1998, on an outdoor plant *Phormium tenax* infested with mealybug *Balanococcus diminutus*; *Donacia bicolor* Zsch. (Chrysomelidae), Merritown Heath, near Hurn Airport, Dorset, 2.vii.1998, swept by stream; *Cryptocephalus bipunctatus* (L.) (Chrysomelidae), Brentmoor Heath, West End, Surrey, 30.v.1998, swept; *Chrysolina americana* (L.) (Chrysomelidae), beside entrance to Pelham Clinton Building, Dinton Pastures CP, Winnersh, Berks, 21.ii.1998, found by K. Merrifield; *C. oricalcia* (Müller, O. F.) (Chrysomelidae), Warren Farm, Nonsuch Park, Surrey, 16.v.1998, swept; *Longitarsus dorsalis* (F.) (Chrysomelidae), Barley Mow Wood, Knaphill, Surrey, 19.iv.1998, on ragwort *Senecio* leaves; *Ottiorhynchus nodosus* (Müller, O. F.) (Curculionidae), The Hermitage near Dunkeld, East Perth, 7.ix.1998, under bark of conifer stump; *O. scaber* (L.) (Curculionidae), near Enochdhu, East Perth, 6.ix.1998, on *Solidago virgaurea* flower.

(2) A live specimen of the cellar beetle *Blaps mucronata* Latr. (Tenebrionidae), which had deformed elytra, found in a shed being used as an apple store at Ewdness near Bridgnorth, Shropshire.

HARMAN, T. W. — A specimen of *Agrilus pannonicus* (Pill. & Mitt.) (Buprestidae) taken in sunshine at Turville Heath, Bucks on 20.vii.1998.

HARVEY, M. C. — A specimen of *Prionus coriarius* (Cerambycidae), found dead by Mrs Shirley Scrivener near her house in Beaconsfield, Bucks, SU929905, 14.viii.1997 and posted to the exhibitor. The associated parasite *Megaselia giraudii* (Egger) (Diptera: Phoridae) subsequently emerged, and from these, two species of braconid wasps, *Dinotrema lineola* (Thoms.) and *Aphaereta minuta* (Nees) (Hymenoptera: Braconidae), were reared.

HENDERSON, M. — Some beetles from Hampshire. *Platycis minutus* (F.) (Lycidae), Chandler's Ford, 26.viii.1991, on nettle leaf near bracken on road verge; *Coccinella septempunctata* L. (Coccinellidae), Shawford, bank of River Itchen, 27.iv.1991, parasitised by *Perilitus coccinellae* (parasite emerged from ladybird and pupated on 28.iv.1991, imago wasp emerged 17.v.1991); *Mycetophagus atomarius* (F.) (Mycetophagidae), Barrow Door, New Forest, 28.iv.1991, under bark of dead wood; *Strangalia quadrifasciata* (L.) (Cerambycidae), Shawford, bank of River Itchen, 25.vii.1992, on flower of umbellifer; *Leptura scutellata* F. (Cerambycidae), Mark Ash Wood, New Forest, 17.vii.1998, flying in sunshine in beech wood; *Plateumaris sericea* (L.) (Chrysomelidae), Shawford, bank of River Itchen, 30.v.1998, abundant on yellow flag *Iris pseudacorus*; *Cassida murraea* L. (Chrysomelidae), Shawford, bank of River Itchen, 25.vii.1992, on common fleabane *Pulicaria dysenterica*.

HODGE, P. J. — Twenty species of Coleoptera from various locations in southern Britain. New vice-county records are marked with an asterisk (*). *Paralister neglectus* (Germ.) (Histeridae), Denbigh, Talacre Warren, SJ1185, 27.iv.1998, crawling on fore dunes; *Zyras haworthi* Steph. (Staphylinidae), S. Hants, West Wood, Netley, SU4509, 19.vi.1998, swept off grass beneath ancient oak; **Agrilus sulcicollis* Lac. (Buprestidae), Middx, Forty Hall, Enfield, TQ3398, 19.vii.1998, on trunk of dead standing oak; *Panspoeus guttatus* Sharp (Elateridae), N. Hants, Eelmoor Marsh SSSI, 28.vi.1998, swept from heathy woodland glade; **Hylis olexai* (Palm) (Eucnemidae), E. Sussex, Sedlescombe, TQ7917, 15.vii.1998, on *Salix*; **Dryophilus anobioides* Chev. (Anobiidae), S. Hants, Netley Common, SU4711, 27.iv.1998, on broom *Cytisus scoparius*; and West Wood, Netley, SU4509, 17.v.1998, on broom *Cytisus scoparius*; **Lymexylon navale* (L.) (Lymexylidae), Middx, Forty Hall, Enfield, TQ3398, 19.vii.1998, flying around dead standing oak; *Colydium elongatum* (F.) (Colydiidae), S. Hants, West Wood, Netley, SU4509, 19.vi.1998, swept off grass beneath ancient oak; *Mordellistena pseudoparvula* Ermisch (formerly *M. parvuloides* Ermisch) (Mordellidae), E. Sussex, Pebsham Wood, Bexhill-on-Sea, TQ766093,

21.vi.1998, two males swept off creeping thistle *Cirsium arvense*; and W. Kent, Bewl Water, TQ683337, 26.vi.1998, male swept off thistles; *Grammoptera variegata* (Germ.) (Cerambycidae), S. Hants, West Wood, Netley, SU4409, 17.v.1998, on grass; *Bruchidius varius* (Olivier) (Chrysomelidae), Surrey, Colley Hill, Reigate, TQ248520, 12.vi.1998, female swept off red clover; *Cryptocephalus biguttatus* (Scop.) (Chrysomelidae), N. Hants, Eelmoor Marsh SSSI, 28.vi.1998, swept off *Erica tetralix*; **Cassida sanguinosa* Suff. (Chrysomelidae), N. Somerset, Staithe, ST370294, 6.vi.1998, female on tansy *Tanacetum vulgare* on bank of R. Parrett; *Anthrribus fasciatus* (Forst.) (Anthrribidae), Isle of Wight, Nunwell Estate, Brading, 21.v.1998, swept off grass under ancient oak by M. Edwards; **Bruchela rufipes* (Olivier) (Urodontidae), Cambs, Kennett Sand-pit, 19.ix.1998, on *Reseda lutea*; and Middx, Park Royal, 16.ix.1998, on *Reseda lutea*; *Cathormiocerus attaphilus* Bris. (Curculionidae), W. Cornwall, Predannack, SW666158, 19.ix.1998, in suction sample from cliff-top dominated by *Plantago coronopus*; *Tanymecus palliatus* (F.) (Curculionidae), Monmouth, Llangua, SO388254, swept near bank of R. Monnow; *Tropiphorus terricola* (New.) (Curculionidae), Monmouth, Llangua, SO388254, swept near bank of R. Monnow; *Lixus scabricollis* Boh. (Curculionidae), Dorset, East Fleet, Weymouth, SY6279, 4.iii.1998, on sea beet *Beta vulgaris* on edge of lagoon; **Magdalis memnonia* (Gyll.) (Curculionidae), N. Hants, Eelmoor Marsh SSSI, 23.v.1998, male swept near pine plantation.

LEVEY, B. — 19 species of Buprestidae collected in the Algarve, Portugal between 3/9.v.1998. The following species were collected in open woodland of umbrella pine *Pinus pinea*, with both grass-rich and maquis-type vegetation, in the Parque Natural da Ria Formosa, Quinta de Marim, near Olhão. *Julodis onopordi fidelissima* Rosen., *Acmaeodera nigellata* Abeille, *Acmaeoderella moroderi* (Reitt.), *A. adspersula* (Ill.), *A. coarctata* (Lucas), *Anthaxia parallela* Castelnau & Gory, *A. scutellaris* Gene, *A. funerula* (Ill.), *A. nigrifolia* Ratz., *A. marmottani hispanica* Cobos, *Agrilus elegans* Muls. & Rey. Species collected at other localities were as follows; *Acmaeodera rubromaculata* Lucas, *A. nigellata* Abeille, *Acmaeoderella adspersula* (Ill.), *Anthaxia funerula* (Ill.), Praia Verde, W. of Villa Real, sand dunes with *Pinus pinea* woodland and understorey of *Lygos monosperma* (L.) (Papilionaceae); *Acmaeodera cylindrica* (F.), *Anthaxia scutellaris* Gene, 1km S. of Santa Catarina da Fonte de Bispo, flower-rich area at edge of orchard; *Acmaeodera nigellata* Abeille, *Anthaxia millefolii polychloros* Abeille, *A. parallela* Castelnau & Gory, *A. scutellaris* Gene, *A. funerula* (Ill.), *A. marmottani hispanica* Cobos, *A. nigrifolia* Ratz., 7 km E. of Monchique, flowery edge of pine wood; *Acmaeodera degener quattuordecimpunctata* (Villers), *Anthaxia funerula* (Ill.), *A. nigrifolia* Ratz., *Agrilus angustulus* (Ill.), *Trachys coruscus* Ponza, 10 km N. of Sao Bras de Alportel, in forest of cork oak *Quercus suber*; *Sphenoptera rauca* (F.), *Trachys coruscus* Ponza, Bensafirim, in flowery meadow; *Aphanisticus emarginatus* Ol., *Trachys coruscus* Ponza, Sierra de Monchique, Foia; *Acmaeoderella adspersula* (Ill.), Cape St Vincent, 5 km W. of Sagres, in heathland; *Anthaxia millefolii polychloros* Abeille, 3 km S. of Barranco Velho, in damp flowery meadow.

LEVEY, B. & PAVETT, P. M. — Two species of Coleoptera new to Britain from Wales. They were collected while surveying two Welsh parklands on behalf of the Countryside Council for Wales. *Bembidion* (*Pseudolimmaeum*) *inustum* Duval (Carabidae), Dinefwr Deer Park, Carmarthen, SN6122, and Llanover, Gwent, SO3108, vi.1996, single specimens collected in flight-interception traps; *Atomaria turgida* Er. (Cryptophagidae), Llanover, Gwent, SO3108, vi.1996, specimens collected in flight-interception trap at edge of *Nothofagus* and *Larix* plantation.

LEWIS, K. C. — Notable Coleoptera found in 1998 from the conservation area at the Royal Botanic Gardens, Kew, Surrey. Two aberrant specimens of *Harpalus azureus* (F.) (Carabidae), vi.1998, one in pitfall trap and one under bark; *Scybalicus oblongiusculus* (Dejean) (Carabidae), found outside conservation area, vi.1998, under beech bark; *Rhytideres plicatus* (Gy.) (Curculionidae), vii.1998, beaten off black walnut *Juglans nigra* (L.); *Otiiorhynchus parvicollis* (Ol.) (Curculionidae), vi.1998, swept from mixed grass and flora, the first British record.

LOTT, D. A. — (1) Beetles collected on 17.vi.1998 between 1400m and 1900m on Kráľova Hora in the Nizky Tatras in Slovakia. Carabidae: *Trechus latus* Putzeys, *T. striatulus* Putzeys, *Pterostichus foveolatus* (Duft.), *P. morio carpathicus* Kult, *P. pilosus* (Host), *Calathus metallicus* Dejean; Staphylinidae: *Philonthus mareki* Coiff., *Quedius subunicolor* Korge (= *unicolor* sensu Kr.), *Q. alpestris* (Heer), *Q. cincticollis* Kr., *Q. collaris* Er., *Aleochara verna* Say.

(2) Beetles collected on 29.vii.1998 in Sphagnum pools in an old cut-over peat bog in the national nature reserve of Lac de Remoray, 850m, in the Jura (department: Doubs), France. Staphylinidae: *Stenus excubitor* Er., *Acylophorus wagenschieberi* Kies. (new to France?); Scirtidae: *Cyphon kongsbergensis* Munster.

(3) Beetles collected in May and September 1998 using an underground pitfall trap (see Owen, 1995, Ent. Rec. J. Var. 107: 225–228) set by old coppice stools in ancient woodland, Launde Big Wood, Leics, SK70. Nitidulidae: *Epuraea fuscicollis* (Steph.); Rhizophagidae: *Rhizophagus parallelocollis* Gyll. (new to Leics).

(4) Saproxylic beetles collected in Sherwood Forest, Notts, SK66 (* = no recent records from Notts, ** = new to Notts according to MS list by Sheila Wright). Scydmaenidae: **Neuraphes plicicollis* Reitt., 12.viii.1998; *Microscydmus minimus* (Chaud.), 12.viii.1998, ***Microscydmus nanus* (Schaum), 29.iv.1998; Pselaphidae: *Euplectus nanus* (Reich.), 12.viii.1998; *Euplectus punctatus tholini* Guill., 1.vi.1998; *Batrissodes venustus* (Reich.), 12.viii.1998; Nitidulidae: *Cryptarcha strigata* (F.), 29.iv.1998; Cryptophagidae: ***Atomaria morio* Kolenati, 1.vi.1998; Tenebrionidae: *Corticeus unicolor* Pill. & Mitt., 12.viii.1998; *Mycetochara humeralis* (F.), 1.vi.1998; Melandryidae: *Abdera quadrifasciata* (Curtis), 4.vii.1998; Serapitidae: *Anaspis septentrionalis* Champion, 4.vii.1998; Cerambycidae: *Saperda scalaris* (L.), 4.vii.1998; Chrysomelidae: *Cryptocephalus querceti* Suff., 1.vi.1998; Curculionidae: **Trachodes hispidus* (L.), 29.iv.1998.

MENZIES, I. S. — Some scarce Coleoptera from Surrey. *Agrilus sinuatus* (Ol.) (Buprestidae), Hogsmill Stream, Berrylands, Surbiton, TQ200678, 19.vii.1997, four beaten off old hawthorn *Crataegus*; and Nonsuch Park, Cheam, TQ235640, 12.viii.1998, one beaten off hawthorn; *Uleiota planata* (L.) (Cucujidae), Bookham Common, TQ125561, 30.v.1998, 1.vi.1998 and 31.viii.1998, single examples under bark of oak logs; *Henosepilachna argus* (Geoff.) (Coccinellidae) (Plate 1, Fig. 3), a species new to Britain: West Molesey, TQ133678, 14.v.1997 and 1.viii.1997, single examples discovered by Alysia Menzies (the exhibitor's granddaughter) in her garden; and 1.xi.1997, nine beaten off ivy *Hedera* growing in the same garden (subsequently found in large numbers on ivy at Molesey Heath, TQ133673); *Rhyzobius chrysomeloides* (Herbst) (Coccinellidae), West Molesey, TQ133678, 6.xii.1997 and 12.x.1998, beaten off ivy *Hedera* and old hawthorn *Crataegus* in private garden; *Rhyzobius litura* (F.) (Coccinellidae), by River Mole, Molesey Heath, 8.xi.1998 [for comparison with *R. chrysomeloides*]; *Stethorus punctillum* (Weise), (Coccinellidae), West Molesey, TQ133678, 6.xii.1997 and 12.x.1998, beaten off ivy *Hedera* in private garden; *Nephus quadrimaculatus* (Herbst) (Coccinellidae), Bookham Common, TQ127560, 1.vi.1998, one beaten off ivy; *Grammoptera variegata* (Germar) (Cerambycidae), Bookham Common, TQ125564, 15.v.1998, one beaten

off hawthorn *Crataegus* blossom; Epsom Common, TQ183610, 25.v.1998, one beaten off oak *Quercus*; and White Downs, TQ124495, 17.vi.1998, one beaten off hazel *Corylus*; *Pogonocherus fasciculatus* (Degeer) (Cerambycidae), Wisley Common, TQ067587, 26.iv.1998, two specimens beaten off recently fallen scots pine *Pinus sylvestris* branch by Maxwell Barclay; *Donacia obscura* Gyll (Chrysomelidae), Thundry Meadows, Elstead, 7.viii.1995, normal golden-green coloured specimens were exhibited next to greenish-blue and dark blue examples (the exhibitor states that the blue colour is due to prolonged exposure to sunlight); *Chrysolina americana* (L.) (Chrysomelidae), outside Shell Building, York Road, London SE1 (VC 17: Surrey) TQ308799, 15.viii.1997, crushed specimen found on pavement, and 3.vi.1998, many adults (some teneral) on flower heads of lavender plants in formal flower bed; *Cryptocephalus nitidulus* F. (Chrysomelidae), White Downs, between TQ105487 (east) and TQ130497 (west), 4.vi.1998 (a typical specimen) and 28.viii.1998 (a very dark specimen with purple reflection), by beating birch *Betula* and hazel *Corylus*; *C. parvulus* Müller, O. F. (Chrysomelidae), Ashted Common, TQ167595, 23.v.1998, several beaten off birch *Betula*, single examples off hazel *Corylus* and hawthorn *Crataegus* blossom; *Pilemostoma fastuosa* (Schall) (Chrysomelidae), on the steep slope of Lamb's Leys, White Downs, TQ124495, 17.vi.1998, in large numbers on young ploughman's spikenard *Inula conyza* plants; *Byctiscus betulae* (L.) (Attelabidae), Pigden, Ranmore Common, TQ124505, 20.ix.1992, one beaten off aspen *Populus tremula*; Bookham Common, TQ125564, 17.v.1998, one on aspen leaf; and Ashted Common, TQ166593, 23.vi.1998, one adult and several characteristic 'leaf-rolls' seen on hazel *Corylus*.

OWEN, J. A.—Some uncommon beetles. Carabidae: *Bradycellus csikii* Laczó, Wangford Warren, W. Suffolk, xii.1997, under stone on waste ground; *Lebia cyanocephala* (L.), Thursley, Surrey, iii.1998, amongst vegetation on the ground; Histeridae: *Halacritus punctum* (Aubé), Crymlyn Burrows, Glamorgan, iv.1998, in buried driftwood on beach; Staphylinidae: *Anotylus mutator* (Lohse), Lundy, N. Devon, vii.1998, in grass; *Euryporus picipes* (Payk.), Linton Loch, Roxburgh, iv.1998, shaken from thick moss; *Medon dilutus* (Er.), Richmond Park, Surrey, vii.1997, in trap at roots of old oak; *M. pociferus* (Peyron), Durdle Door, Dorset, vii.1998, in coarse shingle; Pselaphidae: *Euplectus punctatus tholini* Guillebeau, Richmond Park, Surrey, xii.1997, under bark of oak log; Rhizophagidae: *Rhizophagus oblongicollis* Blatch & Horner, Richmond Park, Surrey, xi.1997, in underground trap; Latridiidae: *Melanophthalma distinguenda* (Comolli), Lundy, N. Devon, vii.1998, in grass; *M. curticollis* (Mann.), Holkham, W. Norfolk, viii.1982, at roots of vegetation on sand; *M. suturalis* (Mann.), West Molesey, Surrey, xi.1997, overwintering in ivy; Colydiidae: *Oxyaenus variolosus* (Dufour), Richmond Park, Surrey, vii.1997, in underground trap; Mordellidae: *Mordellistena pseudoparvula* Ermisch (= *M. parvuloides* Ermisch), near Santon Downham, W. Norfolk, viii.1983, in malaise trap; Anthicidae: *Anthicus angustatus* Curtis, Durdle Door, Dorset, viii.1998, in dry sea weed on beach; *A. scoticus* Rye, Annan, Dumfries, viii.1998, among beach debris; *A. tristis* Schmidt, Weymouth, Dorset, vi.1992, in shingle near sea; Cerambycidae: *Prionus coriarius* (L.), Wimbledon, viii.1998, at MV light; *Tetropium castaneum* (L.), Loch Arkaig, Westernness, v.1998, under bark of spruce log; *Saperda populnea* (L.), Bookham, Surrey, vi.1997, beaten from aspen sapling; *S. scalaris* (L.), Struan, Mid Perth, reared from larva found v.1997, in *Salix* log; *S. carcharias* (L.), Speyside, viii.1998, beaten from aspen; Chrysomelidae: *Psylliodes luridipennis* Kuts, Lundy, N. Devon, vii.1998, off lundy cabbage *Coincya wrightii*; Curculionidae: *Otiorhynchus crataegi* Germar, West Molesey, Surrey, vi.1998, on lilac suckers.

PLANT, C. W. — (1) Water beetles from field drain at Bourne, S. Lincs, 9.ix.1998: *Scarodytes halensis* (F.) (Dytiscidae), *Anacaena bipustulata* (Marsh.) and *Laccobius sinuatus* Mots. (Hydrophilidae).

(2) Water beetles from fire pond at Elstow Storage Depot, Beds, 23.ix.1998: *Haliphus heydeni* Wehncke (Haliplidae), *H. laminatus* (Schall.) (Haliplidae), *Hydroglyphus pusillus* (F.) (Dytiscidae), *Graptodytes granularis* (L.) (Dytiscidae), *Ilybius subaeneus* Er. (Dytiscidae), *Anacaena bipustulata* (Marsh.) (Hydrophilidae), *Laccobius sinuatus* Mots. (Hydrophilidae), *Enochrus melanocephalus* (Ol.) (Hydrophilidae), *Helochares lividus* (Forst.) (Hydrophilidae).

(3) Water beetles from Rainham Marshes, S. Essex, 12.x.1998: *Agabus conspersus* (Marsh.) (Dytiscidae), *Rhantus frontalis* (Marsh.) (Dytiscidae).

(4) Some notable terrestrial beetles captured during 1998. *Colenis immunda* (Sturm) (Leiodidae), Therfield Heath, Herts, 16.ix–11.x.1998, pitfall trap, chalk grassland; *Quedius brevicornis* (Thoms.) (Staphylinidae), Froxen Copse, Arne, Dorset, 8.vi.1998, on oak *Quercus* infested by *Cossus* (Lepidoptera: Cossidae); *Gyrophana jovi* Wendeler (Staphylinidae), Monkfield Wood, Cambs, vi.1998, Malaise trap; *Atheta pervagata* Benick (Staphylinidae), Therfield Heath, Herts, 16.ix–11.x.1998, pitfall trap, calcareous grassland at beech wood margin; *Cryptarcha imperialis* (Ol.) (Nitidulidae), Froxen Copse, Arne, Dorset, 8.vi.1998, on *Cossus* (Lepidoptera: Cossidae) infested oak *Quercus*; *Olibrus flavicornis* (Sturm) (Phalacridae), old hospital site, Bexley, W. Kent, 8–15.vii.1998, pan traps; *Hallomenus binotatus* (Quens.) (Melandryidae), Monkfield Wood, Cambs, vi.1998, malaise trap; *Mordellistena ?acuticollis* Ermisch (Mordellidae), old hospital site, Bexley, W. Kent, 8–15.vii.1998, pan traps; *M. brevicauda* (Boh.) (Mordellidae), Bishops Bowl Lakes, Warks, 10.vii.1998; *Bruchus rufipes* Herbst (Chrysomelidae), Bexley Gun Club sand pit, W. Kent, 5.vi.1998; *Cryptocephalus aureolus* Suff. (Chrysomelidae), Blackbushe Aerodrome, N. Hants, 5.vi.1998; *Chrysolina oricalcia* (Müller, O. F.) (Chrysomelidae), Tottenham Hale, Middx, 20.ix.1995; *Strophosoma faber* (Herbst) (Curculionidae), Blackbushe Aerodrome, N. Hants, 9.vii.1998.

SALISBURY, A. — Some noteworthy Coleoptera found in the RHS Garden, Wisley, Surrey in 1998. *Gnathoncus buyssoni* Auzat (Histeridae), Stage 4 Arboretum, TQ0658, 5.viii.1998, several by sieving nest material containing small mammal bones from hollow oak; *Agrilus laticornis* (Ill.) (Buprestidae), Wildlife area, River Wey embankment, TQ0659, 24.vii.1998, swept; *Dorcatoma flavicornis* (F.) (Anobiidae), Stage 4 Arboretum, TQ0658, 31.vii.1998, beaten off moribund oak twig; *D. serra* Panz. (Anobiidae), Stage 4 Arboretum, TQ0658, 5.viii.1998, three specimens found in large, recently fallen, hollow oak branch by A. J. Halstead; *Ptinus sexpunctatus* Panz. (Ptinidae), Laboratory Building, TQ066583, 30.vi.1998, among herbarium specimens; *Lymexylon navale* L. (Lymexylidae), Battleston Hill, TQ066581, 16.vii.1998, alighted on the exhibitor's hair in a wooded part of the garden.

SMITH, M. — A selection of uncommon Coleoptera taken in 1998. *Graptodytes bilineatus* (Sturm) (Dytiscidae), Vimpennys Lane, ICI Severnside Estate, Easter Compton, S. Glos, 23.vi.1998; *Hydaticus seminiger* (Degeer) (Dytiscidae), Wildmoor Heath, Crowthorne, Berks, 10.vi.1998; *Onthophagus vacca* (L.) (Scarabaeidae), ICI Severnside Estate, Pilning, S. Glos, 3.vi.1998; *Anomala dubia* (Scop.) (Scarabaeidae), Englemere Pond, Bracknell, Berks, 21.vi.1998; *Gnorimus nobilis* (L.) (Scarabaeidae), Peppard Common, Rotherfield Peppard, Oxford, 5.vii.1998, ?new to Oxon; *Ampedus sanguinolentus* (Schrank) (Elateridae), Wildmoor Heath, Crowthorne, Berks, 13.v.1998; *Coccinella magnifica* Redt. (Coccinellidae), Englemere Pond, Bracknell, Berks, 8.v.1998; *Variimorda villosa* (Schrank) (Mordellidae), River Nadder, Salisbury, Wilts, 21.vi.1998; *Grammoptera ustulata* (Schall.) (Cerambycidae), Blackwater

Reach Copse, Sandhurst, Berks, 16.v.1998; *Platystomos albinus* (L.) (Anthribidae), Englemere Pond, Bracknell, Berks, 8.v.1998.

WHITTON, P.—(1) Carabidae taken in flood refuse from the River Cherwell, Sparsey Bridge, Oxford SP518119, in April 1998. *Trechus micros* (Herbst), *Tachys parvulus* (Dejean), *Pterostichus macer* (Marsh.), *Harpalus ardosiacus* (Luts.), **Anisodactylus binotatus* (F.) and *Acupalpus consputus* (Duft.).

(2) Other Carabidae collected during 1997 and 1998. *Nebria livida* (L.), Mundesley, E. Norfolk, TG285383, 26.viii.1997, at base of cliffs; *Trechus rubens* (F.), Grisedale, Mid-west York, SD922774, 5.vi.1998, under stone; *Bembidion fluviatile* Dejean, Gressingham, N. Lincs, SD581699, 5.vi.1998, bank of River Lune; *B. nigropiceum* (Marsh.), Whitesand Bay, E. Cornwall, SX414505, 13.vii.1998, from beach shingle; **B. quadripustulatum* Serv., Otmoor, Oxford, SP582143, 12.iv.1997, on bare mud in drainage ditch; *Agonum ericeti* (Panz.), Burns Beck Moss NR, Westmorland, SD594874, 7.vi.1998, in *Sphagnum*; *Harpalus serripes* (Quens.), West Bay, Dorset, SY473897, 17.ix.1997, at base of sandstone cliff; *H. tenebrosus* (Dejean), Whitesand Bay, E. Cornwall, SX414505, 19.vii.1998, from sandy cliff base.

Species marked with an asterisk (*) are possibly new vice-county records.

WRIGHT, S.—Some beetles found in imported timber products—from the collections at Nottingham Natural History Museum, Wollaton Hall.

(1) A specimen of *Anaplophora glabripennis* Motsch., (Cerambycidae) taken to the RSPCA at Leicester in vii.1998 after being found at a local factory in a wooden packing case from China. It survived for about a week and featured on the 'Pet Rescue' programme (Channel 4 on 22.ix.1998) when the specimen was donated to Nottingham Natural History Museum.

(2) An unidentified longhorn beetle (Cerambycidae) and the leg of a piano stool from which it emerged. The leg was brought into the museum after the owner heard rasping sounds from within and noticed a small pile of sawdust accumulating on the living room carpet. The stool had been purchased in the UK 14 years previously but the origin of the wood used in its construction is unknown. A pupa was extracted from the leg and the beetle emerged a week later.

(3) An aboriginal carving of a snake, purchased at Ayer's Rock, Australia on 22.viii.1983 together with a specimen of *Bostrychus jesuita* (Bostrichidae) which emerged from it in ix.1985, whilst sitting on its owner's mantelpiece in Nottingham. The carving was donated to Nottingham Natural History Museum, where loud munching sounds could be heard emanating from within for about a year afterwards but no more beetles emerged and the noises eventually ceased.

HEMIPTERA

ALEXANDER, K. N. A., FOSTER, A. P. & GODDARD, D. G.—A selection of the more interesting bugs found during the work of the National Trust's Biological Survey Team in 1998: *Odontoscelsis lineola* Rambur (Scutelleridae), Frensham Common, Surrey, rabbit-grazed turf beside sandy path, 15.vii.1998; *Odontoscelsis fuliginosa* (L.) (Scutelleridae), Sutton Hoo, East Suffolk, pitfall traps, vi–vii, 1998; *Dicranocephalus medius* (Mulsant & Rey) (Stenocephalidae), Randwick, Glos., suction sample, 25.x.1998; *Aphanus rolandri* (L.) (Lygaeidae), Woolacombe, N. Devon, 19.v.1998; *Dufouriellus ater* (Dufour) (Cimicidae), Castle Ward Park, Co. Down, adult with nymphs beneath sappy bark on recently fallen oak trunk, 22.viii.1998, new to Ireland; *Globiceps juniperi* (Reuter) (Miridae), Ludshott Common, N. Hants., sweeping regenerating *Calluna/Erica* heath, 7.vii.1998.

BADMIN, J. S.—Exhibit describing life cycle and behaviour of *Issus coleoptratus* (Fab.) (Issidae).

BOWDREY, J. P.—*Stictopleurus punctatonervosus* (Goeze) (Rhopalidae), West Bergholt Heath, Essex, TL9527, 23.ix.1997, new county record. Other specimens: Colchester, post-industrial site, 1997, West Mersea, grassy bank, 1998.

HODGE, P. J.—Two species of Hemiptera from Middlesex (both are new county records). *Deraeocoris flavilinea* (Costa) (Miridae), Forty Hall, Enfield, TQ3398, 19.vii.1998, beaten off aphid infested sycamore foliage; *Fieberiella* sp. (Cicadellidae), Park Royal, TQ1982, 16.ix.1998, beaten off cherry saplings, the first confirmed British record of the genus (Plate 2, Fig. 6).

KNILL-JONES, S. A.—*Enoplops scapha* (Fab.) (Coreidae), Freshwater, Isle of Wight, 13.x.1998.

SHARDLOW, M. E. A.—*Hydrometra gracilentata* Horvath (Hydrometridae), Catfield Fen, Norfolk, 1998, first British record for nine years; *Hydrometra stagnorum* (L.) (Hydrometridae) Catfield Fen, Norfolk, 1998, Dungeness, Kent, 1998.

HYMENOPTERA

ARCHER, M. —(a) Some aculeate bees and wasps from France, Hungary and Crete. Eumenidae: female *Discoelius zonatus* (Panz.), 12.viii.93, near Tousac, Dordogne, France; male *Alastor atropos* Lepeletier, 21.vii.95, Pont d'Alleyras, Haute Loire, France; female *Pterocheilus phaleratus* (Panz.), 19.vii.95, near Naussac, Haute Loire, France; female *Euodynerus dantici* (Rossi), 24.viii.79, Pornichet, Loire-Atlantique, France; female *Allodynerus rossi* (Lepeletier), 19.viii.87, Dirac, Angoulême, Charente, France; female *Eumenes coronatus* (Panz.), 29.viii.85, Menil, near Château-Gontier, Sarthe, France, and male, 24.viii.87, Sergeac, Montignac, Dordogne, France; female *Eumenes mediterraneus* Kreichbaumer, 9.iv.96, and male, 14.iv.96, Paliochora, Crete; female *Odynerus albopictus* de Saussure, 6.iv.88, near Anatoli, Crete, and male, 8.iv.88, Makriyalas, Crete; male and female *Odynerus reniformis* (Gmel.), 14.v.97, Lajosmizse, Hungary. Chrysididae: female *Parnopes grandior* (Pall.), 25.vii.95, Sonzay, Maine-et-Loire, France and male, 21.viii.87, Musset, Gironde, France; female *Holopyga amoenula* Dahlbom, 30.vii.90, near Montendre, Charente-Mer, France, and male, 1.viii.90, La Reole, Gironde, France; female *Chrysis comparata* Lepeletier, 14.viii.93, Castelnaud, Dordogne, France; male *Chrysis dichroa* Dahlbom, 6.iv.88, near Anatoli, Crete; *Hedychridium valesiense* Linsenmaier, 25.vii.95, Sonzay, Maine-et-Loire, France; *Hedychridium flavipes* (Evers.), 26.vii.95, Sonzay, Maine-et-Loire, France. Colletidae: female *Hylaeus difformis* Evers., 5.viii.83, Aizier, Forêt de Brotonne, Seine-Maritime, France, and male, 20.vii.95, Manisfrol d'Allier, Haute-Loire, France; female *Hylaeus variegatus* (F.), 24.vii.95, near Boussay, Indre-et-Loire, France; female *Hylaeus sinuatus* (Schenck), 14.viii.93, Castelnaud, Dordogne, France; female *Hylaeus brachycephalus* Morawitz, 14.viii.93, St Cernin de l'Herm, Dordogne, France.

(b) Some British aculeate wasps and bees from 1997. Chrysididae: *Hedychridium cupreum* (Dahlbom), 10.vii.97, Sandscale Haws, Cumbria; female *Hedychrum niemelai* Linsenmaier, 2.ix.97, Broom Hill, Essex; female *Chrysis hellani* Linsenmaier, 23.vii.97, West Stow Country Park, Breckland. Eumenidae: female *Microdynerus exilis* (H.-S.), 23.vii.97, West Stow Country Park, Breckland. Sphecidae: male *Ectemnius sexcinctus* (F.), 5.vii.97, Lindrick Common, S. Yorks.; female *Podalonia affinis* (Kirby), 29.v.97, Hartlebury Common, Worcs.; female *Argogorytes fargei* (Shuck.), 18.vi.97, Reighton Cliffs, N. Yorks.; female *Philanthus triangulum* (F.),

20.vii.97, Rauceby Warren, Lincs. Apidae: female *Colletes floralis* Evers., 10.vii.97, Sandscale Haws, Cumbria; male *Andrena argentata* Smith, 22.vii.97, Roydon Common, Norf.; male *Andrena nigrospina* Thom., 29.v.97, Highgate Common, Staffs.; male *Andrena ocreata* (Christ), 29.v.97, Hednesford Hills, Cannock Chase, Staffs.; female *Andrena tibialis* (Kirby), 16.iv.97, Hartlebury Common, Worcs.; female *Lasioglossum quadrinotatum* (Kirby), 16.iv.97, Devil's Spittleful, Worcs.; male *Lasioglossum pauperatum* (Brullé), 2.ix.97, Broom Hill, Essex; female *Melitta haemorrhoidalis* (F.), 2.viii.97, Cheswick Dunes, Northumbria; female *Megachile leachella* Curt., 23.vii.97, Rampart Field, Breckland; male *Nomada fulvicornis* F., 20.vii.97, Kirkby Moor, Lincs.; male *Psithyrus rupestris* (F.), 17.vi.97, Brayton Barff, S. Yorks.

BOWDREY, J. P. — A female of the RDB1 sphecoid wasp, *Cerceris quadricincta* (Panz.) taken 20.vii.96 on a sunny bank behind the Roman Wall in Castle Park, Colchester, Essex. It was found frequently in Colchester up to about 1920 when it was thought to have died out.

COLLINS, G. A. — Some RDB aculeate bees and wasps recorded in 1998, mostly in Surrey. Chrysididae: *Hedychrum niemelai* Linsenmaier, 20.vii.98, Horsell Common, Woking, Surrey; *Chrysogona gracillima* (Förster), 5.viii.98, on carrot flower, Spur Hill, Mytchett, Surrey. Pompilidae: *Cryptocheilus notatus* (Rossius) (Plate 2, Fig. 3), 19.viii.98, Bagmoor Common, Surrey. Apidae: *Andrena ferox* Smith, F. (Plate 2, Fig. 2), 7.v.98, Brockenhurst, S. Hants. (not recorded in the New Forest since 1966); *Andrena hattorfiana* (F.), 16.vii.98, Westcott Downs, Surrey; *Sphecodes niger* Sichel, 23.ix.98, Box Hill, Surrey; *Sphecodes spinulosus* von Hagens, 29.v.98, Westcott Downs, Surrey (new to the county).

HALSTEAD, A. J. — Some sawflies and aculeate wasps and bees taken in 1998 in Surrey, Dorset, Herts. and Middx. Pamphiliidae: female *Pamphilus varius* (Lepelletier), 28.viii.98, swept, Wisley Common, Surrey. Cimbicidae: female yellow form of *Cimbex femoratus* (L.), 3.vii.98, swept from birch, Winfrith Heath, Dorset. Tenthredinidae: female *Pachyprotasis variegata* (Fall.), emerged 10.v.98, bred from larvae on foxglove (*Digitalis* × *mertonensis*), RHS Garden, Wisley, Surrey. Vespidae: worker *Vespa crabro* L., 6.viii.98 from a nest in a building at RHS Garden, Wisley, Surrey — this is the first nest there for at least 26 years. Sapygidae: male *Sapyga quinquepunctata* (F.), 17.v.98, on a pine stump, Brentmoor Heath, near West End, Surrey. Tiphiidae: female *Tiphia minuta* V. d. Lind., 1.vii.98, swept, Melcombe Park Wood, near Melcombe Bingham, Dorset. Mutillidae: male *Mutilla europaea* L., 3.vii.98, in sand quarry near Binnegar, Dorset. Eumenidae: female *Pseudepipona herrichii* (Saussure), 4.vii.98, at nest site, Hartland Moor, Dorset. Chrysididae: *Omalus violaceus* (Scop.), 17.v.98, on a pine stump, Brentmoor Heath, near West End, Surrey; *Chrysis viridula* L., 21.vi.98, swept, Brentmoor Heath, near West End, Surrey; male *Cleptes semiauratus* (L.), 1.vi.98, swept, Buckingham Palace Garden, London SW1. Apidae: female *Melecta albifrons* (Forst.), 4.v.98, on old brick wall with nesting *Anthophora plumipes* (Pall.), Royston, Herts.; female *Heriades truncorum* (L.), 29.viii.98, nesting in a drilled fence post, Knaphill, Surrey.

HARVEY, M. C. — Some scarce aculeate bees and a spider wasp taken in 1998. Pompilidae: *Priocnemis coriacea* Dahlbom, 4.v.98, in a rural garden, Upper Basildon, Berks. Apidae: female *Andrena hattorfiana* (F.), 22.viii.98, on field scabious flower, *Knautia arvensis*, Hartslock SSSI, Oxon; *Sphecodes crassus* Thom., 30.viii.98, Swain's Wood SSSI, S. Bucks.; *Osmia bicolor* (Schr.), 25.v.98, North Unhill Bank, Berks.

HAWKINS, R. D. — Some Hymenoptera, mostly aculeates, taken during 1998 at Bagmoor Common (SU9242), a reserve of the Surrey Wildlife Trust. Management to

restore heathland has created some excellent habitats for nesting Hymenoptera. Cimbicidae: female *Zaraea fasciata* (L.), 19.vi.98. Chrysididae: female *Chrysis fulgida* L. (Plate 2, Fig. 5), 19.vi.98, at stump of dead birch (see Miles, 1998, *Br. J. Ent. Nat. Hist.* 11: 113); *Chrysis helleni* Linsenmaier, 29.viii.98, at root mound of wind-blown pine; *Chrysis viridula* L., 19.vii.98 and 14.viii.98 (male), at root mound. Tiphidae: female *Methocha ichneumonoides* Lat., 19.vi.98, on bare sand of 'scrape' (area with turf removed). Pompilidae: *Anoplius viaticus* (L.), 4.v.98, one female of two, very active on mounds; *Priocnemis coriacea* Dahlbom, 4.vi.98, on bare sand of 'scrape'; *Cryptocheilus notatus* (Rossius), 19.vii.98, at root mound, 29.viii.98, on bare sand of 'scrape'. Vespidae: *Dolichovespula saxonica* (F.), 2.viii.98, at flowers of alder buckthorn, *Fragula alnus*. Sphecidae: female *Philanthus triangulum* (F.), 14.viii.98, at flowers of heather, *Calluna vulgaris* (not nesting at this site). Xylocopidae: female *Ceratina cyanea* (Kirby), 15.v.98, at flowers of ground ivy, *Glechoma hederacea*.

HODGE, P. J.—Some aculeate Hymenoptera mostly taken in S.E. England in 1998. Chrysididae: *Chrysis helleni* Linsenmaier, 24.vi.98, swept from south-facing chalk grassland, Ranmore Common, Surrey; *Chrysogona gracillima* (Först.), on trunk of dead lime tree (*Tilia*) and *Cleptes semiauratus* (L.), beaten off oak, both 31.vii.98, by Turkey Brook, Forty Hall, Mickleham, Surrey; *Chrysura radians* (Har.), 24.vi.98, on a log, White Hill, Mickleham, Surrey; *Omalus aeneus* (F.) and *O. puncticollis* (Mocsary), 28.vi.98, swept from willow (*Salix*), Wicken Fen, Cambs. Sphecidae: male *Alysson unicornis* (F.), 25.vii.98, swept from a steep south-facing clay bank, Claylands Nature Reserve, Bishop's Walton, S. Hants., and a female of this species beaten from grey poplar *Populus canescens* near recently disturbed grassland, 16.ix.98, Park Royal, Middx.; female *Stigmus pendulus* (F.), 20.vii.98, one of many females nesting in a dead pine trunk, Forty Hall, Middx.

MARSHALL, T. & V.—Some Australian ants. An "empty" shell of the mollusc *Thersites fraseri* was collected August 1997 on the beach at Nelly Bay, Magnetic Island, off the coast of Queensland, Australia. Four months later back in Britain the shell was found to contain a colony of an unidentified ant with a queen and 12 workers. Also shown from the Queensland rain forest were specimens of the green tree ant (*Oecophylla smaragdina*), the golden or golden bum ant (*Polyrachis* sp.) and an unidentified species.

ROBERTS, S. M.—(a) A selection of aculeate Hymenoptera from various localities in England, Scotland and Wales. Chrysididae: female *Omalus violaceus* (Scop.), 19.viii.98, Feltham, Middx. Pompilidae: male *Ceropales maculata* (F.), 13.viii.98, Kenfig Burrows, Glam.; female *Homonotus sanguinolentus* (F.), emerged 2.vii.98 from host spider's egg nest collected 20.vii.97, Bloxworth Heath, Dorset, also a male collected under similar circumstances 24.vii.98 and emerged 14.viii.98, Talbot Heath, Dorset. Eumenidae: female *Pseudepipona herrichii* (Saussure), 18.vi.98, Hartland Moor, Dorset, and male, 11.vii.97, Bloxworth Heath, Dorset. Tiphidae: female *Tiphia femorata* F., 13.viii.98, Kenfig Burrows, Glam. Sphecidae: male *Crossocerus walkeri* (Shuck.) and female *Pemphredon lugubris* (F.), 25.viii.97, Ancrum, near Melrose, Rox.; female *Ectemnius dives* (Lepeletier & Brullé), 20.vii.98, Feltham, Middx.; female *Ectemnius sexcinctus* (F.), 7.viii.98, Salisbury, Wilts.; female *Mimumesa littoralis* (Bond.), 13.viii.98, Kenfig Burrows, Glam.; male *Philanthus triangulum* (F.), 11.viii.98, Margam Moors, Glam. Vespidae: male *Vespula rufa* (L.), male and worker *Dolichovespula norvegica* (F.) and male *Dolichovespula sylvestris* (Scop.), 28.viii.97, Hartwoodmyres, near Selkirk, Selk.; worker *Vespula rufa* (L.), 28.viii.97, Ettrickbridge, Selk.; male *Dolichovespula saxonica* (F.), 28.vii.98, Fovant Down, Wilts. Apidae: male and female *Colletes succinctus* (L.), 30.viii.98, Rashiel, near Langholm, Dumf., also male, 18.vii.98, Feltham, Middx.; female *Colletes*

fodiens (Geoff. in Fourc.), 13.viii.98, Margam Moors, Glam.; female *Colletes marginatus* Smith, 13.viii.98, Kenfig Burrows, Glam., also female, 11.viii.98, Margam Moors, Glam.; male and female *Halictus rubicundus* (Christ), 25.viii.97, Ancrum, near Melrose, Rox.; female *Lasioglossum cupromicans* (Pérez), 30.viii.98, Rashiell, near Langholm, Dumf.; *Lasioglossum fratellum* (Pérez), female 30.viii.98, male 3.ix.98, Rashiell, near Langholm, Dumf., also female 25.viii.97, Ancrum, near Melrose, Rox., male 28.viii.97, Ettrickbridge, Selk.; male *Lasioglossum rufitarse* (Zett.), 28.viii.97, Ettrickbridge, Selk.; female *Lasioglossum brevicorne* (Schenck), 25.v.98, Parley Heath, Dorset; female *Andrena fuscipes* (Kirby), 30.viii.98, Rashiell, near Langholm, Dumf.; female *Andrena nigriceps* (Kirby), 13.viii.98, Kenfig Burrows, Glam.; female *Andrena tibialis* (Kirby), 13.iv.98, Coombe Bissett Down, Wilts.; male and female *Melitta leporina* (Panz.), female *Sphecodes crassus* Thom., 18.vii.98 and male *Sphecodes niger* Sichel, 19.vii.98, Feltham, Middx.; female *Sphecodes scabricollis* Wesm., 5.vii.98, Uddens, Dorset; female *Nomada rufipes* F., 30.viii.98, male 31.x.98, Rashiell, near Langholm, Dumf.; female *Epeolus cruciger* (Panz.), 13.viii.98, Kenfig Burrows, Glam.; male *Megachile maritima* (Kirby), male *Coelioxys mandibularis* Nylander, male and female *Coelioxys conoidea* (Ill.), 13.viii.98, Crymlyn Burrows, Glam., also female *C. conoidea*, 20.vii.98, Feltham, Middx.; worker *Bombus terrestris* (L.), male *Bombus hortorum* (L.), 26.vii.97, Lindisfarne, Northumb.; male *Bombus bohemicus* Seidl, 25.viii.97, Ancrum, near Melrose, Rox., also male 26.viii.97, Lindisfarne, Northumb.; male *Bombus campestris* (Panz.), 25.viii.97, Ancrum, near Melrose, Northumb., also male 13.viii.98, Crymlyn Burrows, Glam.; male *Bombus muscorum* (L.), 26.viii.97, Lindisfarne, Northumb., also male, 11.viii.98, Margam Moors, Glam.; male *Bombus humilis* Ill., 13.viii.98, Kenfig Burrows, Glam.; also male, 11.viii.98, Margam Moors, Glam.; male *Bombus sylvorum* (L.), 13.viii.98, Kenfig Burrows, Glam.; male *Bombus soroensis* (F.), 19.ix.98, Great Cheverell Hill, Wilts. (*leg.* M Edwards).

(b) A display of distribution maps of aculeate Hymenoptera for inclusion in Part 3 of the Provisional Atlas of British Aculeates due for publication in 2000.

SHARDLOW, M. E. A. — Some rare and unusual aculeates, mostly ants, recorded on RSPB reserves in 1997 and 98. Formicidae: *Leptothorax tuberum* (F.), *L. interruptus* (Schenck), *Tetramorium caespitum* (L.), 1998, Dungeness, Kent; *Leptothorax nylanderii* (Först.), 1998, Wolves Wood, Essex; *Formica exsecta* Nylander, *F. lugubris* Zett., *Leptothorax acervorum* (F.), *Myrmica sulcinodis* Nylander, 1998, Abernethy, Fife. Mutillidae: *Mutilla europaea* L., 1997, Havergate Island, Suff.

SMITH, M. — Some uncommon bees and wasps mostly taken in 1998. Chrysididae: *Omalus violaceus* (Scop.), 25.viii.98, Evercreech, Som. Eumenidae: *Eumenes coarctatus* (L.), 30.vi.98, Wildmoor Heath, Crowthorne, Berks. Sphecidae: *Ectemnius ruficornis* (Zett.), 22.vi.98, Englemere Pond, Bracknell, Berks.; *Nysson dimidiatus* Jurine and *N. trimaculatus* (Rossius), 12.viii.98, disused railway shunting yard, Radstock, Som. Apidae: *Hylaeus signatus* (Panz.), 20.vii.97, on *Reseda* flowers, River Nadder, Salisbury, Wilts.; *Andrena argentata* Smith, F., 30.vi.98, and its cleptoparasite *Nomada baccata* Smith, F., 6.viii.98, Wildmoor Heath, Crowthorne, Berks.; *Stelis punctulatissima* (Kirby) and *Heriades truncorum* (L.) — possibly first county record for the latter, 2.viii.98, Sonning Common, Oxon; *Bombus (Psithyrus) rupestris* (F.), 18.vii.98, Nettlebed, Oxon.

UFFEN, R. W. J. — (a) Some Symphyta, bees and wasps new to the Hertfordshire list or of local interest. Xiphydriidae: female *Xiphydria prolongata* (Geoff. in Fourc.), 29.viii.98, on a fence post, Tyttenhanger sandpit, Colney Heath, Herts. Tenthredinidae: male *Athalia rosae* (L.), 31.viii.98, Therfield Heath, Royston, Herts. — this migrant species was of widespread occurrence in 1998 and was frequently seen near

the Dorset coast during the Dipterists/Hymenopterists' week 28.vi-3.vii. Chrysididae: *Chrysogona gracillima* (Först.), 15.viii.98, two females from a water trap on willow firewood, Smallford, St. Albans, Herts.; female *Hedychridium coriaceum* (Dahlbom), 10.viii.98, on a path with *Lindenius panzeri* (V. d. Lind.) nests, (*L. albilabris* (F.) may also be present), Aldenham golf course, Herts. Pompilidae: female *Anoplus nigerrimus* (Scop.), 13.viii.98, running among cut branches on the ground, Smallford, St. Albans, Herts. — previously erroneously recorded from Letchworth, Herts. by Ray Palmer before *A. concinnus* (Dahlbom) was recognised as British; *Priocnemis agilis* (Shuckard), female 12.viii.98 on carrot flower, male 15.viii.98 in a water trap, Smallford, St. Albans, Herts.; female *Pompilus cinereus* (F.), 29.viii.98, Tyttenhanger sandpit, Colney Heath, Herts. Sphecidae: male *Astata boops* (Schr.), 29.viii.98 (female also seen nesting in vertical soil face of oak stump), Tyttenhanger sandpit, Colney Heath, Herts; female *Gorytes quadrifasciatus* (F.), 2.ix.98, Commons Fen, Welwyn Garden City, Herts.; *Spilomena troglodytes* (V. d. Lind.) running over leaves in the exhibitor's garden, Welwyn, Herts.; missing from the exhibit but recorded at Smallford, Herts., 15.viii.98, on a carrot flower, a male of the nationally scarce *Alysson lunicornis* (F.). Vespidae: worker *Dolichovespula saxonica* (F.), 24.vii.98, from a nest in a felled tree, Hatfield Park, Herts. Apidae: male *Hylaeus signatus* (Panz.), 22.vii.98, on flowers of *Matricaria inodora* and *Campanula ?latifolia* in a public garden, Welwyn Garden City, Herts. — no sight of females or their preferred pollen source, *Reseda*; female *Hylaeus cornutus* Curt., 12.viii.98, on a carrot flower, Smallford, St. Albans, Herts.; *Melitta tricineta* (Kirby), first record for mid-Herts. of this bee associated with *Odontites*, males 12.viii.98 and a single worn female on 24.viii.98, Smallford, St. Albans, Herts.

(b) A scarce spider wasp from Bedfordshire. Pompilidae: male *Priocnemis cordivalvata* Haupt, 7.viii.98, from a sunny patch by a woodland path, Kings Wood, Heath and Reach, Beds.

WHITE, J. — Some ants from Sydenham Hill Wood, London SE21 and SE26. Formicidae: *Lasius niger* (L.), *L. flavus* (F.), *L. brunneus* (Latr.), *L. fuliginosus* (Latr.), *Myrmica ruginodis* Nylander, *M. scabrinodis* Nylander, *M. rubra* (L.) and *Stenamma debil* (Förster).

ORTHOPTERA

HACKETT, D. — The stripe-winged grasshopper, *Stenobothrus lineatus* (Panz.) is a species widely regarded as occurring on heathland or chalk grassland in Britain but the exhibitor had found it in two London boroughs in recent years, with those in Middlesex appearing to be new for the county. These were at Camley Street Nature Park, 20.vii.96, and Adelaide Nature Reserve, Chalk Farm, 7.vii.98, both in Camden, Middx. The former is recently established grassland on clay in a former lorry park and the latter is a south-facing railway embankment, also on clay. It has also been found at Wimbledon Common, near the Windmill car park, 5.vii.95, in the borough of Wandsworth and Merton, Surrey. The habitat here is heathland/acid grassland. The exhibitor would welcome further records from the London area.

SMITH, I. F. — Photographs of the grey bush cricket, *Platycleis albopunctata* (Goeze) taken 4.viii.98 at Pared Mawr cliffs, Porth Ceiriad, Lleyn Peninsula, Caer, where a large colony was found.

DICTYOPTERA

MARSHALL, T. & V. — A mantid, *Campion* sp. from the rain forest on Lizard Island, off Queensland, Australia; also the world's largest cockroach, *Macro-*

panesthia rhinoceros, which was abundant in the rain forest on Magnetic Island, off Queensland, Australia after storms in August 1997.

SHARDLOW, M. E. A. — Two native cockroaches, *Ectobius panzeri* Steph. and *E. pallidus* (Ol.) taken at Arne RSPB reserve, Dorset, 1998.

PLECOPTERA

MARSHALL, T. & V. — A stonefly, *Dinotoperla* sp. from the rain forest on Lizard Island, off Queensland, Australia, August 1997.

NEUROPTERA

BARNARD, P. — The BENHS logo and a display of Nemopteridae. There has been some recent discussion about the origin and identity of the BENHS logo. In 1996 Richard Jones published an article (*Br. J. Ent. Nat. Hist.* 9: 1–2) describing how the original drawing of the mystery insect was made by Arthur Smith in the early 1960s. Apart from its use on the Society's ties, the logo was little used elsewhere, until it was recently redrawn by Rob Dyke and incorporated with the Society's name in the form now used in all official publications. But what is the mysterious insect? In a later note (*Br. J. Ent. Nat. Hist.* 9: 128) Richard Jones showed that the original was certainly a member of the Neuropteran family, the Nemopteridae, none of which occurs in Britain, but also showed that it was not the well-known Iberian species *Nemoptera bipennis* Illiger. An example, shown in the exhibit, has been used in the logo of the Asociación Española de Entomología.

There are over 150 species of Nemopteridae world-wide, mostly in the tropics and warm temperate regions. The functions of the long narrow hind wings vary: sometimes they have an aerodynamic stabilising function, in some species they act as visual signals, and the swollen wing-tips of some species may divert the attention of predators. One subfamily, the Crocinae, have simple thread-like hind wings, and their cave-dwelling larvae have an enormously elongated "neck". Examples of both were shown in the exhibit. These larvae were first found in ancient tombs in Egypt, and were therefore given the generic name *Necrophilus*! The striking appearance of the members of this family means that they have often been used as logos: in 1994 the International Association for Neuropterology adopted *Palmipenna pilicornis* Tjeder for this purpose. A related species was exhibited.

The specimen illustrated on the BENHS tie seems to have either a double swelling on each hind wing, or else the wing is twisted. Both conditions are found in this family, as shown in two of the specimens exhibited. On the new version of the logo the hind wings seem to have only a single apical swelling, and the hind wings are relatively shorter in comparison to the forewings than in the specimen on the tie. Any further attempts to track down the exact species of the logo will probably fail. Let us just accept that it is a nemopterid, and that it makes a very striking logo!

PLANT, C. — The ant lion *Euroleon nostras* (Geoff. in Fourc.) in East Sussex. An adult with teneral wing tips was found alive in a spider's web on 6.ix.98 at St Leonards-on-Sea, E. Sx., by Colin Milkins and sent to the exhibitor for identification. A few days earlier another specimen had been taken in a light trap at Dungeness, Kent, and released. These are the only known British records away from the breeding population on the Sandlings around Minsmere Nature Reserve, E. Suff. A note has been published in *The Entomologist's Record*, November 1998.

RAPHIDOPTERA

SHARDLOW, M. E. A.—Two snake flies, *Phaeostigma notata* (Fab.) and *Xanthostigma xanthostigma* (Schummel), recorded from the RSPB reserve at Wolves Wood, Essex, in 1998.

ARACHNIDA

SHARDLOW, M. E. A.—(a) Some rare and notable shingle-dwelling spiders recorded on RSPB reserves in 1997 and 1998. Salticidae: *Euophrys browningsi* Millidge & Locket and *Sitticus inexpectatus (rupicola* C L Koch), 1998, Havergate Island, Suff.; *Pellenes tripunctatus* (Walckenaer) and *Phlegra fasciata* (Hahn), 1998, Dungeness, Kent. Gnaphosidae: *Gnaphosa lugubris* (C L Koch) and *Haplodrassus minor* (O.P.-Cambridge), 1997, Havergate Island, Suff. Linyphiidae: *Trichoncus affinis* Kulczynski, 1997, Havergate Island, Suff.

(b) Some notable and uncommon spiders found in other habitats on RSPB reserves in 1997 and 1998. Gnaphosidae: *Zelotes petrensis* (C L Koch), *Z. lutetianus* (CL Koch), *Z. subterraneus* (CL Koch), 1997, Havergate Island, Suff.; *Trachyzelotes pedestris* (CL Koch), 1998, Wolves Wood, Essex. Pisauridae: *Dolomedes fimbriatus* (Clerck), 1998, Abernethy, Easternness. Linyphiidae: *Dismodicus elevatus* (CL Koch), 1998, Abernethy, Easternness.

ISOPODA

SHARDLOW, M. E. A.—Two local woodlice recorded at Dungeness, Kent, during the 1998 BENHS field meeting. Oniscidae: *Cylisticus convexus* (Deg.) and Armadillidiidae: *Armadillidium nasatum* Budde-Lund.

ACTINARIA

SHARDLOW, M. E. A.—An RDB3 BAP priority species of sea anemone, *Nematostella vectensis* Stephenson, found off Havergate Island RSPB reserve, Suff., in 1997 and 1998.

ILLUSTRATIONS

HIGGS, G. E.—Five watercolour paintings comprising the following species: Picture 1. oleander hawk-moth *Daphnis nerii* L., convolvulus hawk-moth *Agrius convolvuli* L., death's-head hawk-moth *Acherontia atropos* L., bedstraw hawk-moth *Hyles galli* Rott. Picture 2. least yellow underwing *Noctua interjecta caliginosa* Schaw., lunar yellow underwing *N. orbona* Hufn., large yellow underwing *N. pronuba* L., lesser yellow underwing *N. comes* Hübn., lesser broad-bordered yellow underwing *N. janthe* Borkh., broad-bordered yellow underwing *N. fimbriata* Schreb. Picture 3. emperor moth *Pavonia pavonia* L. (print). Picture 4. clouded border *Lomasipilis marginata* L., july highflyer *Hydriomena furcata* Thunb., bordered beauty *Epione repandaria* Hufn., the chevron *Eulithis testata* L., scallop shell *Rheumaptera undulata* L. Picture 5. white admiral *Limenitis camilla* L.

REVELS, R.—A range of wildlife photographs from Richard Revels library. A photograph of *Epipagis cancellalis* Zeller and *Marasmia poeyalis* Boisduval, resting on a wall at Bo, Sierra Leone.

WOOLDRIDGE, D.B.—A photograph of *Cyclophora puppillaria* (Hübn.). Taken at mv at The Causeway, Freshwater, Isle of Wight on the 30.vi.1998.

BOOK REVIEWS

The families of Diptera of the Malay Archipelago, by P. Oosterbroek. Fauna Malesiana Handbooks, Volume 1, xii + 227 pp. Brill, Leiden, £70.00, hardback—The volume considered here is the first in the Fauna Malesiana Handbook series, intended to 'facilitate the identification, and thereby the management, of the vast zoological diversity of the region'. It covers the order Diptera, the two-winged flies. The book contains an introduction, sections on classification, life stages, adult morphology, keys to the families, family descriptions and illustrations. The region covered extends from Sumatra and Borneo eastwards to the tip of New Guinea, excluding the Bismarck Archipelago, the Solomon Islands and the Philippines. It thus lies within the Oriental Region and the Australasian/Oceanian Region including islands both sides of Weber's line. Dipterists are fortunate that there are catalogues available for all Regions (only the Neotropical catalogue is incomplete) and the catalogues for the Oriental Region and the Australian/Oceanian Regions were published in 1973–7 and 1989 respectively. This gives workers a firm foundation for research, but the area covered here is huge and diverse and the present work wisely attempts only to give an overview of the state of knowledge to family level. It does not give details of the larval morphology of the families included, but most of the information available on Diptera larvae is from temperate species and is very incomplete. The Malay Archipelago has some of the richest centres of biodiversity in the world, with islands rich in endemic species and even single valleys in New Guinea with endemics. Although no single island approaches the Afrotropical or Neotropical Regions in number of species, the total diversity is nearly as important and the fauna is much more fragmented and therefore vulnerable. It is only through encouraging local workers that conservation can become effective. Besides the scientific interest of biodiversity, the Diptera of this region include very many species damaging to man, crops or domestic animals. Examples are mosquitoes as carriers of human disease and the screw-worm fly which causes myiasis in stock. There is a centre of diversity of dacine fruit-flies in the east of the region, including some of the most feared quarantine pests of fruit and vegetables in the tropics. Thus there is a clear need for an authoritative account of the Diptera of the region.

The book contains 109 families known to occur in the region and makes reference to six more that probably occur there. The key to families contains 150 couplets, too many for inexperienced students, but it is made workable by the excellent range of illustrations and the division of the key into seven major divisions. More experienced students can go straight to the division they require. This is an excellent key, overcoming many of the difficulties of identifying families from the region. There are undoubtedly some species that will not key out correctly, but they will be a tiny minority. The family accounts are a most useful feature, giving a short diagnosis to act as a check on determinations, a simple account of biology and classification and what references are available for the region. Many are written by or in collaboration with acknowledged experts in the field. It is clear from these accounts that much taxonomic and biological research needs to be undertaken in most families. In the chapter on classification there is a table of all families giving the number of documented genera and species and an estimate of the total number of species. Totals of 8811 documented species and 27694 estimated species are given. From the standpoint of a temperate dipterist the interesting families are those associated with rainforest—for example the estimated number of species of the following families: Stratiomyidae (600); Platystomatidae (600); Tephritidae (1400); Lauxaniidae (500); Chloropidae (600) and Drosophilidae (1000) indicate a much greater diversity than

would be found in temperate regions. The estimates are in fact rather conservative as they are mostly about double the number of described species. The Malay Archipelago has been of great interest to naturalists since Alfred Russel Wallace collected there in the nineteenth century—incidentally collecting some of the early type specimens of Diptera. There is still great scope for biogeographical work in the region and this handbook should stimulate further work.

The 213 illustrations are largely taken from other works, with acknowledgements, and form an invaluable adjunct to the key. The references are extremely comprehensive for an introductory text and are commendably up to date.

This is a most useful work and will set a hard standard to follow for the remaining handbooks in the series. It is thoroughly recommended to workers on Diptera and other groups in the region and elsewhere, and as an introduction to one of the most diverse and interesting insect faunas in the world.

JOHN W. ISMAY

Expedition Field Techniques: Insects and other terrestrial arthropods, G. C. McGavin. Expedition Advisory Centre, Royal Geographical Society, 1 Kensington Gore, London SW7 2AR. Paperback, spiral bound, 94 pp, 1997, £10.00 (incl. p&p)—The Expedition Advisory Centre of the Royal Geographical Society provides training and advice to anyone planning an expedition overseas. Among its services it publishes a range of books on field research, including this slim but attractively produced spiral-bound volume on insects. George McGavin, the Assistant Curator of the Hope Entomological Collections at the Oxford University Museum of Natural History, has attempted to gather essential information on what he considers to be the most useful field techniques appropriate to expeditions. The result is an enjoyable and easily readable account with much sound advice. An exhaustive bibliography has deliberately been avoided, but key references are provided as an entry to the literature.

A short introduction to the diversity and importance of insects leads to Section 1, in which planning and preparation are discussed. It is stressed that expeditions which include an element of collecting have to have clear objectives or scientific justification. The chapter includes an interesting table of those expeditions with an entomological bias that have been supported by the RGS in recent years. Other topics touched upon include data handling, the importance of permits, the consideration of the long-term survival of the specimens, and whether the success of the expedition will depend on the availability of taxonomic help in the home country. Section 2 covers safety in the field, with advice on protecting oneself against insect attack, as well as the risks from road traffic accidents. This section is followed by a short section on insect conservation, and which provides more detail on the need for the correct permits for field research.

Section 4, the longest in the book at almost 50 pages, is about actually collecting insects. A wide range of techniques are covered (and well illustrated with black and white photographs), from the use of nets, trays and traps to suction samplers, extraction and sampling from live animals. Many of the entries are brief and lead to further references to provide more detail on the technique. It is obvious that many of the techniques could equally be used nearer to home. It seems that some of the mass-trapping or specialized techniques more often used in the tropics are now leading to the most striking contributions to field entomology in the UK. There may well be other ideas here that could be developed and tried. The chapter ends with a

discussion on data recording, which is also equally applicable to fieldwork at home. After collecting insects it is necessary to kill and preserve them and two short sections deal with these topics. I am a little surprised at the advice given on the preference in killing using a 'traditional' cyanide jar but ethyl acetate is given as the safest alternative and I would have thought that most would use ethyl acetate for this purpose.

Final sections provide information on equipment suppliers, sources of information, internet websites and references.

I can thoroughly recommend this book to all fieldworkers and not only those who are thinking of undertaking an expedition!

M. R. WILSON

The Collembola of Fennoscandia and Denmark: Part I. Poduromorpha by Arne Fjellberg. Fauna Entomologica Scandinavica, Volume 35. Brill, Leiden, 1998, 184 pages, 112 figures, Nlg145/US\$85, hardback—Collembola, or springtails as they are more colloquially known, are abundant in terrestrial ecosystems occurring at densities of more than 40,000 m⁻² in most soils. In the 1960s and 1970s, the standard work for identification was Hermann Gisin's *Collembolenfauna Europas* (1960, Muséum d'Histoire Naturelle, Geneva). However, it is a tribute to Arne Fjellberg that when British entomologists need to identify Collembola, most now turn to his *Identification Keys to Norwegian Collembola* (1980, Norsk Entomologisk Forening) due to the clarity of the layout and the excellence of the diagrams. Fjellberg's work, which includes most of the species also found in the UK, was prepared as camera-ready copy on a typewriter. How things have changed! Not only is this new volume produced to the very high standards we have come to expect from this series, but the number of species now known to occur in this part of Europe has increased substantially, several being described as new to science by Fjellberg himself.

In his 1980 key, Fjellberg included 105 species of Poduromorpha but this new volume contains descriptions of 161 species. The book is the first volume of a planned trilogy which will eventually cover all Collembola from Fennoscandia and Denmark. The Poduromorpha, comprising about a third of the species, are perhaps the most difficult to identify as many are small (less than 1 mm in length) poorly-pigmented species which spend most of their lives in the soil. Paradoxically, several species have lost their springing organ (furca) altogether. These 'springless springtails' no longer need this escape mechanism as they move in between soil particles.

After a concise introduction, in which the main characteristics of Collembola are described, there is a key to all families found in the region including those to be covered in the subsequent two volumes. There are comprehensive keys to genera and species within each family of Poduromorpha, and the text includes copious line drawings of the main diagnostic features, all of which are excellent (unfortunately due to an error by the printer, Fig. 101 of *Metaphorura affinis* is missing but this can be obtained from Dr Fjellberg on request from the address given on page 4). A comprehensive list of references is followed by several tables indicating presence or absence of all species from the provinces of Fennoscandia and Denmark. The localities are thoughtfully provided on a map on the inside front cover.

It has to be said that beginners will initially find this scholarly work difficult to use. However, it is hard to write an easy key to Collembola as they are such small animals, require clearing and examination on a microscope slide if one is to see all

the diagnostic features, and are difficult to observe alive. Nevertheless, if you feel like a challenge, why not study Collembola? They are ecologically important, especially as grazers of mycorrhizae and fungal diseases of plant roots, and have been implicated in assisting the movement of plasmids between bacteria in their guts, a possible link in gene transfer between genetically modified crops and native plants. Such work requires definitive identification of the species involved and Fjellberg's book provides the information one needs to be able to do this accurately.

STEVE HOPKIN

Care and Conservation of Natural History Collections. David Carter and Annette Walker (Eds). Butterworth Heinemann, 1998. ISBN 0 7506 0961 3, £50—Hardback. This book is part of a series in Conservation and Museology and is aimed primarily at curators and collection managers of both large and small collections. However, there is much that should be read by amateurs. There are 9 contributed chapters, covering the physical care and conservation of groups such as vertebrates, insects and other invertebrates, vascular plants, and non-vascular plants. These are followed by chapters on fluid preservation, genetic material, pest management, prevention and control of insect pests, the collection environment, policies and procedures.

The chapter on "Insects and other invertebrates" (by A. Walker, M. G. Fitton, R. I. Vane-Wright and D. J. Carter) should be read by all entomologists who have collections or care for them. The emphasis is on good practice, long-term storage and accessibility to the information the specimen represents. It covers in detail topics ranging from preparation, handling and labelling of specimens, microscope slides, how to deal with plant material associated with insects (e.g. galls, leaf mines), specimen labels, to storage of specimens. Some of the points clearly need constant airing. There is no longer any excuse for specimens not being fully labelled for the future. Computer generation of labels is now routine (as long as they are on the right sort of thin card and use the right ink; another topic covered in an appendix). I believe that for British material the vice-county and a 6-figure grid reference should be routinely included. Short pins are the bane of older collections, and while I have some sympathy with those who use shallow cabinet drawers, which may not take the standard 38 mm pin, there is no excuse for using anything other than a stainless steel pin for modern material. Black pins just should not be used. I assume that many amateurs hope that their collections may one day be deposited in a public museum. It is very disappointing when otherwise superb collections arrive poorly labelled and on short black pins.

Perhaps other chapters of special interest to amateur entomologists will be those on the "Collections environment" (D. Carter & A. Walker) and on "Pest management, prevention and control" (D. Pinniger & J. Harmon). The emphasis here is very much on prevention of pest damage but is also on integrated pest management and the reduction of use of traditional pesticides. Amateurs are often rather cavalier in their use of chemical treatment, but reading this chapter should give rise to some revision in ideas. An example of this is naphthalene, no longer allowed in museums in the UK but still widely used by amateurs, even though it may be harmful to health and only a repellent to insect pests (and not an especially efficient one at that). I regret I can't remember who told me that the best use of naphthalene at the (then) British Museum (National History) was for noticing one's colleagues on the tube home in the evening! But how does one protect a collection from the ravages of insect pests without the use of chemicals? Prevention is better than cure and if *Anthrenus* strikes one can resort to

freezing the drawers or boxes (which incidentally is what is usually done to incoming collections at many museums now).

Of the 4 appendices the one on papers, inks and label conservation is of particular relevance to amateurs, but others on disaster planning and a case history of a flood in a museum in Austria make salutary reading.

Although authoritative, all the contributions are very readable and well referenced. Perhaps it is not a book that will find a place in the library of amateur entomologists (although the price is reasonable for a reference work), but it should be a standard reference wherever natural history collections are housed.

M. R. WILSON

Handbooks for the Identification of British Insects. Vol. 12. Checklists of Insects of the British Isles (New Series) Part 1: Diptera. ed. Peter Chandler. xx + 234 pp. Royal Entomological Society, London. A4 paperback, price £21.00, to RES members £14.70p plus postage and packing UK £3.70p, elsewhere £4.70p. ISBN 0 901546 82 8.

This is a most valuable contribution to the study of British Diptera, updating the Kloet & Hincks checklist of 1976, in which interval profound changes have taken place in accepted higher classification and the British Diptera fauna has increased considerably in the number of species represented. The unfortunate limitation of catalogues in general is that they require nomenclatorial changes to be made, but without affording the compiler the opportunity for stating the reason why. This catalogue is different, citing as it does every paper in which changes have been made, apart from adding a large number of additions, corrections, exclusions, explanations and useful notes. All papers in which nomenclatorial changes have been made are cited in full in the references following each family. Unlike many catalogues, synonyms are listed on a world basis. Each family has been checked by a person or persons having expert knowledge of it, and where differences of opinion exist these are mentioned. In the case of the Syrphidae views differ so greatly as to its phylogeny that there is no consensus of opinion. This has required genera to be listed alphabetically, rather than being placed in subfamilies and tribes as elsewhere in the catalogue. All in all it is a splendid piece of work and is an essential book for any dipterist, whether or not their interests are restricted to the British fauna.

J. C. DEEMING

Insect pests of food premises, by Peter Meaney. National Britannia Ltd., Caerphilly, 1998, 172 pages, including 125 colour plates, paperback, ISBN 1-902510-00-3. £35.00. Distributed by E. W. Classey, Oxford House, Marlborough St., Faringdon, Oxon SN7 7JP—This book is a lavishly illustrated guide to the recognition of the most common arthropod pests of food-handling premises in Britain. Most of the illustrations are in colour. Some have been published previously. They vary in quality: most are good or at least adequate, but a few (e.g. plate 70) are poor. Plate 108 appears a second time as plate 116. Over half of the book is concerned with illustrated descriptions of 64 individual pests or groups of related pests like mosquitoes, plaster beetles, or storage mites. With the descriptions there are brief notes on biology, preferred foods, habitat, and control.

Different follows a series of tables, including a calendar (*sic*) of insect activity in different months, and a list of food groups at risk from different pest types. Two

longer tables follow. The first of these (Table 5) lists the pests most likely to be found in 27 different types of flood-manufacturing premises. The common names together with the Latin names of all the pests are listed on page 120, but despite this both names are given throughout this 11-page table, which is thus twice as long as necessary. Table 6 lists the pests most likely to be found in over 170 different food-stuffs ranging from alfalfa seed through arcane foods like marchpane and dried rose petals to yoghurt powder. Again at every mention the common names of pests are invariably followed by the Latin names, resulting in an overlong table extending to 15 pages. It appears that these tables have been computer-generated without much thought about the data or their presentation. The name *Fannia canicularis* is consistently misspelt (9 times) in Table 5, and *Oryzaephilus mercator* misspelt (8 times) in Table 6. In this last table minor foods like dried loganberries are included, as well as major products like barley, wheat, and maize. These cereals are separately listed, and also covered by broader food categories like 'Grain' and 'Corn, grains, flour etc'. No distinction is made between major and minor pests, and some omissions are unexpected. *Necrobia rufipes* appears twice in the list of maize pests, but no species of *Sitophilus* is included under this cereal. In the text (p.88) the preferred foods of *Nemapogon granella* are stated to include dried meats, spices, and oilcake, but in Table 6 this species is not mentioned under any of these foods. Combining similar foods, e.g. bacon with ham, powdered goat's milk with dried milk, cayenne pepper with ground chilli pepper, and macaroni with dried pasta, would further shorten this table without loss.

There are more errors than is desirable. The house cricket and cockroaches are wrongly numbered and the dried bean and coffee bean weevils are confused in Table 2. The genera *Gnatocerus* and *Rhyzopertha* are consistently misspelt. Several printer's errors have not been picked up at the proof stage, including one in Table 4 which has generated a new pest 'boiled egg flies'. The binding appears to be inadequate for the rather thick paper used, and already several pages in the review copy have become detached. This, and the profligate use of space are particularly undesirable in a softback book of 170 pages (omitting advertisements) expensively priced at £35.

C. E. DYTE

BOOK NOTICE

Checklist of Lepidoptera recorded from the British Isles. J. D. Bradley. 1998. vi + 106 pages. A4 paperback. ISBN 0-9532508-6. Antony Rowe Ltd. Available from: D. J. Bradley. The Glen, Frogham, Fordingbridge, Hants SP6 2HS. £10.50 + £2.00 delivery.

A comprehensive list of the species and subspecies of Butterflies and Moths known from Great Britain and Ireland, with Log Book numbers used in recording. Nomenclature revised, with current scientific and English names and important synonyms indexed. Annotated.

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The Society's Public Liability Insurance

In 1997 the Society extended its third party liability insurance for cover in respect of official Society events to include field work carried out by members as part of their personal activities. It was expected that this would cover the insurance obligations, which accompany application for collecting and recording permits in many cases.

The Society has received a number of queries regarding the scope of the cover provided and this notice will hopefully clarify the position.

At events arranged by the Society and its sister organisations, Dipterists' Forum and B.W.A.R.S., public liability insurance is in place which covers injury and damage to third parties arising from the activities of members and guests. Events include both field meetings and indoor events such as workshops and exhibitions. The cover provided is £2,000,000. It is important that permits for field meetings are issued in the name of the Society, or sister organisation, or to an individual on behalf of the Society, not in the name of the leader of the meeting.

The Society's insurance policy also provides £2,000,000 of public liability insurance to individual members of the Society and sister organisations, in respect of their own field work and entomological research which is not part of a Society activity, providing this is undertaken in the United Kingdom and is not carried out with a view to financial reward.

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We must emphasise that the cover referred to above is Public Liability Insurance and does not include Professional Indemnity, for which separate arrangements have been made.

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Cover illustration: *Torymus nitens* ♀ (Hymenoptera: Torymidae) on oak marble gall
photo: Robin Williams

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ENTOMOLOGICAL SURVEYS OF VERTICAL RIVER FLOOD DEFENCE WALLS IN URBAN LONDON—BROWNFIELD CORRIDORS: PROBLEMS, PRACTICALITIES AND SOME PROMISING RESULTS

RICHARD A. JONES

135 Friern Road, East Dulwich, London SE22 0AZ.

Abstract. Entomological studies of Deptford Creek and River Wandle, two tributaries of the River Thames in urban London, have highlighted some of the logistical difficulties faced by entomologists undertaking survey work, especially on derelict sites in built-up localities. The two sites are essentially vertical river flood defence walls, crumbling industrial wharfs and decaying timber frontages. The available habitat was limited to small pockets of crumbling wood, some nooks and crannies in old concrete, sprouting vegetation and a few small pockets of derelict land immediately behind the tops of the walls. Access was difficult and dangerous, invertebrates few and far between and normal collecting methods were inadequate. This paper reflects on some of the problems encountered, solutions devised and creatures discovered. A selective systematic list of uncommon, unusual and interesting species illustrates the power of colonization of insects in these ruderal sites and includes a nationally rare (red data book) species and 11 nationally scarce (notable) species.

INTRODUCTION

There are many practical books on field entomology, handbooks dealing with the basic skills of just how and where to find insects. In many of them great store is placed on seeking out the right habitat for the right quarry. It is a common feature of many of these handbooks to suggest that by exploring prime natural habitats for the more unusual or specialist species, the commonplace ones will also be found along the way. And so it is that much valuable research is done on the distribution, ecology and biology of insects.

But entomologists who carry out survey work on behalf of some organization, be it local authority, national organization or wildlife group, have the hunting equation reversed. Rather than seeking out suitable specific habitats for certain particular insect species, the habitats are already chosen and the task is to find out what occurs in them.

For many such surveys, however, this is not a problem and the standard techniques of sweeping, chasing, visual searching, grubbing, digging, trapping and all those other methods second nature to the naturalist, are perfectly adequate. For example, faced with any natural or semi-natural habitat like woodland, grassland, heathland, pond or marsh, the location of at least some insects is relatively easy. Even more extreme biotopes such as saltmarsh, moor or quarry are more or less accessible to these normal entomological techniques.

However, urban sites, derelict, ruderal, waste or however one might choose to describe them, are distinctly less easy to study: vegetation is sparse; soil is often littered with rubble, tangled steel and rubbish; the ground is uneven and treacherous underfoot; access is often difficult, either because of dangerous physical obstruction or the sensitivities of owners and developers.

Studying insects on derelict industrial sites is fraught with enough difficulties, but even several years of "brownfield" entomological work had not prepared me for

Deptford Creek and the River Wandle, two tributaries of the River Thames. The previous unusual and problematic demands of working on desolate habitats paled into insignificance beside the peculiar problems of surveying these decaying wharfs.

THE PROBLEMS OF VERTICAL RIVER WALLS

When I was first asked, by the south-east London Boroughs of Lewisham and Greenwich, to survey the invertebrates of Deptford Creek, my heart sank. What was there to survey? Looking over the Creek Road lifting bridge in September 1997, all I could see were a few straggling bits of buddleia hanging down into the gloomy grey water, and a few tufts of stinging nettle sprouting from the tops of half-decayed timber piles. What sort of habitat was that?

For one thing, there was hardly any habitat anyway. The vegetation sprouting from rotten piles was Spartan in the extreme—a small clump of greenery every few yards and some stunted overhanging bushes. A few tiny ledges had accumulated a thin layer of wind-blown soil with moss and lichen. Some nooks and crannies in the broken brickwork and concrete appeared to be curtained with cobwebs. Near the high tide mark some of the wharf timbers were decayed and crumbling.

The habitat was also inaccessible. Vegetation was growing out at about the mean high water mark, 3 to 7 metres above the thick silt mud at low tide and well out of reach from the tops of the wharfs. Likewise the crumbling timber and brickwork was at the point of greatest weathering from wind and water, at the high tide mark. Many of the wharf tops were crumbling and unsafe, ancient access ladders were rusted through or now barely attached to the walls by tenuous strands of precarious looking metal. The mud below was littered with jagged bits of metal rubbish. It presented, to say the least, a thoroughly unsavoury appearance.

After discussion with members of the Creekside Renewal Project, who were commissioning the survey, it became clear that, apart from brief forays across the thick silt mud at low tide, the only really sensible way to approach the task was to visit the walls by boat at high tide. This raised another sheaf of difficulties over the safety of the exercise and the logistical nightmare of co-ordinating weather, tide, boat hire and on-board help. Luckily a local boatman was found who was enthusiastic about the project and knowledgeable about the local boating conditions in the creek.

Just after this I was asked to do a similar survey of the lower reaches of the River Wandle where it enters the Thames at Wandsworth. The tidal stretch of the river was similar to Deptford Creek, but shorter and narrower and with more vegetation and above two weirs was a narrow canalized non-tidal section with slow-flowing freshwater. But it was equally inaccessible and only marginally less dreary looking. Similar boating tactics were proposed for the Wandle survey. Figure 1 shows a sketch map of London's Thames with the River Wandle and Deptford Creek.

In the course of a year's work on Deptford Creek and River Wandle, I spent very many hours bobbing about in a boat, and became quite adept at not falling in whilst leaning out precariously to tube a small fly or poot up a spider. During that time I had to adapt my equipment and methods to the odd situation I found myself in. At the end of it all I was unprepared for the unusual and exciting results.

EQUIPMENT

In addition to the usual array of entomological and photographic paraphernalia ordinarily carried by naturalists, the following items were found useful or necessary for the survey.

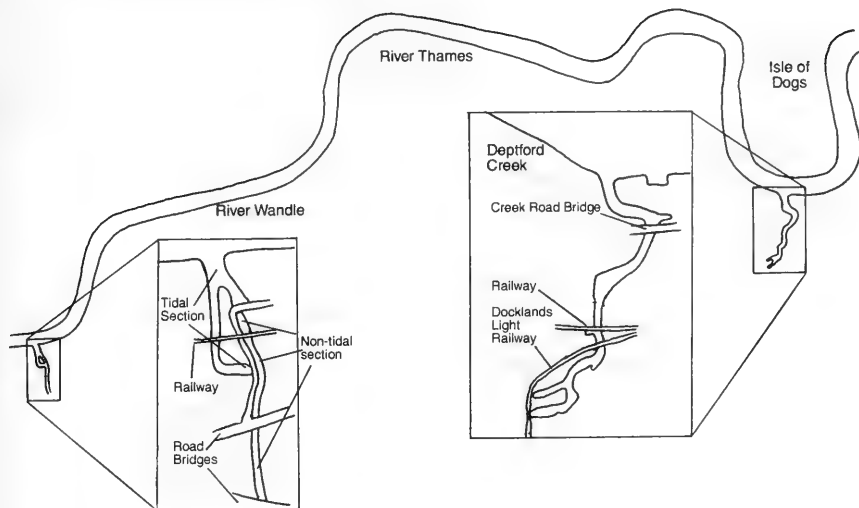


Fig. 1. Sketch map of the River Thames showing its tributaries the River Wandle (TQ 2575, VC 17) and Deptford Creek (TQ 3777, VC 16). Not to scale.

- **Boat.** My transport in Deptford Creek and tidal section of the River Wandle was an especially buoyant one, a small (4 metres) steel jolly boat with outboard motor, from a small commercial ship; it had sealed enclosed voids to ensure flotation even if deluged or upturned. This was particularly important when reaching up to vegetation on the walls, standing on the edge of the boat and making it list perilously. Had we turned over, I was assured that there were handrails on its underside to cling to and to assist in righting the vessel. We always carried oars, and if intending to go out into the Thames also carried a spare outboard motor and extra fuel. For the canal section of the Wandle, we used a sturdy inflatable craft with wooden floor and reinforcing. We had to manhandle it over an 8-foot gate, but luckily it could be deflated and dismantled into manageable pieces. This boat had the advantage of being remarkably stable on the slow-flowing water and had a very small draught (the part of the boat beneath the water) so managing to avoid catching on the upturned supermarket trolleys and other rubbish dumped into the shallow water.
- **Lifejacket.** I was not sitting carefully in the boat like any sensible passenger should; I was standing up, moving about, leaning out over the edge, grabbing onto overhanging vegetation and wharf timbers and generally acting in what would ordinarily be a thoroughly irresponsible manner. Even on the stillest day in the calmest stretch of Deptford Creek I would have been foolhardy not to wear some sort of flotation jacket. A true lifejacket was rather bulky and cumbersome, so I opted for a buoyancy jacket, a safety garment designed to counter my weight in the water rather than support me completely. I could wear it under my normal coat or jacket and so still make full use of my pockets for lens, tubes etc. It also kept me warm, something I had not appreciated I would be thankful for; on even warm days, the wind and spray were exceptionally cooling in our exposed situation.

- Equipment box. In the confines of the boat, I was forever standing on my rucksack. It was constantly shifting as the boat rocked about and it frequently got wet with spray, splashes from the oars and mud from the river walls. I preferred to use a tough plastic flip-top tool box. It was more or less waterproof, it resisted being kicked and trodden on, and I could also use it as a seat when most of the rest of the boat was wet and muddy. It had small compartments in the lid for tubes and pooter. As a precaution against accidental opening when getting in and out of the boat, it was secured with a small padlock. After a particular muddy outing it could be emptied and hosed down with water to clean it.
- Extra-long pooter. The usual technique of popping a plastic tube over a fly or other insect sitting on a tree trunk could not work while the person doing the tubing was bobbing up and down in a boat. An extra-long rubber tube on a pooter at least allowed a flying suck to be made as an insect sitting on wall, timber or vegetation came in and out of reach.
- Washing-up bowl. Sieving onto a plastic sheet was impossible in the boat. There was no flat surface except the floor, often muddy, slopping with water or cluttered with ropes. Standing precariously on the edge of the boat I could grab handfuls of litter, vegetation or rotten wood and pass it down to someone else offering up the bowl and sieve to meet me. Even so, no small amount of "habitat" ended up in the boat.
- Torch. Holes and crevices in the walls were often occupied by spider webs. A small torch was useful when examining these nooks.
- Boat hook. To keep the boat steady against swell and tide, a long-pole boat hook jammed into a hole in the wall or hooked over an old wharf fixing was the most effective stabilizing device. It could also be used to pull down high branches for beating or holding a long stalk steady for a photograph.
- Rope. Apart from its obvious use in mooring the boat while the occupants had a cup of tea and a sandwich, rope tied to a fastening up-water could be gently let out allowing the boat to drift down slowly on the flow or tide as the passing walls were scanned for invertebrate life. It was much easier to control the movement of the boat in this way rather than to keep stopping and starting the engine or fiddling with oars against the slow but remorseless flow of the water.
- Broom handle. For low-tide visits to Deptford Creek, a long wooden pole was very important for testing our footing. At low tide, the centre of the creek had a trickle of running water and the ground was more or less firm and pebbly underfoot because the silt was washed away. In most places it was a few inches deep but there were deep pockets many feet deep. The pole was used to test the river bed as we waded through the water. Stretching out on either side of the central channel were mud banks of deep silt. In some places the mud was many feet thick, but submerged stones and other rubbish under the surface allowed approach to the river walls in places. The pole was very important for testing depth and stickiness of the silt banks.
- Ladder. For the low-tide visits, a light two-stage aluminium ladder was used to climb up the walls to the line of vegetation sprouting around the mean high water mark several metres above.
- Mobile phone. Not just a luxury for idle chat, it was felt very important to have at least one telephone on board should any accident occur or the boat get into difficulties. Wrapped and waterproofed in a sealed plastic bag, it could be used even after complete submersion. Such communication was also important for low-tide visits should anyone become trapped in the thick silt or get caught short by the incoming tide. Luckily I was never called upon to make emergency use of this item.

SPECIAL TECHNIQUES

Because of the highly unusual nature of the terrain, standard collecting techniques had to be modified.

- Sieving soil and rotten wood. During the autumn and winter, Deptford Creek was especially bleak. Vegetation had died back and the only available habitat was leaf litter, soil and decaying vegetable material on the crumbling timbers and ledges. Handfuls of this were quite literally snatched from the walls as the bobbing movements of the boat allowed and sieved over the plastic bowl. With care, a foothold could be found on the wall to reach up higher to grab a handful from further up the wall. This was nevertheless rather disconcerting if there was much swell, and at any moment I half expected to be either stranded dangling precariously from a stunted buddleia bush or tipped into the river. Thankfully the latter outcome never occurred.
- Sweeping. Sweeping is a very awkward procedure when standing up in a boat. A swift thrash of the net tended to push the boat in the opposite direction. Too much sweeping backwards and forwards made the boat bob unnervingly. A technique of gentle sweeping was employed resembling a rather balletic parody of the normal aggressive technique. Since vegetation was scarce, thin and straggling, gentle sweeping was usually sufficient to dislodge insects.
- Beating. Larger overhanging bushes and small trees were beaten, either over a sweep net or a plastic bowl. A pale umbrella, upturned to make a large but collapsible beating tray was found to be too unwieldy, particularly on blustery days when the boat was very exposed. Unfortunately this meant that when working under a large bush, the boat tended to accumulate falling leaves, twigs and debris and not a few invertebrates. On more than one occasion an insect was found scuttling round the gunwales as we pattered back to base. It was sometimes impossible to be certain from which particular site it had come.
- Dissecting rotten timber. Unlike a terrestrial habitat where a log might be casually turned over for easy inspection, any examination of rotten wharf timber had to be made while leaning out of the boat, or sections had to be examined in the boat. This was all very well for small flakes of friable wood crumbling from a rotten wooden plank which could be sieved over the plastic bowl. However, the decayed nature of the Deptford Wharfs meant that in many places whole timber piles were in danger of collapse. On several occasions very large pieces of wood suddenly broke loose and a lightning decision had to be made whether to try and manhandle them onto the boat for examination or push them away to fall harmlessly into the water.
- Visual searching. On sunny days in spring and summer, the vertical river walls of the creek acted as sun traps, and basking insects were visible on the timber, walls and herbage. Large umbels of garden angelica were a prominent feature of the creek and attracted many insects including bees and hoverflies. It was often necessary to stand up in the boat to examine these flowers closely, or they had to be gently pulled down by hand or boat hook.
- Direct pooting. Leaning out from the boat as we manoeuvred at high tide, it was possible to suck up insects directly from the herbage using a pooter. Lying down on the bow of the boat as we slowly drifted on the flow and tide, no tall human silhouette was visible and close approach to dipterons and hymenopterons was possible where under other circumstances it would have been very difficult. This was a most useful technique for capturing the small flies which seemed to spend all their time on the algal coating to the vertical walls, just above the lapping waves of

the incoming or outgoing tide, and the spiders which rested inside their funnel and sheet webs in the crumbling walls.

- Close-up photography. My usual technique for close-up photography requires that my hand rests on the plant, log, ground or trunk on which the insect was resting. The lens of the camera resting on top of my hand is thus steadied and I could image the insect more or less easily in a very shallow field of focus. But with my hand resting on the river wall or timber pile to steady the lens, the remainder of my body was being forced to bob up and down on the swell of the water. I had to move my body up and down with equal and opposite motion to the swell to counter the movement of the boat. This was very tiring to the neck and back muscles, but it could be done for a few moments. In fact, doing anything in a boat, other than sitting calmly, meant a constant working of the head, arms and legs to counteract the vessel's bobbing movement. This was surprisingly tiring, even on a still day.

SAFETY

It is hard to imagine that "safety" might be considered an important issue when pursuing the gentle art of collecting insects. But the dangerous nature of the crumbling wharfs, the hazardous metal rubbish dumped in the water, the treacherous nature of the thick and sticky silt and the difficulties of manoeuvring a small boat in a tidal waterway all compounded to lift these surveys out of the ordinary.

It was a prerequisite of the commissioning bodies for both surveys that no activity should be construed as dangerous or unsafe. As stated above we always carried life jackets, mobile phone and spare motor. I always made sure I had a small first aid kit. When in the boat, I was always accompanied by a knowledgeable boatman, and often by another person who could hold the boat steady whilst I leant perilously out. We always consulted tide tables and kept a wary eye on the movement of the water. If the tide left quicker than we anticipated and we suddenly found that we could not get back up river to our base, we had already planned to tie up the boat against an alternative wharf and return for it at next high water.

Because of the derelict nature of parts of the Creek, there was always a danger from hidden obstructions under the water—mainly dumped supermarket trolleys and car bodywork parts, spilled building materials from a neighbouring merchant warehouse and dropped steelwork from the Docklands Light Railway bridges being constructed over the Creek whilst the survey was progressing. Reconnaissance at low water revealed where particular hazards were, so that we could avoid them when they were covered by the tide.

Low-tide visits were also only made when I could be accompanied, and working in pairs we constantly tested the water through which we were wading and the mud over which we ventured, with a long wooden pole. We had to be particularly careful when walking under the newly built railway bridges because of the danger of snagging our waders on the pieces of sharp metalwork which fell from the scaffold, gantries and welding work all too frequently. We also had to be careful of sudden deep water where vortices had created hidden and treacherous pools.

RESULTS

Having established an approach to surveying the unusual terrain of these decaying wharfs, the learning process of finding invertebrates took several visits. The Deptford Creek survey began in September 1997. The start was very slow. On some visits, during the first few months, I was lucky to finish a day with more than 10

invertebrate finds, most of which would be immature spiders and virtually impossible for me to name anyway. By the end of the preliminary survey, in December 1997, after 3 months of very poor insect-hunting weather, the 92 species recorded seemed a not unsatisfactory list (Jones, 1997). Given the incredibly small areas of habitat, the lateness of the season and the severe harshness of the environment, this was about 90 species more than I had expected.

At the end of a full year's worth of fairly intensive recording, with about 30 site visits, the list increased to 287 species (Jones, 1998a), and included one nationally rare (red data book) species and nine nationally scarce (notable) species. I was suitably impressed. At the finish, I was at least able to answer my own rhetorical question. What sort of habitat was it? It was an astounding habitat. Its capacity to astound was based on two conflicting powers: the power of the human mind to dismiss it as ugly and unproductive, and the power of nature to carve a foothold on even the bleakest strand of earth. As can be seen from Figs 2 and 3, some areas of the creek had plants growing out of every available cranny, notably buddleia overhanging from above and garden angelica sprouting up from the mean high water mark.

The Wandsworth River Wandle survey was less intensive, but at the end of one season, 5 day visits had produced 153 species (Jones, 1998b); they included the same nationally rare (red data book) species as found at Deptford, one of the same and two further nationally scarce (notable) species. There was generally a great deal of



Fig. 2. General view of the central reach of Deptford Creek, looking north. The tide is about half out, and the silt mudbanks are beginning to be exposed. At low tide, the water is confined to a small flowing channel in the centre of the creek, about 3 metres wide and 30 cm deep. Buddleia grows out from the tops of the wharfs, there is some sprouting vegetation from the old timber frontages (left and far distance), but virtually none from the sterile sheet metal piling (centre). Photo N. Bertrand.

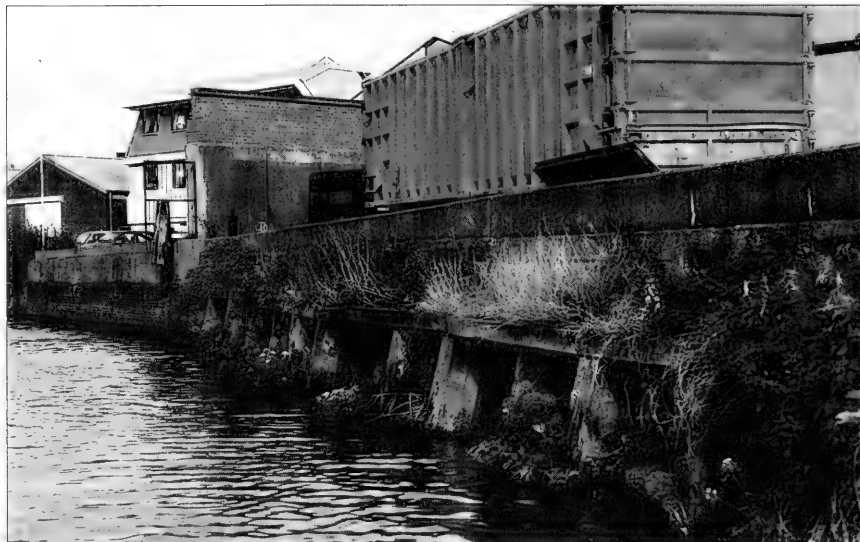


Fig. 3. Herbage growing out of a ledge just below one of the Deptford wharf tops, and sprouting out from decayed timber piles. The tide is virtually at the mean high water mark. The most prominent plants are cascading hops (right), garden angelica umbels half submerged and ivy (far end of ledge). Photo N. Bertrand.

Table of species. The Deptford survey shows two columns, one for the total species at the end of 1998 and one for the species recorded by the end of the preliminary survey to December 1997.

Invertebrate order	Deptford Creek Total	(1997)	River Wandle	Species in common
Collembola (springtails)	2	(2)	0	—
Coleoptera (beetles)	63	(22)	53	23
Dermoptera (earwigs)	1	(1)	1	1
Diptera (flies)	78	(10)	27	13
Hemiptera (bugs, hoppers, aphids etc)	39	(17)	31	12
Hymenoptera (bees, wasps, ants etc)	44	(6)	11	8
Lepidoptera (butterflies and moths)	19	(5)	9	4
Neuroptera (lacewings)	2	(2)	5	2
Odonata (dragonflies)	1	(0)	3	0
Orthoptera (grasshoppers)	1	(0)	0	—
Thysanura (bristletails)	2	(1)	0	—
Aranacea (spiders)	15	(10)	6	3
Opiliones (harvestmen)	1	(0)	1	1
Acari (mites)	1	(0)	0	—
Isopoda (woodlice)	10	(10)	5	3
Chilopoda (centipedes)	1	(0)	0	—
Myriapoda (millipedes)	2	(2)	0	—
Amphipoda (sandhoppers)	2	(2)	0	—
Mollusca (slugs, snails and shells)	3	(2)	1	0
Total	287	(92)	153	70

overlap (70 species in common) between the two surveys reflecting the similar nature of the habitats, but because of the greater flow of freshwater down the Wandle, and its less tidal estuarine character, a greater proportion of what might be termed more characteristically "riverine" species occurred. But in both cases, a remarkable diversity of species demonstrated the powerful colonization abilities of invertebrates to discover available niches and to eke out a living in the relatively harsh and exposed conditions of the decaying man-made habitats.

Many of the species from both tributaries were very common and widespread and were what might be termed ubiquitous garden species, occurring throughout the area of urban and suburban London on almost any patch of disused, ruderal or disturbed ground. There were some straightforward characteristic species of estuaries, rivers and exposed marine habitats, but there were also unusual finds which came as a real surprise. Rather than repeat the complete systematic lists which contained all these commonplace creatures, a table of species and a selective systematic list is included here with comments on a few noteworthy and interesting species.

SELECTIVE SYSTEMATIC LIST

Collembola

At least two unidentified springtail species were found in leaf litter on ledges or beaten from overhanging vegetation in Deptford Creek.

Coleoptera

Anobiidae. *Anobium punctatum* (Deg.) and *Ptilinus pectinicornis* (L.) were both found in decaying timber piles on the Wandle. Burrows and larvae of an *Anobium* species were also found in a driftwood log which had become caught up in a large fig tree growing out from one of the crumbling Deptford wharfs. *Stegobium paniceum* (L.) was beaten from overhanging vegetation at Deptford; it is unusual to find it in the open. On the River Wandle, this species was common in pigeon nests on deep ledges underneath a broad road bridge over the river and was presumably feeding on grass seeds from nesting material and other spilled food brought back by the birds to their young.

Apionidae. *Kalcapion semivittatum* (Gyll.), by sweeping annual mercury sprouting above one of the Deptford wharfs, 6.ix.1997; notable A (Hyman & Parsons, 1992), but fairly frequent in the London area. *Taenapion urticarium* (Herbst), by sweeping and beating overhanging nettles and other vegetation at Deptford, 1 & 8.vi.1998; generally a very local species despite its common foodplant, although provisionally listed as notable B by Hyman (1986), this was not confirmed by Hyman & Parsons (1992).

Biphyllidae. *Biphyllus lunatus* (Fab.), several were found in crampball fungus, *Daldinia concentrica*, 1.iv.1998, on a small log apparently dumped on a site on the Thames just near the mouth of Deptford Creek. An ancient woodland "indicator" species, this beetle is highly unlikely to have got to the site naturally, and on the same day, a few feet away I found the wood-boring sawfly *Xiphydria camelus* an equally odd find.

Carabidae. Various common species were found under planks, stones and rubble above the wharfs. The most frequent carabid in both surveys was *Bembidion harpaloides* Serville which occurred in the rotten timber piles, in the splash zone near the mean high water mark upwards. According to Luff (1998) this is mainly a species of woodland, but it is obviously very tolerant of the saline conditions.

Chrysomelidae. Chrysomelids were very few and far between. On the Wandle a medium-sized willow growing from one of the banks was covered with many hundreds of *Plagioderia versicolora* (Laicharting); although provisionally given notable B status by Hyman (1985), this was not confirmed by Hyman & Parsons (1992), and it is fairly frequent on willows even in suburban London.

Coccinellidae. *Adonia variegata* (Goeze) occurred at both Deptford (two specimens, 20.v and 23.vi.1998) and Wandsworth (many seen on 15.vi, 24.vi, 5.viii. & 22.ix.1998); notable B (Hyman & Parsons, 1992). According to Majerus *et al.* (1997) this ladybird has numbers and populations which fluctuate, boosted by regular migrations from the Continent, and is fairly widely distributed in the Thames Estuary. *Halyzia sedecimguttata* (L.) was beaten from overhanging vegetation at Deptford, possibly associated with the several small stunted sycamores growing out from the wharf tops. Although provisionally given notable A status by Hyman (1986), this species has been found to be quite widespread and this status was not confirmed by Hyman & Parsons (1992). *Stethorus punctillum* Weise, several by beating overhanging vegetation, on both sides of Deptford Creek. Provisionally given notable B status by Hyman (1985), this was not confirmed by Hyman & Parsons (1992). *Coccinella septempunctata* L. was astonishingly common at both Deptford and Wandsworth, with hundreds of larvae, pupae and adults often crowded together on the stunted buddleia bushes which carried a very heavy aphid load.

Curculionidae. *Euophryum confine* (Broun) was dug out of rotten timber piles on some of the Deptford Wharfs, but I was slightly surprised not to find *Pseleactus spadix* (Herbst). *Notaris scirpi* (Fab.), one beaten from small garden angelica plant growing out from brick wall on Deptford Creek, 23.vi.1998; notable B (Hyman & Parsons, 1992), and associated with lesser pond sedge *Carex acutiformis* and reedmace *Typha latifolia*. Neither plant occurs in the Deptford area, however, reedmace does occur further up the Ravensbourne River system in Lewisham (Burton, 1983) and it therefore seems likely that the weevil may have been washed down the river from above.

Halipidae. *Halipus confinis* Stephens occurred in small numbers in the non-tidal part of the River Wandle above the weirs. This was the only true water beetle found in the surveys.

Lucanidae. *Lucanus cervus* (L.), the stag beetle, a large male found crawling up the brick wall of Mumford's Mill, Deptford, 23.vi.1998, inches above the incoming tide; notable B (Hyman & Parsons, 1992), but fairly common in south-east London. There is no suitable habitat anywhere in Deptford Creek for this beetle which is essentially a garden species in the London area. The tall warehouse buildings of the mill produce strong down-draughts when the wind is from the south-west and it is likely that the flying beetle was caught in the draughts and blown into the water from where it crawled up to safety.

Nitidulidae. *Meligethes rotundicollis* Brisout, swept from ruderal vegetation growing at the confluence of the Wandle and the Thames, 24.vi.1998; notable (Hyman & Parsons, 1994) associated with various crucifers including charlock *Sinapis arvensis* which was present on the site.

Oedemeridae. *Nacertes melanura* (L.), the wharf borer, a few adults were seen crawling on the vertical timbers and metal sheet piles of both Deptford Creek and the River Wandle. At Deptford, larvae (Fig. 4) were dug out at around mean high water level from timbers throughout the more tidal reaches of the creek. It is a fairly common species in the London area and Thames Estuary.

Phalacridae. *Olibrus flavicornis* (Sturm), several were beaten from overhanging vegetation in various areas of Deptford Creek and many were swept from rough

ground on either side of the Wandle where it empties into the Thames. Although not listed by Shirt (1987) this beetle was allocated status RDB-K, insufficiently known, by Hyman & Parsons (1992). It is thought to be associated with smooth hawkbit *Leontodon autumnalis* and ox-tongues *Picris* species, and is obviously well established in the London area. *Olibrus affinis* (Sturm) was also beaten from overhanging vegetation at Deptford. Although provisionally given notable B status by Hyman (1986), this was not confirmed by Hyman & Parsons (1992).

Diptera

Bombyliidae. *Bombylius major* L. was seen on the wing above one of the Deptford wharfs. Although usually associated with woodland rides and edges, it occurs in urban London along railway tracks and occasionally in gardens.

Dolichopodidae. Several species of *Syntormon*, characteristic of riverside and brackish vegetation, were among the commonest insects in both surveys, resting in clouds on the vegetation as it sprouted at the mean high water mark, and running on the algal covering of the vertical river walls inches above the outgoing or incoming tide.

Empidae. *Hydrodromia stagnalis* Haliday, a species of river and stream edges, occurred at Deptford.

Ephydriidae. *Scatella stagnalis* (Fallén) was the commonest fly in Deptford Creek, running in untold thousands on the algal covering of the vertical river walls inches above the outgoing or incoming tide. It was also common in some areas of the Wandle, in similar situations.

Lauxaniidae. *Homoneura tesquae* Becker, one by sweeping sprouting vegetation above one of the Deptford wharfs, 8.vi.1998; notable (Falk, 1991a), a secretive species which breeds in leaf litter and other decaying vegetable matter.

Sciomyzidae. *Pherbellia cinerella* (Fallén) occurred in both surveys; the larvae attack a variety of snail species in dry and wet habitats. *Sepedon spegea* (Fab.) was found at Deptford; this widespread but local species is associated with marshes and streams where the aquatic larvae are predators of freshwater snails. Its presence here, in the tidal reach of the creek, suggests that it had been breeding further up river.

Stratiomyidae. *Chorisops nagatomii* Rozkošný, one by sweeping rough behind one of the Deptford wharfs; listed as notable by Falk (1991a), but fairly widespread in the London area.

Syrphidae. Many very common species occurred on flowers of garden angelica and other plants growing out from the mean high water mark or growing above the wharfs. *Chrysotoxum festivum* (L.) was seen at Wandsworth. *Eupeodes* (formerly *Metasyrphus*) *latilunulatus* (Collin), was found on flowers above one Deptford wharf, 6.viii.1998; notable (Falk, 1991a), its habitat preferences are uncertain: this site was a heat trap with the sun reflected off of sheltered brick walls. *Xanthogramma pedissequum* (Harris) occurred in both surveys and is generally quite common in the London area.

Tephritidae. *Oxya parietina* (L.), sweeping above wharfs; although not included by Falk (1991a), this species is suggested to be notable B by Clemons (1996). It is fairly widespread in the London area on mugwort *Artemisia vulgaris*.

Hemiptera

Aphididae. At Deptford, *Aphis fabae* Scopoli completely encrusted some of the heads of garden angelica making them appear to be black-flowered. These plants

commonly sprouted out from the rotten timbers at the mean high water mark. The stunted buddleia bushes which overhung the creeks also suffered a very heavy aphid load, possibly also this common species, and were often dripping with honeydew.

Cicadellidae. *Idiocerus decimusquartus* (Schrank) and *I. stigmatalis* Lewis were beaten from overhanging poplars and willows respectively on the Wandle.

Coccidae. *Pulvinaria vitis* (L.), females with their fluffy white egg masses were often seen at Deptford on alders growing out from the wharf tops.

Cimicidae. Several common species of *Anthocoris* and *Orius* were found beating overhanging vegetation. *Lyctocoris campestris* (Fab.) was very frequent in pigeon nests on ledges under a road bridge where it crossed the Wandle.

Corixidae. Several specimens of *Sigara dorsalis* Leach were caught by water netting in the non-tidal upper reaches of the Wandle, above the weirs. This was the only truly aquatic bug found during the surveys.

Hydrometridae. One specimen of *Hydrometra stagnorum* (L.) was found walking in matted vegetation on a ledge just above the water line in the non-tidal part of the Wandle.

Lygaeidae. *Metopoplax ditomoides* (Costa), one specimen sweeping rough ground at the confluence of Wandle and Thames, 24.vi.1998. First discovered in Britain in Middlesex in the 1950s, since 1992 it has started to turn up again, apparently sometimes in numbers. *Nysius senecionis* (Schilling), at Deptford several were swept above the wharfs and at Wandsworth it was found in countless hundreds of thousands on rough ground near the confluence with the Thames (Jones, 1999a); although only discovered new to Britain in the early 1990s (Hodge & Porter, 1995), it is now seemingly fairly common.

Miridae. *Deraeocoris flavilinea* Costa, many swept and beaten from overhanging vegetation at Deptford on several occasions. First discovered in Britain in Essex in 1995 (Miller, in prep.), and until a few years ago confined in western Europe to Italy; it has spread across France and Germany and its arrival in Britain was accurately predicted. It is associated with sycamores and there are many small saplings growing out from the decaying wharfs.

Pentatomidae. *Aelia acuminata* (L.) occurred in both surveys on small plots of derelict ground adjoining the wharfs; this species is on the increase and is now common and widespread in the London area on bits of rough ground, ruderal sites, parks and gardens.

Reduviidae. *Empicoris culiciformis* (De Geer), several beaten from overhanging vegetation and in small pockets of leaf litter in even very exposed parts of Deptford Creek.

Hymenoptera

Apidae. The honeybee *Apis mellifera* (L.) and 4 common bumblebees, *Bombus* species, occurred, mainly visiting the flowers of garden angelica growing out from the rotten timbers at the mean high water mark.

Bethylidae. *Bethylus boops* Thomson, sweeping, above one of the Deptford wharfs, 25.viii.1998. Very little is known about this species which was only recently recognized as new to Britain (Burn, 1997). Although this appears to be only the tenth British specimen, the fifth, sixth, seventh and eighth specimens were recorded from my old Nunhead garden in the last 6 years and the ninth was found recently in Morden Cemetery, indicating that this creature is well established in south London (Jones, 1999b).

Chrysididae. *Omalus auratus* (L.) occurred in both surveys and one specimen of *Chrysis ignita* (L.) was seen flying round a grey drainpipe (mistaken for a tree trunk?!), above one of the Deptford wharfs where walls acted as a sun trap.

Colletidae. *Hylaeus signatus* (Panzer) was swept on rough ground at the confluence of Wandle and Thames, 24.vi.1998; notable B (Falk, 1991b), it is associated with weld and mignonette, *Reseda* species, and these were present on the site.

Eumenidae. *Microdynerus exilis* (Herrich-Schaeffer), found twice on flowers growing above the Deptford wharfs; notable B (Falk, 1991b). First discovered in Britain in the 1930s and possibly a recent arrival and still spreading, it has turned up elsewhere in urban south London.

Formicidae. *Lasius niger* (L.) was found throughout both survey areas in almost any situation above the mean high water mark including right at the mouth of Deptford Creek at the junction with the Thames, on exposed concrete surfaces even within the splash zone.

Pompilidae. *Auplopus carbonarius* (Scopoli), one found running on the ground above one of the Deptford wharfs; notable B (Falk, 1991b), supposedly a woodland species and seemingly out of place on the creek, but the area was a bit of a sun trap.

Sphecidae. Several common species were found including stem-nesting and wood-nesting species. Several of the crumbling dry rotten timbers about 1 metre above mean high water mark had extensive borings thought to have been made by the *Ectemnius* and *Pemphredon* species found as adults on leaves and flowers elsewhere above the wharfs.

Xyphidiidae. *Xyphidia camelus* (L.), crawling in the grass above one of the wharfs at Deptford and thought to have emerged from a small log apparently dumped there. This log, probably ash, had cramp balls, *Daldinia concentrica*, growing on it and the small fungus beetle *Biphyllus lunatus* feeding inside them. Both species seem very out of place and are unlikely to have arrived by natural means.

Lepidoptera

Lycaenidae. *Celastrina argiolus* (L.), the holly blue, seen flying above the Deptford wharfs and a common species of urban south-east London. *Polyommatus icarus* Rottensburg, the common blue, was found at Wandsworth.

Lymantridae. *Orgyia antiqua* (L.), the vapourer, a caterpillar was found on herbage above the walls of the River Wandle.

Noctuidae. Several common species were found including a fully grown caterpillar of the old lady, *Mormo maura* L., found in leaf litter on a very narrow ledge on one of the most exposed sections of Deptford Creek, near the junction with the Thames. At this time, the area above the wall was being developed and had been a busy building site for at least 18 months with heavy machinery moving about all the time and precious little vegetation. Plants sprouting from wall timbers were also very sparse and it is a mystery what the caterpillar had been feeding on.

Nymphalidae. The usual common species including: *Aglais urticae* (L.), the small tortoiseshell, several adults seen on the wing and a chrysalis found attached to some sheet metal piling at Deptford just inches above the mean high water mark. *Vanessa atalanta* (L.), the red admiral and *Cynthia cardui* (L.), the painted lady, several seen visiting flowers above the wharfs and resting on the wooden timber piles in the sunshine. *Polygonia c-album* (L.), the comma, one adult seen at Deptford and several caterpillars beaten from hop plants overhanging the walls of the creek. The decline of the comma during the end of the 19th century, linked to the decline of the hop

industry, and its recovery during the middle part of the 20th century, when it appeared to switch to nettles, is well known. How ironic, then, that in Deptford Creek it is breeding on the hop plants which overhang the flood defence walls and which cascade down into the water where once barge-loads of dried hops from the fields of Kent were shipped to the breweries of London.

Neuroptera

Sisyridae. *Sisyra fuscata* (Fab.), was beaten from vegetation overhanging the River Wandle. This common species has aquatic larvae which breed inside freshwater sponges.

Odonata

Aeshnidae. Unidentified blue/green *Aeshna* species were seen hawking up and down the river walls at both Wandsworth and Deptford; they could easily have been breeding in the freshwater section of the Wandle, but the Deptford specimen must have flown some distance from its breeding site.

Calopterygidae. *Calopteryx splendens* (Harris), a female was seen fluttering around the freshwater part of the Wandle and was more than likely breeding there.

Coenagruidae. *Enallagma cyathigerum* (Charpentier), the common blue damselfly, was seen on several occasions on the Wandle and was no doubt breeding there.

Orthoptera

Acrididae. *Chorthippus parallelus* (Zett.), the meadow grasshopper, was found above one of the wharfs at Deptford, seemingly very out of place and far from any meadow, although it is generally recorded from a variety of rough grassy habitats.

Thysanura

Lepismatidae. *Lepisma saccharina* L., the common household silverfish, one beaten from overhanging vegetation at Deptford; it is unusual to find it out of doors, but there were many buildings nearby.

Machilidae. A *Petrobius* species, probably *P. maritimus* Leach or *P. brevistylis* Carpenter seen running about in cavities and crawling on the river wall of Deptford Creek near the junction with the Thames, just above the mean high water mark, its typical habitat.

Aranea

Araneidae. Although the common garden spider *Araneus diadematus* Clerck was found on both surveys, the most obvious orb-web spider on both the Wandle and Deptford Creek was *Larinioides sclopetarius* (Clerck), a very distinctively marked species (Fig. 5). It occurred along all banks of both tributaries, sheltering in dry crevices and beaten from overhanging vegetation or sitting in its orb webs spun across emergent vegetation, decaying timbers, metalwork and crumbling brickwork. Although a fairly local species, it is often associated with buildings, bridges, fences and walls near water, especially those lining rivers and canals.

Gnaphosidae. *Micaria pulicaria* (Sundevall), a warmth-loving species, was found once at Deptford, running on bare ground behind a derelict wharf.

Salticidae. *Salticus scenicus* (Clerck), the common zebra spider, occurred on the vertical walls of both surveys, even out into the bare and exposed steel and concrete of the Thames, inches above the water.

Segestridae. *Segestria florentina* (Rossi) was found only on the River Wandle. Here it had colonized a short sheltered stretch of non-tidal river, on both banks, where a concrete topping overhung the walls creating a sheltered series of nooks and crevices. The characteristic spoke-and-hub webs lined this section of the river, many shed skins were found in the leaf litter on a small shelf below and one large female was discovered in her burrow behind a small piece of wood prised off from the concrete. Despite exhaustive searching along seemingly similar habitat at Deptford, none could be found there. This very local but fairly widespread species is associated with old walls, especially in ports, and is thought to have been originally introduced from the Mediterranean in shipping.

Tetragnathidae. Several immatures of a *Tetragnatha* species were found in the buddleia bushes overhanging a sheltered dock inlet at Deptford; they could not be identified. There are several species in the genus, often found near water.

Isopoda

Armadillidiidae. The common *Armadillidium vulgare* (Latreille) was frequent at Deptford, but on rough ground above the mouth of the Wandle the very local *Armadillidium nasatum* Budde-Lund was the only species to be found, in large numbers under rough concrete rubble.

Cylisticidae. *Cylisticus convexus* (De Geer) was found in a decaying timber pile at Deptford. It is primarily a coastal species of rocky or stony areas above the tidemark, but it has also colonized quarries, walls and waste ground.

Ligiidae. *Ligia oceanica* (L.), the sea slater, was very common on the tidal walls of Deptford Creek, occurring in rotten timber and under stones on the foreshore exposed at low tide. One was also found crawling up a wall in the tidal part of the Wandle. Although completed some time ago, the atlas of woodlouse distributions in Britain (Harding & Sutton, 1985) shows *Ligia* to be a truly marine animal, occurring only on the coast. According to that study *Ligia* was unknown from the Thames in London. Wandsworth is by far the furthest inland that this creature has been found, but this is not totally unexpected.

Trichoniscidae. *Androniscus dentiger* Verhoeff was dug from timber piles at Deptford. A widespread and moderately common species, it is associated with old walls, coastal cliffs and other exposed habitats.

Sphaeromatidae. Three common species were found at Deptford Creek, under stones on the foreshore exposed at low tide: *Sphaeroma hookeri* Leach, *S. monodi* Bocquet *et al.* and *S. rugicauda* Leach.

Myriapoda

Polyxenidae. *Polyxenus lagurus* (L.), one of Britain's smallest and most curious millipedes, was found in very large numbers at Deptford, in soil and leaf litter, crawling on bare walls and sheltering in nooks and crannies in even the most exposed parts of the creek. A widespread, but rather local species, it has two distinctly different habitat types. Inland it is found beneath the bark of old dead trees, but also on the ground beneath stones and leaf litter. It also occurs on old walls and in exposed coastal habitats beneath spare halophile (salt-tolerating) vegetation, down



Fig. 4. Larva of *Nacerdes melanura*, the "wharf borer", dug out from timbers at and even below the mean high water mark. Photo R. A. Jones.

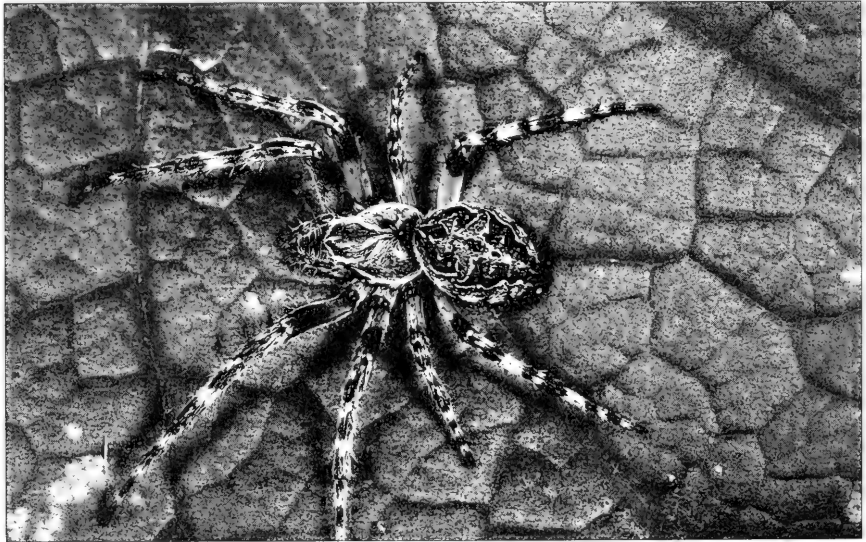


Fig. 5. The characteristic orb-web spider *Larinioides sclopetarius*, a regular inhabitant of the riverside, and often found sitting in its webs spun across emergent vegetation, timber piles, ironwork and concrete. Photo R. A. Jones.



Fig. 6. The minute millipede *Polyxenus lagurus*, often found living gregariously in a mess of shed skins on exposed vertical timbers. Photo R. A. Jones.

to the shore. It lives in small colonies, amidst a mess of shed skins (Fig. 6), and feeds on decayed plant matter.

Amphipoda

Gammaridae. Very many unidentified *Gammarus?* species were found at Deptford, under stones on the foreshore exposed at low tide.

Talitridae. *Orchestia gammarella* (Pallas) was dug out from a timber pile at Deptford.

Mollusca

Helicellidae. Several specimens of *Hygromia cinctella* (Draparnaud) were found on narrow ledges along part of the non-tidal Wandle. For many years this species was confined to a small area of South Devon, but in the last 40 years it has started to spread and is now quite widespread in southern England. This was exactly the same stretch of the river where the large Mediterranean spider *Segestria florentina* occurred, so it may have been very sheltered.

Limacidae. A very large specimen of *Limax flavus* (L.) was seen crawling along one of the old brick river walls of Deptford Creek. Although local, it is a widespread species usually found near human habitations.

DISCUSSION—"BROWNFIELD CORRIDORS"

The natural history of both Deptford Creek and the River Wandle today, exemplified by the insects and other invertebrates occurring there, is clearly an ecology based on invasion, recolonization and adaptation to decaying man-made structures.

There is little doubt that new things will continue to turn up at both sites. It is probably no surprise that the nationally scarce Adonis ladybird, *Adonia variegata*, noted for its migrations, appeared first on that exposed and scruffy foreshore of Dreadnought Wharf, at the very north end of Deptford Creek, and on a tiny derelict corner near the mouth of the Wandle, for running past both is perhaps the largest wildlife corridor in England—the Thames. True, the river banks in this part of London are not what one might describe as prime natural habitats, but they are littered and lined with half derelict and overgrown sites along their entire length right out into the "proper" countryside of the Thames Estuary in Essex and Kent.

These derelict plots, formerly described rather disparagingly as "waste" places, have long been an overlooked resource for nature conservation. Even today they are often dismissed under the heading "brownfield" sites, implying that they are not green and therefore ripe for development at no loss to the natural world. Naturalists and ecologists tend towards the other direction and prefer to describe sites as "ruderal" in an attempt to avoid these negative associations. Study of these sites often shows that, just like Deptford Creek and the River Wandle, they may not be as aesthetically pleasing as verdant forests, rolling hills, purple moors or green valleys, but they do have a valid and varied natural history interest.

The invertebrate interest of urban derelict sites has generally received scant attention. Ironically, London's contribution to this study began long ago, with the surveys of the City's bombed sites after the last war by members of the London Natural History Society (Le Gros, 1949; Owen, 1951; Parmenter, 1953; Jones, 1954, etc). At that time, interest in the sites was limited to an academic study of colonization and establishment, and there was no suggestion of preserving the broken-down buildings and rubble-strewn areas for their natural history value. Attitudes have changed subtly since then. The idea that invertebrates on brownfield sites might have some conservation value was explored briefly by Lonsdale (1991) and has recently achieved greater status in various reports. Gibson (1998) makes the observation that of the nationally rare and scarce species listed by Kirby (1995) in a review of habitat preference, an estimated 12–15% of them are recorded from artificial (i.e. ruderal) habitats.

In particular, ruderal sites offer in abundance a habitat which is fast disappearing from the countryside at large—bare ground with sparse vegetation. This is important for insects because the soil in such a microhabitat is usually warmed by the sun much more than a turf of long grass and dense herbage. Changes in grazing practice and other land management techniques have meant that what were once much more open areas of downland, grassland and heathland are now threatened by scrub invasion. Ruderal sites are fast taking over as important habitats in their own right because they are home to many warmth-loving invertebrates, perhaps on the northern edge of their distribution in Europe. Indeed, an unexpected feature of both tributaries was only revealed on warm sunny days when certain south-facing buildings and walls reflected the sun's heat and created many blisteringly hot sun-traps.

This is not to say that the entire fauna of the rivers exists because it needs such a microhabitat, but it adds another layer to the habitat complexity which makes up the lines of crumbling wharfs, adding to their ability to act as wildlife corridors through

London. It is becoming clear from reports of other surveys in the Thames Estuary out into Essex (C. W. Plant, *pers. comm.*), that the chain of these ruderal sites is already acting as a corridor, with the discovery of many unusual, uncommon and new invertebrates being found right along their length into the heart of the East End. The appearance of the "new" bugs *Nysius senecionis* and *Deraeocoris flavilinea* in several localities can only support the notion that these small London rivers are acting as natural highways, allowing movement of invertebrates along them.

The vertical flood defence walls and the meagre strips of earth behind are a sorely underestimated habitat for wildlife. It has become patently clear that the dowdy appearance of these two creeks to the unguided eye should not be allowed to overshadow the fact that there is teeming life, diverse biology and important ecology.

This fact has been ably demonstrated to the Creekside Renewal Programme (Steele *et al.*, 1999), the commissioning body for surveys on Deptford Creek which included not only terrestrial invertebrates but also marine invertebrates, plants, birds, fish and other animals. Such was the interest generated by these surveys that the idea of "conserving" the derelict nature of the crumbling walls has emerged. Unfortunately, repair of a river flood defence is a major civil engineering project and will necessitate complete destruction of certain parts of the walls. But this will be done in a piecemeal manner so as not to scour the whole creek clean in one sweep. The new walls will include various design features, including wooden uprights and horizontal ledges around the mean high water mark to deliberately accumulate silt, in the knowledge that these will shortly be colonized by plants, then invertebrates, mimicking the decay and colonization which has occurred through neglect during the last 50 years. Some of the sound walls, comprising steel sheet piling and engineering brick and not in need of repair or renewal, will have timber cladding placed on them to encourage this marginal growth specifically as an important and interesting wildlife habitat and to maintain the integrity of the "brownfield corridor".

The value of ruderal sites for plants, invertebrates and other animals has been recognized for many years, but there are few examples, in London at least, of major redevelopment projects taking this sort of initiative to allow wildlife to continue having its natural colonizing effect on the environment.

CONCLUSION

The study of natural history has long been a pursuit of natural wonder. Historically it was spurred by a reverence to the creator subtly revealing his designs to the enquiring disciples of natural philosophy. More recently it has been driven by the professional engine of biological and ecological science. But wonder is still to be had out there: at each visit to Deptford Creek, where most signs of life have been buried and shored-up under sheet-pile, concrete and engineering brick, I still wonder at the audacity of nature to claw back what was once her own.

ACKNOWLEDGEMENTS

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photographs in this paper. Jill Goddard of the Creekside Renewal Programme, a partnership between the London Boroughs of Lewisham and Greenwich, commissioned the survey of Deptford Creek and arranged access to the various wharf sites. Valerie Selby of Wandsworth Borough Council's Nature Conservation Centre commissioned the survey of the Wandle and negotiated access to adjoining land.

REFERENCES

- Burn, J. T. 1997. Additions and changes to the Chrysoidea (Hym., Aculeata) occurring in Britain. *Entomologist's Monthly Magazine* **133**: 65–66.
- Burton, R. M. *Flora of the London area*. London: London National History Society.
- Clemons, L. 1996. A provisional atlas of the Tephritidae (Diptera) of Britain and Ireland. *British Tephritidae Newsletter* **6**.
- Falk, S. 1991a. *A review of the scarce and threatened flies of Great Britain. Part 1*. Peterborough: Nature Conservancy Council.
- Falk, S. 1991b. *A review of the scarce and threatened bees, wasps and ants of Great Britain*. Peterborough: Nature Conservancy Council.
- Gibson, C. W. D. 1998. *Brownfield: red data. The values artificial habitats have for uncommon invertebrates*. English Nature Research Report No. 273. Peterborough: English Nature.
- Harding, P. T. & Sutton, S. L. 1985. *Woodlice in Britain and Ireland: distribution and habitat*. Abbots Ripton: Biological Records Centre.
- Hodge, P. J. & Porter, D. A. 1997. *Nysius senecionis* (Schilling) (Hemiptera: Lygaeidae) new to the British Isles. *British Journal of Entomology and Natural History* **10**: 1–2.
- Hyman, P. S. 1985. *A provisional review of the status of British Coleoptera*. Invertebrate Site Register, Report Number 60. Peterborough: Nature Conservancy Council.
- Hyman, P. S. 1986. *A national review of British Coleoptera. Ia. A review of the statuses of British Coleoptera (in taxonomic order)*. Invertebrate Site Register, Report Number 64. Peterborough: Nature Conservancy Council.
- Hyman, P. S. & Parsons, M. S. 1992. *A review of the scarce and threatened Coleoptera of Great Britain. Part 1*. UK Nature Conservation Number 3. Peterborough: Joint Nature Conservation Committee.
- Hyman, P. S. & Parsons, M. S. 1994. *A review of the scarce and threatened Coleoptera of Great Britain. Part 2*. UK Nature Conservation Number 12. Peterborough: Joint Nature Conservation Committee.
- Jones, A. W. 1954. Drone-fly visitors to the flowers of the City bombed sites. *London Naturalist* **34**: 154–157.
- Jones, R. A. 1997. *Deptford Creek: terrestrial invertebrate study. Preliminary results—December 1997*. Unpublished report for the Creekside Renewal Programme.
- Jones, R. A. 1998a. *Life on the edge. A terrestrial invertebrate survey of Deptford Creek*. Unpublished report for the Creekside Renewal Programme.
- Jones, R. A. 1998b. *Wandsworth's hidden river. A preliminary invertebrate survey of the River Wandle*. Unpublished report for the London Borough of Wandsworth.
- Jones, R. A. 1999a. *Nysius senecionis* (Schilling) (Hemiptera: Lygaeidae) feeding in large numbers on Guernsey Fleabane. *British Journal of Entomology and Natural History* **12**: 229–230.
- Jones, R. A. 1999b. Further records of *Bethylus boops* Thomson (Hym., Bethyilidae) from south London. *Entomologist's Monthly Magazine* **135**: 102.
- Kirby, P. 1994. *Habitat fragmentation; species at risk: invertebrate group identification*. English Nature Research Report No. 89. Peterborough: English Nature.
- Le Gros, A. E. 1949. Notes on the spiders of the bombed sites. *London Naturalist* **28**: 37–39.
- Lonsdale, D. 1991. Derelict land and wasteland. In: *Habitat conservation for insects—a neglected green issue*. ed D. Lonsdale and R. Fry. Middlesex: Amateur Entomologists' Society. pp. 189–192.
- Luff, M. L. 1998. *Provisional atlas of the ground beetles (Coleoptera, Carabidae) of Britain*. Huntingdon: Biological Records Centre.
- Majerus, M. E. N., Majerus, T. M. O., Bertrand, D. & Walker, L. E. 1997. The geographic distribution of ladybirds (Coleoptera: Coccinellidae) in Britain (1984–1994). *Entomologist's Monthly Magazine* **133**: 181–203.

- Miller, D. 1999. [*Deraeocoris flavilinea* Costa (Hem., Miridae) new to Britain.] in preparation.
- Owen, D. F. 1951. The Lepidoptera of Cripplegate. *London Naturalist* 31: 84–88.
- Parmenter, L. 1953. The flies of the Cripplegate bombed site, City of London. *London Naturalist* 33: 89–100.
- Shirt, D. B. (ed.) 1987. *British red data books: 2. Insects*. Peterborough: Nature Conservancy Council.
- Steele, J. (ed.) 1999. *Deptford Creek: surviving regeneration*. London: Deptford Forum Publishing.

SHORT COMMUNICATION

Scarce wood-decay beetles in a river floodplain farmed landscape in the Upper Thames Valley—The National Trust's Coleshill and Buscot Estate near Faringdon in the far west of VC22 (Berkshire—but currently within the administrative county of Oxfordshire) comprises a very large acreage of intensively managed farmland, probably no better or worse than the average farmland of the area. However, a recent biological survey revealed a surprisingly interesting range of deadwood-breeding beetles, including some generally regarded as collectively indicative of relict old forest conditions (Harding & Rose, 1986). In this respect the key feature of the estate is that it coincides with low-lying ground along the Thames and its minor tributary the River Cole. The two rivers include networks of field drains and hedgerows lined by mature and overmature trees, including old pollards as well as standards, and with crack willow, ash, oak and native black poplar. Only a few hundred years ago this would have been grazing marsh country and effectively an open pasture-woodland system—Buckland & Dinnin (1993) have pointed out that many localities with relatively rich saproxylic faunas have a core of old wetland, the wetness of the ground conditions having protected the tree cover from intensive exploitation for timber or small wood products. Thus today's fauna is a survival from an earlier landscape. Similarly interesting faunas have been noted also very close by to Buscot and Coleshill, along the Thames (M.F.V. Corley, in Peachey, 1982) and in other river floodplains, e.g. in the Severn Vale of Gloucestershire (Atty, 1983), the River Teme in Worcestershire (Whitehead, 1996), along the River Cam in Cambridgeshire (Kirby & Lambert, 1992) and the Darent in Kent (Williams, 1990).

Six nationally scarce (Hyman, 1992) beetles were found within the farmland:

Agrilus pannonicus (Pill. & Mitt.) (Buprestidae)—Nationally Scarce Category A—Kilmester Farm, SU251965, extensive borings and exit holes in bark of dead hedgerow oak, 9.viii.1995.

Agrilus sinuatus (Olivier)—Nationally Scarce Category A—Step Farm, SU275951, characteristic D-shaped exit holes in dead hawthorns in old pasture, 7.viii.1995; Furzehill, Colleymore Farm, SU259940, two adults beaten from old hawthorn in old pasture, 8.viii.1995.

Ctesias serra (Fab.) (Dermestidae)—Nationally Scarce Category B—Step Farm, old hedgerow pollard, SU278957; and Manor Farm, old willow pollards, SU264992.

Anisoxya fuscula (Illiger) (Melandryidae)—Nationally Scarce Category A—Furzehill, Colleymore Farm, SU259940, three beaten from dead hawthorn in old pasture, 8.viii.1995; Kilmester Farm, SU245974, one beaten from a dead young willow, 9.viii.1995; Snowswick Copse, SU229958, one beaten from a dead hawthorn at woodland edge, 17.viii.1995.

Conopalpus testaceus (Olivier) (Melandryidae)—Nationally Scarce Category B—Colleymore Farm, one beaten from old oak, SU255924.

Cossonus parallelepipedus (Herbst) (Curculionidae)—Nationally Scarce Category B—Dead adults abundant plus a few live in trunk of large fallen poplar along drain

south of Waterloo Copse, SU239925, 17.viii.1995; also remains of dead adults in trunk of willow pollard at SU257930.

John Campbell (*pers. comm.*) of the Oxfordshire Museums Service has additionally taken *Ischnomera sanguinicollis* (Fab.) (Oedemeridae)—Nationally Scarce Category B—on the estate.

Cossonus parallelepipedus is a regular inhabitant of old crack willow pollards along river valleys and in other grazing marsh situations, while *Anisoxya fuscula* is often found in these situations as well, e.g. Alexander (1987). *Agrilus pannonicus* is, however, most likely a recent colonist. Its general increase in the western suburbs of London has been well-documented (Hackett, 1995) and the present record suggests that the species is moving westwards along the Thames Valley. The estate also includes two landscape parks, Coleshill Park and Buscot Park, although neither is known to be long-established and few deadwood beetles were found in them. Buscot Park had no accessible deadwood at the time of the survey, and the little available in Coleshill Park revealed *Bitoma crenata* (Fab.) (Colydiidae), *Pediacus dermestoides* (Fab.) (Cucujidae) and *Phymatodes testaceus* (L.) (Cerambycidae). *Ctesias serra* has been found at Coleshill previously. Certainly not of the same quality for deadwood fauna as the surrounding farmland! A large area of ancient woodland lies to the east of Buscot Park—Badbury Forest—but, as with the parkland, the deadwood beetle fauna is not exceptional. A long history of exploitation for wood products has resulted in a relatively poor fauna. The most interesting species found during the survey were *Platycis minuta* (Fab.) (Lycidae) and *Mycetophagus multipunctatus* (Fab.) (Mycetophagidae), of which only the former has nationally scarce status. The latter is very much a river floodplain species in the western parts of its GB range and likely therefore to occur also outside of this woodland, with the fauna described above.

Thus we have the interesting situation where ancient semi-natural woodland and historic parks are relatively poor in wood-decay fauna while the conventional farmland is relatively rich. K. N. A. ALEXANDER & A. P. FOSTER, National Trust, 33 Sheep Street, Cirencester, Glos GL7 1QW.

REFERENCES

- Alexander, K. N. A. 1987. Some notable deadwood associated Coleoptera from N. Somerset. *The Entomologist's Record* **99**: 156.
- Atty, D. B. 1983. Coleoptera of Gloucestershire. Privately published, Cheltenham.
- Buckland, P. C. & Dinnin, M. H. 1993. Holocene woodlands, the fossil insect evidence. In: Kirby K. J. & Drake C. M., eds, *Dead wood matters: the ecology and conservation of saproxylic invertebrates in Britain*. English Nature Science 7.
- Hackett, D. 1995. The jewel beetle *Agrilus pannonicus* in the London area. *The London Naturalist* **74**: 161–164.
- Harding, P. T. & Rose, F. 1986. *Pasture-woodlands in lowland Britain: a review of their importance for wildlife conservation*. Institute of Terrestrial Ecology (NERC).
- Hyman, P. S. (revised Parsons, M. S.) 1992. *A review of the scarce and threatened Coleoptera of Great Britain*. Part 1. UK Nature Conservation: **3**. Peterborough: Joint Nature Conservation Committee.
- Kirby, P., & Lambert, S. J. J., 1992. 1991 Annual Exhibition, Coleoptera. *British Journal of Entomology and Natural History*, **5**: 75.
- Peachey, C. 1982. Review of the invertebrate sites in England: Provisional Review of Oxfordshire. *Invertebrate Site Register Report No. 8*, Part II. Nature Conservancy Council, London.
- Whitehead, P. F. 1996. The northernmost British record of *Euryusa sinuata* Erichson, 1837 (Coleoptera: Staphylinidae). *Entomologist's Gazette* **47**: 255–256.
- Williams, S. A. 1990. A good haul of beetles in West Kent. *The Coleopterists Newsletter* **38**: 7–8.

MICROPYGUS VAGANS PARENT (DIPTERA: DOLICHOPODIDAE), A NEW ZEALAND FLY IN THE BRITISH ISLES

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Abstract. A species of Dolichopodidae (Diptera) native to New Zealand, *Micropygus vagans* Parent, has been present in Ireland since 1971. It was found in Northern Ireland in 1987 and in several areas of south-west Scotland in 1994. The means and timing of introduction and rate of spread are unknown, but it was found to be numerous and well established at several sites.

INTRODUCTION

The occurrence of a dolichopodid of New Zealand origin in the British Isles has already been reported in the newsletter of the empid and dolichopodid study group (Chandler, 1996) and it was consequently included in the new checklist of British Diptera (Chandler, 1998). Here more detail is provided of the characters of this species and of the known records.

This species was first recognised in Irish material and was mentioned as an undetermined species of Campsicneminae (now included in Sympycninae) by Chandler (1988), when it was thought to be near to *Campsicnemus* Haliday, with which it was compared. The Irish specimens were examined by Peter Dyte, who considered that the species was more nearly related to *Sympycnus* Loew, but clearly not any of the known European species of this or related genera.

The matter rested there until the species was found in numbers in south-west Scotland, during the Dipterists Forum summer field meeting based at Ayr in 1995. It was then decided to submit specimens to Dan Bickel of the Australian Museum, Sydney, who was revising southern hemisphere genera of Sympycninae and he rapidly determined them as *Micropygus vagans* Parent, a species endemic to New Zealand.

It was thought for several reasons that this species had probably been introduced to the British Isles. It has been found in numbers at several localities, some of which are landscaped parks with gardens associated. It is apparently absent from earlier collections and one of the Irish sites is close to the residence of A. H. Haliday, the first author to monograph the Dolichopodidae of the British Isles, who might have been expected to have found it if it was present in the area in the 19th century. It is also well known that a number of other organisms, especially Coleoptera and terrestrial planarians, have been introduced to the British Isles from New Zealand, although no New Zealand Diptera have previously been recorded here.

The date and means of introduction of *M. vagans* is unknown, but it may have been brought in with plant material or soil around imported plants. It was already present in Ireland by 1971 and is widespread there, at least in the east of the island. In Scotland it is still known only from Ayrshire and Kirkcudbright, but is well established there. It may be restricted by climatic requirements and it will be interesting to see if it spreads to other parts of the country.

The genus *Micropygus* is endemic to New Zealand and not recorded elsewhere. All of the 16 known species were described by Parent (1933), most of them being recorded from only one or two localities. *M. vagans* was recorded from six scattered localities, mostly in the South Island, taken in x, xii-i and vi. Nothing was recorded

concerning the habitats or biology of any species of *Micropygus*. Because the genus was described after 1930 and Parent did not designate a type-species, the generic name was unavailable until it was validated by Bickel & Dyte (1989), from which it now dates.

DESCRIPTION

This is a rather small fly of undistinguished appearance, the body approximately 2mm long, the wing 2.6–2.8mm (male), 2.6–3.1mm (female). The body is predominantly dark greenish, more or less covered with grey dusting, and the legs are mainly yellow. The wing is mainly dark grey in appearance with brown veins, but with a strip including the posterior crossvein appearing whitish in both sexes, which is due to the absence both of pigmentation in the vein and of microtrichia on the adjacent part of the wing membrane (Fig. 1).

Unlike many members of the family, there are no obvious secondary sexual characters in the male. Apart from genital characters, the female has the face a little broader than in the male; Parent referred to presence of a ventral bristle on the mid tibia in the female, but this has not been found in the material available. The general description below therefore refers to both sexes.

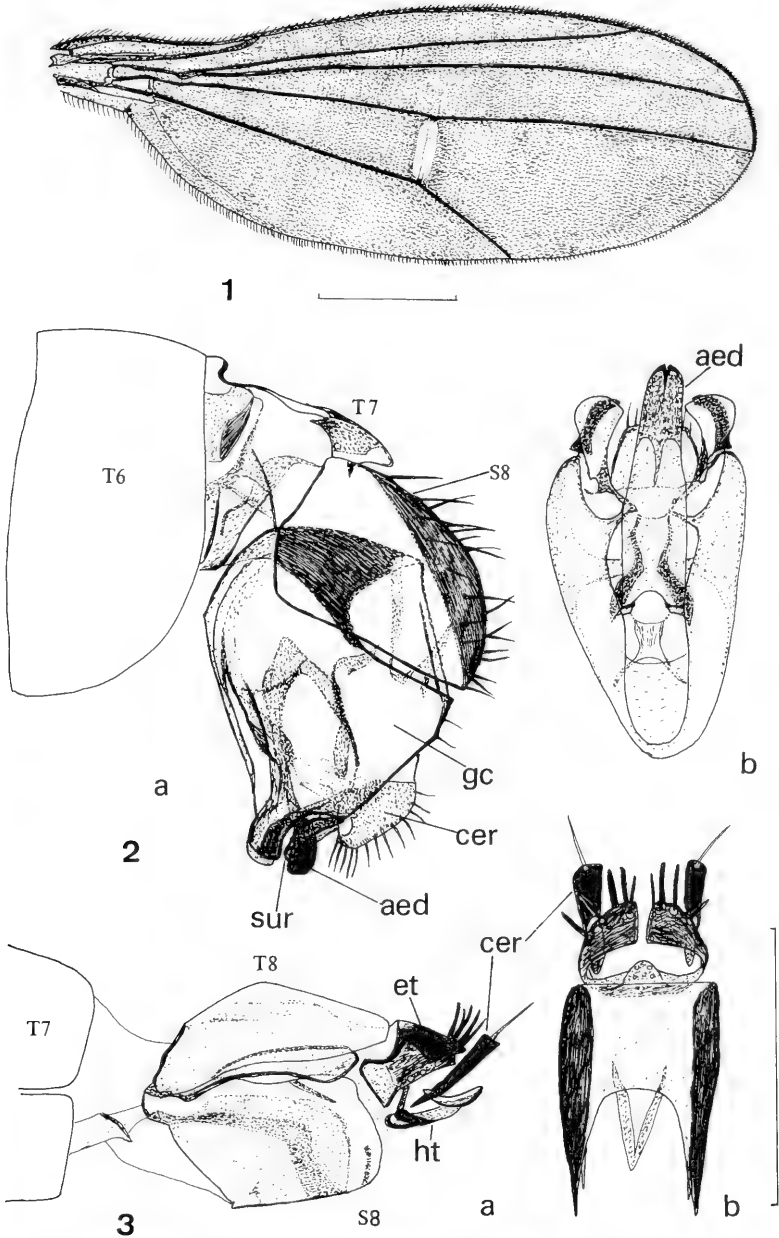
The head is grey dusted, with areas on the frons appearing dull black when viewed from certain angles. The face is whitish grey and is narrow and parallel-sided below the antennae (a little broader in the female), then widening sharply to the mouth margin. The antennae and palpi are black. The antenna has the scape bare, pedicel with short bristles and third segment (first flagellomere) triangular, a little longer than broad, bluntly rounded apically and densely covered with hairs; the arista is set dorsally at the basal third of the third segment and is slender, about 3 × antennal length. The head bears 4 strong black bristles posteriorly, comprising a pair of divergent postocellars and an erect outer vertical bristle near the hind corner of each eye.

The thorax is humped, greenish brown in ground colour with thin grey dusting on the dorsum, which also bears three vague dark stripes which are widely interrupted around the suture, being present anteriorly before the first dorsocentral bristle and also posteriorly with the laterals on the dorsocentral rows. Acrostichal bristles are absent, but there are 5 pairs of strong erect dorsocentrals, 2 of them being presutural. The pleura are more strongly grey dusted.

The coxae are dark grey; the femora are vaguely greyish dorsally, this dark colouring usually not reaching the base or tip of the femur; the legs, including the trochanters, are otherwise dull yellow. Mid femur has anterior and posterior preapical bristles, the hind femur only an anterior preapical. Mid tibia has 2 long anterodorsals, situated at a third and two-thirds of its length, and a single posterodorsal basal to the more basal of the anterodorsals: these bristles are longer than the tibial width. Hind tibia has a row of about 8 dorsal bristles, of which 4 are usually longer and equalling tibial width, and 4 posteroventral bristles. Hind basitarsus (first tarsomere) is shorter than the second segment of the hind tarsus.

The wing (Fig. 1) is of grey appearance due to the presence of minute close-set microtrichia covering the membrane, except in a strip on either side of the posterior crossvein. The anterior crossvein is absent. The wing veins are brown except for the greater part of the posterior crossvein, which thus appears white in contrast to the rest of the wing. The halteres are yellow.

The abdomen is dark greenish with thin grey dusting. The male genitalia (Fig. 2) are small, black and held vertically; the cerci are relatively large with fine hairs. The



Figs 1-3. *Micropygus vagans* Parent. 1. Male wing. 2. Male genitalia: a, lateral view; b, ventral view. 3. Female genitalia: a, lateral view; b, dorsal view. Abbreviations: aed = aedeagus, cer = cercus, et = epiproct, gc = genital capsule, ht = hypoproct, sur = surstylus, S = sternite, T = tergite. Scale lines: wing 0.5 mm, others 0.25 mm.

female genitalia (Fig. 3) are slender and retracted *in situ*, with the epiproct bearing blunt spinose setae and the cerci strap-shaped and black, with a single apical seta.

RECOGNITION

M. vagans runs in the keys by Assis Fonseca (1978) to couplet 12 in the male key to genera and couplet 13 in the female key. This is because the "discal vein" (M_{1+2}) is unforked and running straight to the margin parallel to the preceding vein (R_{4+5}), antennal scape simple, arista set basally on third antennal segment, proboscis and front coxae without spines, a preapical bristle present on the hind femur, acrostichals absent and 5 pairs of dorsocentrals present.

In both male and female keys the choice is then between *Campsicnemus*, which has the face narrowed below the antennae but then immediately broadened to the mouth margin, and other genera in which the face is narrowed from the antennae to the mouth margin. *Micropygus* thus differs from both alternatives in having the face parallel-sided on the upper part and then sharply broadened to the mouth margin.

As mentioned above, there is some general resemblance to *Sympycnus*, which runs elsewhere in the keys by Assis Fonseca because the British species have uniserial acrostichals although these are absent in some exotic species. *Sympycnus* species also have 6 pairs of dorsocentrals.

According to the key by Parent (1933), *M. vagans* shares the characters of yellow tibiae and the white marking on the posterior crossvein with five other species of the genus, but all of these have one or more additional white markings on the wing and some also differ in chaetotaxy of the legs.

This wing character also enables immediate recognition of *M. vagans* among other small nondescript Dolichopodidae found in the British Isles.

DISTRIBUTION

The Irish and British records are listed chronologically. Without recent Irish records it is not possible to speculate on how widespread it may now be there. The most recent list with locality data of Irish Dolichopodidae was by Dyte (1969), following his collecting trip in 1967. I collected Dolichopodidae, among other Diptera, widely in Ireland from 1968 to 1987, enabling Assis Fonseca (1978) to add six species and over thirty new county records to those previously recorded from Ireland. Prior to first finding this species in 1971, I had spent seven weeks collecting in Ireland and this find was on my fifth visit. The Irish dolichopodid list was updated by Speight & De Courcy Williams (1992) and Speight and others have also published several other notes on species additional to the Irish list, but have not reported this species.

The widespread occurrence of the species in Ayrshire and the adjacent part of Kirkcudbright suggests that *M. vagans* has been established in that part of Scotland for many years, but has passed unnoticed through lack of previous visits by dipterists. It is possible that Culzean (pronounced Cullane) Castle Park was the point of introduction, but until more is known of its biological requirements, the means of spread must remain uncertain. My records are cited as PJC; most specimens are in the collections of the recorder or that of Peter Dyte, but examples will be deposited in the National Museums of Scotland and other national collections.

IRELAND: *Dublin*, Howth (O2837), mixed woods on summit of hill, 17.vii.1971, female (PJC); 27.vi.1975, male and female (PJC).

Dublin, Slade of Saggart (O033245), 7.viii.1981, female (J. P. O'Connor, to be deposited in National Museum of Ireland).

Down, Crawfordsburn Country Park (J4481), 2 and 3.vii.1987, numerous by stream bordered by *Rhododendron* thicket in beech woodland (PJC).

SCOTLAND: *Ayrshire*, Culzean Castle Country Park (NS2209–2310): Swan Lake, 5.vii.1995, two females (PJC) and 6.vii.1995, in numbers amongst low vegetation around wooded margin of lake (R. Crossley); belt of sycamore woodland between shore and Cow Cliffs, vii.1995 (J. H. Cole); amongst *Rhododendron* by cliff path and by ditches near the Carse Walk, 16.vii.1995, numerous (PJC).

Ayrshire, River Ayr Gorge at Failton (NS458258), vii.1995, numerous below overhanging wooded riverbank (J. H. Cole).

Ayrshire, Bridgend, Loch Winnoch (NS348595), 6.vii.1995, frequent in wooded ravine with stony stream; presence of ramsons (*Allium ursinum*) suggested a base-rich influence (C. M. Drake).

Ayrshire, Sevenacres Mains Wood (NS332452), 6.vii.1995, 2 males, 1 female in secondary damp birch woodland on sand (C. M. Drake).

Ayrshire, North Lissens (NS323479), 6.vii.1995, frequent in oak/beech woodland with a stream and a few boggy patches (with *Luzula* and *Phalaris*) (C. M. Drake).

Ayrshire, East Newton Valley (NS519383), 8.vii.1995, very abundant by heavily shaded wooded stream (C. M. Drake).

Kirkcudbright (Dumfries & Galloway), Wood of Cree RSPB Reserve (NX3870), 7.vii.1995, 2 males, 3 females by small stream under oaks (C. M. Drake).

Kirkcudbright (Dumfries & Galloway), Loch Trool (NX415803), 7.vii.1995 male and female by wet drainage ditch alongside upland track with moorland vegetation, the only open site but near a stream under a few trees (C. M. Drake).

Wooded streams or ditches are a common factor to a number of the sites and in two cases wooded lake margins. However, at least one site lacked open water and the last mentioned site was away from trees. The woodland types are quite varied and other vegetation also quite variable. As with so many Dolichopodidae, development in damp soil or mud seems most likely, but knowledge of the early stages of members of the family with this general habitat is very limited.

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I am grateful to the other collectors involved for kindly permitting me to include their data. I am especially indebted to Dan Bickel for the determination of this species and to Peter Dyte, both for his assistance throughout and for his very useful comments on the manuscript.

REFERENCES

- Assis Fonseca, E. C. M. d' 1978. Diptera Orthorrhapha Brachycera Dolichopodidae. *Handbooks for the Identification of British Insects* 9, Part 5: 1–90. Royal Entomological Society.
- Bickel, D. J. & Dyte, C. E. 1989. 44. Family Dolichopodidae. pp. 393–418. In Evenhuis, N.L. (Ed.) Catalog of the Diptera of the Australasian and Oceanian Regions. *Bishop Museum Special Publication* 86: 1155 pp. Bishop Museum Press and E. J. Brill.
- Chandler, P. J. 1988. Three Campsicneminae recently discovered in Britain and Ireland. *Empid and dolichopodid study group Newsheet* 5: 6.
- Chandler, P. J. 1996. An Irish dolie of antipodean extraction turns up in Scotland. *Empid and dolichopodid study group Newsheet* 14: 2–3.
- Chandler, P. J. 1998. (Ed.) Checklists of Insects of the British Isles (New Series) Part 1: Diptera. *Handbooks for the Identification of British Insects* 12, Part 1: xx + 234 pp. Royal Entomological Society.

- Dyte, C. E. 1969. A provisional list of Irish Dolichopodidae (Diptera). *The Entomologist* **102**: 40–48.
- Parent, O. 1933. Étude monographique sur les Diptères Dolichopodides de Nouvelle Zélande. *Annales de la Société scientifique de Bruxelles* (B) **53**: 325–441.
- Speight, M. C. D. & De Courcy Williams, M. 1992. Records of 23 species of Dolichopodidae (Diptera) whose presence in Ireland requires confirmation. *Irish Naturalist's Journal* **24**: 17–20.

SHORT COMMUNICATION

***Procas granulicollis* Walton (Col.: Curculionidae) discovered in Surrey**—The known world distribution of this weevil has until now been the hill country of the north and west of Britain—in Cumberland and Kirkcudbrightshire (Hyman, 1992) and three Welsh vice-counties (Fowles, 1992). It was therefore a considerable surprise when one was found amongst material taken on Holmwood Common (TQ1746), near Dorking in Surrey. Just the single specimen had been captured, by sweep-netting along a rideside in rather nondescript secondary woodland with open bracken-filled glades, 29.vii.1997. The situation of bracken in glades within ungrazed woodland is precisely as described for Welsh localities (Fowles, 1992).

Following up on this discovery, John Owen and other coleopterists visited the spot, 2.v.1998, and had no difficulty in finding *P. granulicollis* in some numbers by sieving bracken debris. They saw about 30 examples and estimate the population density at some spots to be around 10 per square metre. Only two small spots were closely examined. In one, where the weevil was plentiful, there were numerous seedlings of *Corydalis claviculata*. Many seedlings showed signs of being eaten and one weevil was found on a plant. At the other spot, about 100 m distant, there were plenty of weevils but not a sign of the plant. *Corydalis* has been identified as a key feature of the known sites and is suspected to be the main foodplant of the adult weevil.

Holmwood Common is a large area of common land, ungrazed since the 1950s, which has developed extensive cover of secondary oak and birch woodland. It is underlain by Cretaceous Wealden Clay and soils covering the site are mainly poorly drained silty or clayey surface water gleys, grading locally to better drained acidic sandy soils (Wickham 1 Association). The bulk of the woodland falls within the W10, *Quercus robur*–*Pteridium aquilinum*–*Rubus fruticosus* community of the National Vegetation Classification (Rodwell, 1991). The W10 community is characteristically found on base-poor brown soils throughout the temperate lowlands of southern Britain, often in places like Holmwood which have poor drainage and a tendency for seasonal waterlogging. The woods are otherwise unremarkable in terms of botanical and entomological interest due to their recent secondary origin.

My thanks to Mike Morris for identifying the weevil, to John Owen for carrying out some follow-up recording, and to Janet Lister for information on geology, soils and vegetation.—KEITH N. A. ALEXANDER, The National Trust, 33 Sheep Street, Cirencester, Gloucestershire GL7 1RQ.

REFERENCES

- Fowles, A. P. 1992. Observations on *Procas granulicollis* Walton (Curculionidae). *Coleopterist* **1**(3): 19–20.
- Hyman, P. S. (revised Parsons, M. S.) 1992. *A review of the scarce and threatened Coleoptera of Great Britain*. Part 1. UK Nature Conservation: 3. Peterborough: Joint Nature Conservation Committee.
- Rodwell, J. 1991. *British Plant Communities. 1. Woodlands and scrub*. Cambridge University Press.

BUCHANANIELLA CONTINUA (B. WHITE) (HEMIPTERA: ANTHOCORIDAE) ESTABLISHED IN BRITAIN

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Abstract. The anthocorid *Buchananiella continua* (B. White) has been found established in Buckingham Palace Garden, London. Characters for identification are given.

INTRODUCTION

Buchananiella continua (B. White) is a pan-tropical species, but has been reported quite widely in the western Palaearctic in recent decades, and in some places at least has established breeding populations. Péricart (1972) lists records from France, Portugal, Italy, Madeira and the Azores. *B. continua* has previously been reported from Britain only as a casual importation at Liverpool Docks (Péricart, 1972). Captures of a number of individuals from Buckingham Palace Garden, Middlesex, in 1995 and 1997 strongly suggest an established population in Britain. Single males were captured in malaise-traps operated by Mr C. W. Plant in the periods 3.viii.–7.ix.1995 and 7–22.ix.1995; I took a further three males and seven-females by active collecting on 21.viii.1997. No nymphs have been found, but the number of individuals captured and the time-span over which they have been found makes it almost certain that an outdoor breeding population has been established over at least a three-year period.

IDENTIFICATION

B. continua is a small and, to the naked eye at least, a rather undistinguished-looking bug. The length of the Buckingham Palace specimens varies from 2.2 to 2.35 mm for males and 2.25 to 2.4 mm for females. The coloration is a little variable. The lightest individuals are an almost uniform mid-brown, with the scutellum and cuneus rather deeper and more reddish in colour and the head darker black-brown. In the darkest individuals head, pronotum and scutellum are a deep rather shining brown-black in colour, the rear corners of the pronotum somewhat lighter, the forewings a somewhat lighter brown, the cuneus darker, somewhat reddish towards the tip. The wing membrane is dark grey. The legs are pale yellow-brown, the femora sometimes slightly infuscated. The first antennal segment is almost black and shining; the second pale at the base and darkened, almost black, at the tip; the third and fourth somewhat darkened. The second antennal segment is considerably broader than the third and fourth, more so in the male than the female. The males from Buckingham Palace Garden are, on the whole, somewhat lighter and more uniform in colour than the females, but with more extensively darkened second antennal segments, almost the entire segment being darkened in one individual. The whole of the dorsal surface has moderately long pale pubescence which, however, is sufficiently pale and fine not to be immediately conspicuous in some lights.

To the naked eye, the size and coloration give *B. continua* the appearance of a very dark *Cardiastethus fasciventris* (Garbiglietti). It is also somewhat similar to *Orius* spp., for which it could conceivably be passed over in the field. Under the microscope, however, it is immediately distinctive. The pronotum is of different appearance to that of any other British anthocorid. A central longitudinal furrow in the rear half of the pronotum divides into two widely spread arms running laterally

at approximately the mid-point of the pronotal length. *Cardiastethus fasciventris* has a similarly placed transverse furrow, but only a trace, at most, of a longitudinal furrow; *Dufouriellus ater* (Dufour) has a longitudinal furrow, but lacks the transverse arms. The male genitalia of *B. continua* are also different to those of any other member of the British fauna. The shape of the genital capsule, if pulled only slightly clear from the abdomen, is sufficient for identification without the need for dissection. The overall appearance and chief distinguishing features of *B. continua* are shown in Fig. 1.

B. continua is keyed and illustrated in Péricart (1972). Attempting to identify it using the key in Southwood & Leston (1959) would probably lead to an unsatisfactory outcome; *B. continua* does not comfortably fit the couplets. The most likely end-point is probably *Xylocoridea brevipennis* Reuter, depending on what opinion were taken of its colour and the length of its pubescence, but since *X. brevipennis* is almost always brachypterous, whereas *B. continua* is always macropterous, there would be immediate cause for doubt. *B. continua* is a member of the tribe Dufouriellini (=Cardiastethini). If placed in taxonomic order in the checklist of Kloet & Hincks (1964) *Buchananiella* Reuter, 1884 would come immediately after *Cardiastethus* Fieber, 1860.

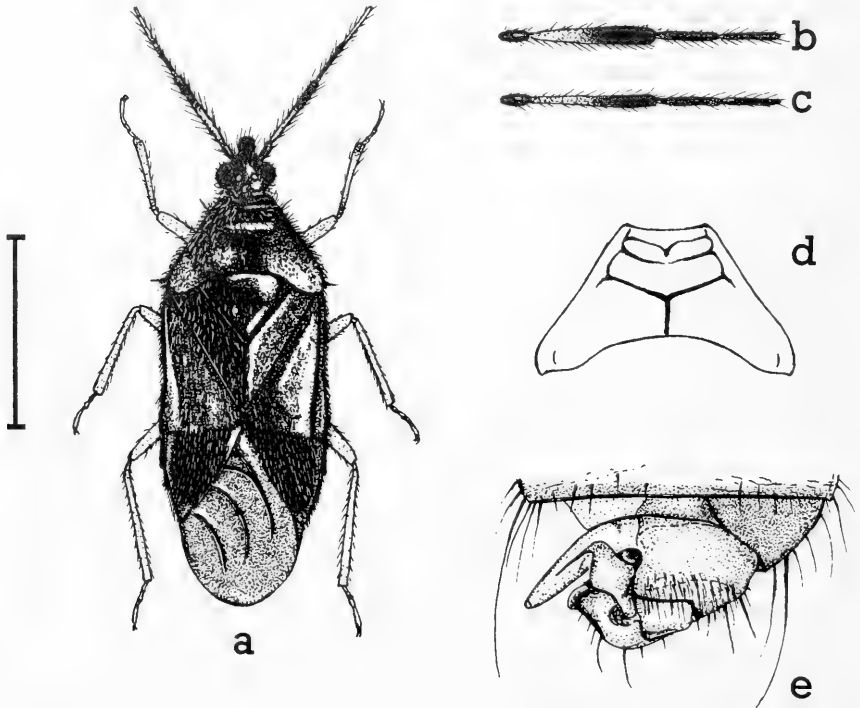


Fig. 1. a. *B. continua* female, dorsal view: scale bar = 1 mm. b. male antenna. c. female antenna. d. pronotum, dorsal view. e. tip of male abdomen, genital capsule pulled slightly back, dorsal view.

B. continua appears to live amongst accumulations of dry vegetation. Péricart records it amongst dry cut hay, where it was probably preying on Psocoptera. In Buckingham Palace Garden, *B. continua* was found in an area used for composting. All individuals captured were amongst stacked dry branches, still with leaves attached, though dry and brittle. The resultant vegetation formed a sizeable protected and sheltered volume, but with quite large internal spaces. Though this cut and stacked material probably represented the breeding site, there can be no guarantee that this was the case. Only adults were captured, and it is possible that the nymphs developed elsewhere, perhaps at a greater depth within the piled vegetation, and that only adults were active amongst the more accessible branches. However, no adults or possible nymphs of *B. continua* could be found in material of any other sort within the composting area, despite specific search by beating and sieving.

The bugs were readily beaten from the dry branches onto a plastic tray. Their behaviour, once on the tray, was quite different to that of any other British anthocorid I have encountered. They were very active, moving in a series of very short flights of a few centimetres, often with brief rests or short walks between. Such behaviour may well be an efficient method of escape from danger in the loosely packed dry vegetation where they lived, but is decidedly ineffectual on a plastic tray. In my experience, other anthocorids of similar size and shape usually either run to shelter, or, if they choose to fly, do so with more determination and are quickly lost. This behaviour may not, however, be an infallible method of recognition for *B. continua*: the captures were made on a warm day in August; the insects might well be less active and more inclined to run than fly in colder weather.

The long-term viability of *B. continua* as an established British species must be open to some doubt. It does not appear to be able to diapause in the winter (Péricart, 1972), which could pose problems in the British climate. The mid 1990s have been notable for a succession of mild winters. A single severe winter might pose a problem for *B. continua*. However, its adoption of artificial habitats may facilitate its finding conditions sheltered from extremes of climate, and the relatively warm climate provided by the urban complex of London is likely to provide outdoor conditions as suitable as can be found anywhere in Britain. *B. continua* could be considerably more widespread, at least in London and the south-east. Habitats similar to that in which it was found in Buckingham Palace Garden are by no means scarce in urban and suburban areas, and in the wider countryside, though suitable conditions may often be of short duration. Moreover, such habitats in urban areas are likely to receive rather little attention from heteropterists.

ACKNOWLEDGEMENTS

This publication results from a survey of the natural history of Buckingham Palace Garden being undertaken by the London Natural History Society in order to record the entire flora and fauna there. This work is being carried out by gracious permission of Her Majesty The Queen.

REFERENCES

- Kloet, G. S. & Hincks, W. D. 1964. A check list of British insects. part 1. Second edition. *Handbooks for the identification of British Insects* 11(1).
 Péricart, J. 1972. Hemiptères Anthocoridae, Cimicidae, Microphysidae de l'Ouest Paléarctique. *Faune de l'Europe et du Bassin Méditerranéen* 7: 1-402.
 Southwood, T. R. E. & Leston, D. 1959. *Land and water bugs of the British Isles*. Warne, London.

SHORT COMMUNICATIONS

Humming-bird hawk-moth *Macroglossum stellatarum* (L.) (Lep.: Sphingidae) probing the ground—A humming-bird hawk-moth was seen hovering and probing the ground at Micheldever Wood, Hampshire, along the path between grid reference SU533366 and SU531386 at ~15.30 h BST on 22. viii. 1996. The ground here comprised a mixture of compacted earth and, predominantly, stony gravel, with sparse ground-lying vegetation. The moth was tracked and observed for several minutes during which it would hover and probe the ground, fly for short bursts without deviating to seek nectar, and resume probing 3–10 m further NNW. Intermittently however, hovering was followed by periods of settling on the spot for several seconds with wings in resting posture. These periods were always followed by a short burst of flight before hovering and probing resumed. Attempts to approach the insect, whether hovering or settled, elicited similar flights. During one period of settling the moth was netted with the aim of determining its sex, but forced its way out through a hole and flew 10–12 m along the path in an erratic course before resuming its prior behaviour. A second capture attempt revealed it to be male.

M. stellatarum is a mainly diurnal nectar feeder that has been recorded at many wild and cultivated plants (Skinner, 1984; Herrera, 1992; Pitt-Payne, 1996). Yet despite searching several works on moth biogeography and behaviour (Ford, 1955; South, 1977; Heath & Emmet, 1979; Skinner, 1984; D'Abrera, 1986; Pittaway, 1993) the author could find no mention of *M. stellatarum*, or other Palaearctic Sphingidae, feeding at the ground; although some tropical species will drink eye secretions and some North American hawk-moths will probe rotting animal remains (Pittaway, 1993).

Ground feeding is better known in butterflies which use it to obtain moisture and salts, notably sodium chloride (Adler & Pearson, 1982). Sodium is needed for proper muscle function, and for egg production (Porter, 1992) where its precise physiological role is poorly understood (House, 1974; Happ, 1984). However, as most of the sodium for egg production is obtained during copulation from the males, the reserves are more seriously depleted and in need of replenishment in this sex (Porter, 1992). Rainwater collecting in puddles elutes salts from the ground, which become concentrated as the water evaporates, and it is such damp patches that are most attractive (Sevastopulo, 1974).

Middle Wallop, the nearest meteorological station, recorded 0.6 mm of rain on 20. viii. 1996, a trace on 21. viii, and prior to this 0.2 mm on 17. viii. The ground at Micheldever Wood was not visibly damp when the moth was probing, but comparable rainfall there may have been sufficient to dissolve surface salts. Sodium chloride is hygroscopic, and should *M. stellatarum* be able to secrete water from its proboscis to cope with viscous nectars (see Kevan & Baker, 1983), as its wide range of nectar sources might suggest, then hygroscopically bound water could lessen the amount of fluid the moth must secrete.

In day-flying moths, scent may be relatively unimportant for locating nectar (Kevan & Baker, 1983), and an instance of *M. stellatarum* trying to feed from coloured lights (Bigger, 1960) demonstrates that visual cues can suffice. However, the stimulus for ground-probing, and the means by which moisture and salts are detected, remain to be established. Low-level flying and probing for moisture may exemplify a generalized response to increased humidity or decreased barometric pressure, and the habit of male honeydew-feeding purple hairstreak butterflies *Quercusia quercus* L. (Lycaenidae) to forage lower than usual in the canopy during sultry weather is well known (Ford, 1957). Many butterflies can "taste" salt with

their feet (Adler & Pearson, 1982) and comparable sense organs in *M. stellatarum* would enable the moth to detect surface salt when settling. The observation that a proximity of salt solution will elicit flexing motions of the antennae in purple emperor butterflies *Apatura iris* L. (Martin C. White, *pers. comm.*), on the other hand, suggests that some species may be able to detect short-range gradients in the concentration of airborne salt molecules.—LEONARD WINOKUR, 8 Parklands Close, Chandlers Ford, Eastleigh, Hants SO53 2EQ.

REFERENCES

- Adler, P. H. & Pearson, D. L. 1982. Why do male butterflies visit mud puddles? *Canadian Journal of Zoology* **60**: 322–325.
- Bigger, T. R. L. 1960. A confused humming-bird hawk-moth (*Macroglossum stellatarum* L.) *Entomologist's Gazette* **11**: 3.
- D'Abbrera, B. 1986. *Sphingidae mundi, hawk moths of the world*. E. W. Classey, Faringdon.
- Ford, E. B. 1955. *Moths*. Collins, London.
- Ford, E. B. 1957. *Butterflies*. 3rd Edition. Collins, London.
- Happ, G. M. 1984. Development and reproduction. In Evans, H. E. (Ed.). *Insect biology*. Addison-Wesley Publishing Company, Reading, Massachusetts, pp. 99–113.
- House, H. L. 1974. Nutrition. In Rockstein, M. (Ed.). *The physiology of Insecta*. Vol. 5. Academic Press, New York & London, pp. 1–62.
- Herrera, C. M. 1992. Activity pattern and thermal biology of a day-flying hawkmoth (*Macroglossum stellatarum*) under Mediterranean summer conditions. *Ecological Entomology* **17**: 52–56.
- Heath, J. & Emmet, A. M. (Eds.). 1979. *The moths and butterflies of Great Britain and Ireland*. Vol. 9. Sphingidae–Noctuidae (Hadeninae). Curwen Books, Plaistow, London.
- Kevan, P. G. & Baker, H. G. 1983. Insects as flower visitors and pollinators. *Annual Review of Entomology* **28**: 407–453.
- Pittaway, A. R. 1993. *The hawkmoths of the western Palearctic*. Harley Books, Colchester.
- Pitt-Payne, M. 1996. Humming-bird hawkmoth in Aylesbury. *Bulletin of the Amateur Entomologists' Society* **55**: 77.
- Porter, K. 1992. Eggs and egg-laying. In Dennis, R. L. H. (Ed.). *The ecology of butterflies in Britain*. Oxford University Press, Oxford, pp. 46–72.
- Sevastopulo, D. G. 1974. Lepidoptera feeding at puddle-margins, dung and carrion. *Journal of the Lepidopterists' Society* **28**: 167–168.
- Skinner, B. 1984. *Moths of the British Isles*. Viking, Harmondsworth.
- South, R. 1977. *The moths of the British Isles*. 4th Edition, part 1. Frederick Warne & Co. Ltd, London & New York.

A new locality for *Cosmotettix caudatus* (Flor) (Hemiptera: Cicadellidae), with a note on its ecology—The known distribution of *C. caudatus* in Britain is very scattered, with single localities previously reported in Buckinghamshire, Lancashire, Northamptonshire, Oxfordshire and Somerset (Kirby, 1992). The ecology of the insect is poorly known. Previous British records are from wet areas and water margins. Le Quesne (1969) reports it from "grasses in damp places". Ossiannilsson (1983) gives *Carex vesicaria* L. as a foodplant, and its habitat as "tall sedge-bogs".

In 1990 I found *C. caudatus* at a second Northamptonshire locality, Racecourse Farm Fields SSSI, National Grid Reference TF018042. My first visit to this site was made on 10.vi.1990, close to dusk on a cold evening. Examination of a large (approximately two metres across) patch of *Carex hirta* L. revealed a considerable number of *Cicadula persimilis* (Edwards), many of them quite high in the vegetation and easily caught by sweeping. There were smaller numbers of a similarly sized but paler insect without obvious markings on the head. These occurred only low down in

the sedge clump. None were taken by sweeping and, because of the dense vegetation, they were elusive, even at the low temperature at the time of observation. My initial reaction was to dismiss them as teneral *Cicadula*, hypothesizing that their tendency to keep low in the vegetation might be an adaptation to keep them relatively safe from predation when their defences were weak and, perhaps, their jumping ability limited. I captured two individuals for checking, which proved on my return home to be a male and female *C. caudatus*.

My next visit to the site was on 20.vii.1990, when I hoped to establish more clearly the distribution of the insect and to capture nymphs. Though the weather was better than on the June visit and I now had an established search-image for the insect, *C. caudatus* seemed significantly less numerous than on the first occasion, and I was unable to find associated nymphs. Once again, the insects were concentrated low down in the vegetation. A third visit to the site on 12 September produced no *C. caudatus* despite careful search of its known area of distribution.

Two points which emerge from these observations are worthy of note. First, Racecourse Farm Fields is not a wetland, but an oolitic limestone grassland. Second, *C. caudatus* was found only on *Carex hirta* (of which only this one patch was found on the site). There was a large patch of *Carex flacca* Schreber adjacent to the *C. hirta* and contiguous with it for a length of about a metre. *Cicadula persimilis* occurred freely and seemingly indifferently in both sedge species, but no *C. caudatus* were found on this or on other patches of *C. flacca* in the vicinity, nor on three other *Carex* species present at the site: *C. ericetorum* Pollich, *C. spicata* Hudson and *C. caryophylla* Latourr, all of which grew as scattered plants throughout the grassland.

It seems clear that *Carex hirta* is a foodplant of *C. caudatus*, and rather likely that, at Racecourse Farm Fields, it is the occurrence of the host plant rather than the habitat as such which is the limiting factor in determining the distribution of the insect. There is no reason to suppose that *C. hirta* is the only foodplant, but it does seem that the insect does not occur on all sedges. It is possible, also, that it requires its foodplants to occur in large dense clumps. If the habits of the insect at this site, in remaining very low in the vegetation, are typical, then it could easily be overlooked, especially if amongst similarly sized *Cicadula* species. This could go some way towards explaining the widely scattered records of the species.

The phenology of the insect observed in 1990 may be atypical. The very hot summer of that year profoundly affected limestone grasslands in the Peterborough area. By early July signs of drought were already apparent, and by September much of the vegetation was brown and dry, and finding insects of any sort was difficult.

My visits to Racecourse Farm Fields were made as part of a survey of oolitic limestone grasslands undertaken for the East Midlands Region of the Nature Conservancy Council (now English Nature). Thanks go to Burleigh Estates for giving permission for the survey, and to Sarah Lambert for identifying the sedges.— P. KIRBY, 21 Grafton Avenue, Netherton, Peterborough PE3 9PD.

REFERENCES

- Kirby, P. 1992. *A review of the scarce and threatened Hemiptera of Great Britain*. Joint Nature Conservation Committee, Peterborough (UK Nature Conservation, no. 2).
- Le Quesne, W. J. 1969. Hemiptera: Cicadomorpha, Deltocephalinae. *Handbook for identification of British Insects 2(2)b*.
- Ossiannilsson, F. 1983. The Auchenorrhyncha (Homoptera) of Fennoscandia and Denmark. Part 3: the family Cicadellidae: Deltocephalinae, catalogue, literature and index. *Fauna Entomologica Scandinavica 7(2)*.

MORDELLISTENA SECRETA HORAK (COLEOPTERA: MORDELLIDAE), A SPECIES NEW TO BRITAIN

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Abstract. *Mordellistena secreta* Horak is recorded from Britain for the first time. Notes are given to distinguish it from other species with which it is likely to be confused.

INTRODUCTION

Batten (1986) in his review of British Mordellidae includes *Mordellistena pentas* Mulsant in his key as a species which might eventually be found in Britain. Amongst some Coleoptera collected by me on Epsom Common, Surrey, on 23.vi.1971 were two *Mordellistena* which I had not identified until recently. One of these was a female *M. pumila* (Gyllenhal) and the other a male, keyed out to *M. pentas* Mulsant using Batten (1986).

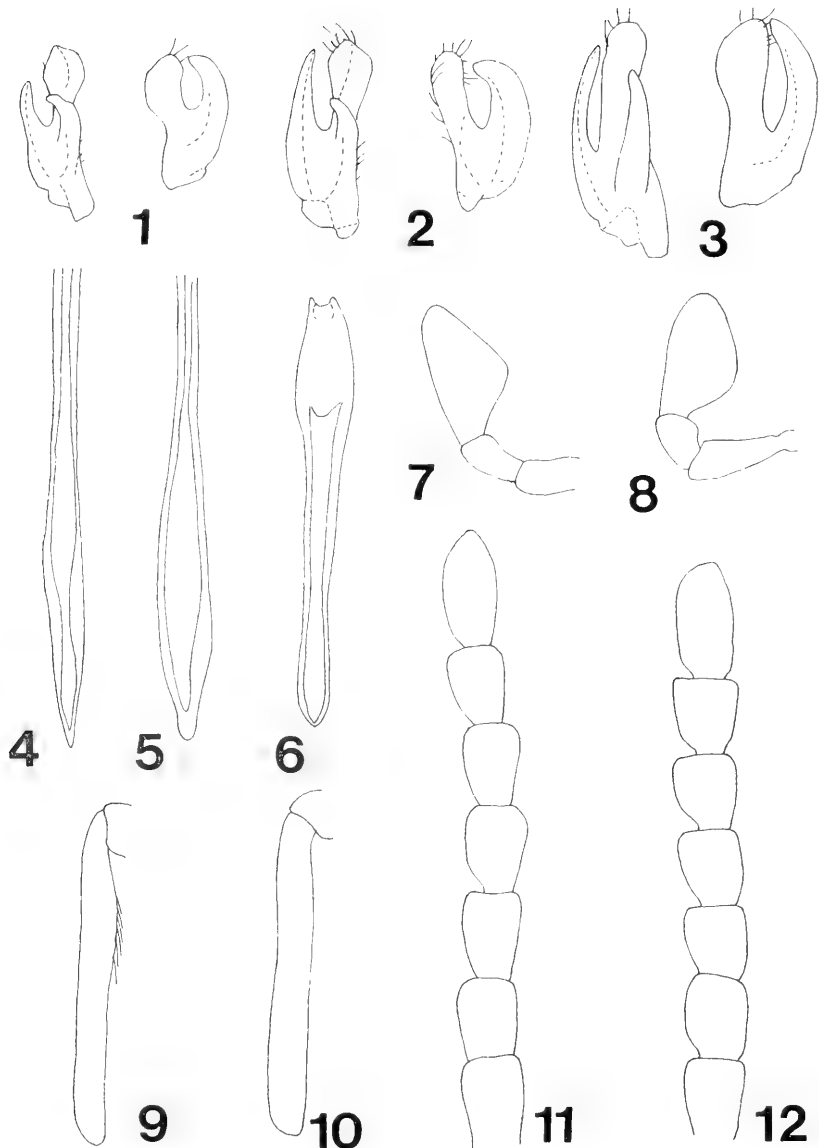
However, using Horak's (1983) key to the *pentas* species group, this specimen keyed out to *M. secreta* Horak, a species described from Slovakia and the Czech Republic, and also recorded from Austria, Rumania, Bulgaria, Greece, Macedonia, Turkey, the Caucasus and Armenia, but not apparently from western Europe. I sent the specimen to Jan Horak who kindly confirmed my identification.

I was subsequently sent another male of the *pentas* species group by Daniel Hackett, collected on Hounslow Heath, London, on 3.vii.1998. The genitalia of this specimen did not match well with that of my specimen of *M. secreta*; the length to width of antennal segments 5–10 was between 1.1 and 1.3 times instead of 1.4–1.6 times as long as wide, as given for *secreta*, and the shape of the last segment of the maxillary palp was somewhat different. These characters appeared to correspond more closely with the figures and description given by Horak for *M. berbera* Horak, described from Algeria. I sent the specimen to Jan Horak who identified it as a specimen of *M. secreta*. It thus appears that *M. secreta* shows some variation in those characters used to identify the species in this group, rendering identification problematic in this difficult group. I have figured the antennae, maxillary palpi and male genitalia of the two specimens for comparison (Figs 1, 2, 4–8, 11, 12).

IDENTIFICATION

In Batten (1986) *M. secreta* will key to *M. pentas*. *M. secreta* can be distinguished from *M. pentas* in that the males of the former species have a brush of longer protruding hairs near the base of the fore tibia on the inner part of the anterior face, which is absent in *M. pentas* (Figs 9–10). In the few specimens I have examined the elytra of the latter species is also less curved when viewed from the side. Needless to say it may not be possible to identify females unequivocally in this group.

I have figured the parameres of a specimen of *M. pentas* from Konitsa, Ioanina, Greece from my collection, that was identified by Jan Horak, in case this species should be found in Britain (Fig. 3). The figure of the parameres given in Batten (1986) which is the same as that given in Batten (1976) from a specimen from Vernet, France, and the figure in Ermisch (1969) do not agree well with the specimen I have



Figs 1-12: *Mordellistena* species. 1-3: Parameres of male. 1-2 *M. secreta*: 1 Epsom Common specimen; 2 Hounslow Heath specimen; 3 *M. pentas* from Konitsa, Greece. 4-5: Apex of penis of *M. secreta*. 4 Epsom Common specimen; 5 Hounslow heath specimen. 6: Phallobase of *M. secreta* from Hounslow Heath. 7-8: Maxillary palp of *M. secreta*. 7 Epsom Common specimen. 8 Hounslow Heath specimen. 9-10: Fore leg of male. 9 *M. secreta*. 10 *M. pentas*. 11-12: Segments 5-10 of male antennae of *M. secreta*. 11 Epsom Common specimen. 12 Hounslow Heath specimen.

figured. This could be due to individual or geographic variation, or possibly the specimens figured are another species.

The *pentas* group can be distinguished from the *pumila* group in that members of the former group have three ridges on hind tarsal segment two, whereas the latter group have only two ridges on this segment. This character can be difficult to see unless the specimens are well set. *M. secreta* in general appearance is very like the rather variable *M. pumila* (Gyllenhal) and the shape of the parameres, phallobase and the apical part of the penis are also very similar, so it is possible that *M. secreta* may well turn up amongst material standing as *M. pumila* in collections.

ACKNOWLEDGEMENTS

I wish to thank Jan Horak for confirming and correcting the identification of specimens mentioned in this paper, and Daniel Hackett for allowing me to see his specimen.

REFERENCES

- Batten, R. 1976. De Nederlandse Soorten van de Keverfamilie Mordellidae. Zoologische Bijdragen No. 19, Bijdragen tot de Faunistiek van Nederland, IV.
- Batten, R. 1986. A review of the British Mordellidae (Coleoptera). *Entomologist's Gazette*, 37: 225–235.
- Ermisch, K. 1969. Familie Mordellidae. In Freude, H., Harde, K. W. & Lohse, G. A. *Die Käfer Mitteleuropas*, 8: 160–196.
- Horak, J. 1983. Revision der Mordellistena-Arten aus der pentas-Gruppe (Coleoptera, Mordellidae). *Entomologische Abhandlungen Staatliches Museum für Tierkunde in Dresden*. 47(1): 1–13.

SHORT COMMUNICATIONS

***Nysius senecionis* (Schilling) (Hemiptera: Lygaeidae) feeding in large numbers on Guernsey fleabane**—On 22.ix.1998, whilst visiting a derelict site in Wandsworth, West London (VC17, 'Surrey'), I was startled by the abundance of Guernsey fleabane, *Conyza sumatrensis* (Retz.) E. Walker (Asteraceae). The site, on the River Thames at the outlet of the River Wandle (TQ253752), had previously been a storage facility for Shell, and the large circular concrete bases of the storage tanks were still present amongst the acres of rubble. The fleabane was growing out from almost every available crack and piece of bare ground. Thinking it might be a novel foodplant for some insect or other I swept a small patch and was rewarded by a sweep net crawling with about 200 specimens of a ground-bug, a *Nysius* species—both adults and nymphs. Beating other patches of the plant over the net confirmed that the insect was incredibly abundant. The *Nysius* was easily determined later as *N. senecionis*, using the description and figures given by Hodge & Porter (1997).

As its name suggests, *Nysius senecionis* is well known to feed on ragworts, *Senecio* species, and since the insect's discovery in Britain in 1992, it has been fairly widely recorded in south-east England on these common plants (Hodge, 1997; Kirby, 1997).

Guernsey fleabane is not unrelated to ragworts, but its use as a foodplant for the bug is a little surprising. What is even more surprising, however, is the amazing abundance of the bug on the fleabane at this site. It was not possible, in the limited circumstances of the visit, to make anything other than a rough guess of the bugs' numbers, but a few sweeps of the net produced easily over 100 specimens from a small patch of the foodplant. Several hundreds of thousands must be a conservative estimate of the insect's numbers at this site.



Fig. 1. Capitula of Guernsey fleabane, *Conyza sumatrensis*, showing the rather insignificant 'flowers' as some go to seed at the end of September.

Oxford ragwort in the 1930s and 1940s (Burton, 1995). It is now reckoned to occur in over 25% of the 400 or so tetrads which cover the urbanized area of greater London (N. Bertrand, personal communication).

Guernsey fleabane is a large and obvious plant, but because of the insignificant flowers (capitula), it is easily overlooked. Since it was first pointed out to me at the Shell site, I now see it wherever I go in London. It is rather similar to Canadian fleabane, *Conyza canadensis* (L.) Cronq., but is often taller, to 1.5 metres, with a more conical inflorescence (Figure 1), and with the phyllaries (green sepal-like structures around each capitulum) quite pubescent.

Since finding *Nysius senecionis* on Guernsey fleabane, I have been examining the plant whenever I come across it, so far without further success. However, given the plant's rapid spread across (and out of) London, and the bug's huge numbers on the banks of the Thames corridor, it seems quite probable that this South American plant will be worth examining by all entomologists wherever they find it. A photograph of the plant is included here to stimulate this search.

My thanks to Valerie Selby of Wandsworth Borough Council's Nature Study Centre for negotiating access to the Wandsworth Shell site, and to botanist Nick Bertrand for his comments on Guernsey fleabane and for pointing it out to me 'in the field'.—RICHARD A. JONES, 135 Friern Road, East Dulwich, London SE22 0AZ.

REFERENCES

- Burton, R. M. 1995. The present distribution of Guernsey fleabane *Conyza sumatrensis* in the London area. *London Naturalist* 74: 169–170.

- Hodge, P. J. 1997. Additional British records of *Nysius senecionis* (Hemiptera: Lygaeidae) from Hampshire and Kent. *British Journal of Entomology and Natural History* **10**: 2.
- Hodge, P. J. & Porter, D. A. 1997. *Nysius senecionis* (Schilling) (Hemiptera: Lygaeidae) new to the British Isles. *British Journal of Entomology and Natural History* **10**: 1–2.
- Kirby, P. 1997. News digest. *Heteroptera Study Group Newsletter* **13** (1996): 1.
- Stace, C. 1991. *New flora of the British Isles*. Cambridge: Cambridge University Press.

***Oedalea ringdahli* Chvála (Diptera: Hybotidae) in northern England.**—On 10.vii.95 at Forge Valley Woods Nature Reserve, near Scarborough (SE984874), I collected a female *Oedalea* which I was subsequently unable to identify. The specimen was swept in damp shady deciduous woodland close to the River Derwent, which at that point is little more than a shallow stream.

Attempts to name the specimen using the keys in Collin (1961) and Chvála (1983) failed at the first couplet because the antennal style is neither 'bristle-like' (or 'slender') nor 'stout', but somewhere between the two extremes. As the legs are predominantly dark brown I put the specimen on one side for further study and noted that it was probably 'close to *ringdahli*'.

The Fourth International Congress of Dipterology, which was held at Oxford in September 1998, provided an opportunity for me to ask Dr Milan Chvála to look at the specimen, which he kindly did, and he suggested that it was probably *ringdahli*. I later submitted it to Dr Adrian Plant who had described the female of this species from specimens collected at Cwm Sere in the Brecon Beacons (Plant, 1991), and he has confirmed that it is, indeed, *Oedalea ringdahli*. As far as can be ascertained, this record constitutes the first for northern England.

O. ringdahli was first described in 1983 from a single male from Sweden (Chvála, *op. cit.*) A single male was found in northern Scotland in 1984 (McLean, 1991), and a further single male in the Black Wood of Rannoch (MacGowan, 1991). Subsequently both males and females were found at Cwm Sere (Plant, *l.c.*).

Two dark-legged male specimens of what were originally taken to be *Oedalea holmgreni* Zett., were noted by Collin (*op. cit.*). One of these, *leg.* J. H. Wood at Cusop Dingle, Herefordshire, 16.vi.1914, and now in the collection of the Natural History Museum, has proved to be *O. ringdahli* (McLean, *l.c.*). The second, which might also be of this species, *leg.* B. R. Laurence at Harpenden, Hertfordshire 22.vi.1950, cannot be located at present (MacGowan, *l.c.*).

I am obliged to Dr Chvála for his advice, and to Dr Plant for kindly identifying my specimen and for helpful comments.—ROY CROSSLEY, 1 The Cloisters, Wilberfoss, York YO41 5RF.

REFERENCES

- Chvála, M. 1983. *The Empidoidea (Diptera) of Fennoscandia and Denmark. II. Fauna Entomologica Scandinavica* **12**. Klampenborg: Scandinavian Science Press.
- Collin, J. E. 1961. *British Flies* **6**. Empididae. Cambridge: Cambridge University Press.
- MacGowan, I. 1991. A further record of *Oedalea ringdahli* Chvála (Diptera: Hybotidae) in Britain. *Br. J. Ent. Nat. Hist.* **4**: 181–182.
- McLean, I. F. G. 1991. *Oedalea ringdahli* Chvála (Diptera: Hybotidae) new to Britain. *Br. J. Ent. Nat. Hist.* **4**: 181.
- Plant, Adrian R. 1991. *Oedalea ringdahli* Chvála (Diptera: Hybotidae) in Britain. *Br. J. Ent. Nat. Hist.* **4**: 183.

**A RECORD OF *ECTEMNIUS RUFICORNIS* (ZETT.)
(HYMENOPTERA: SPHECIDAE) AND ITS ANTHOMYIID
CLEPTOPARASITE (DIPTERA) BREEDING IN SOUTHERN
SCOTLAND**

K. P. BLAND

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While investigating a four-foot-high rotten birch stump at Threeewood Moss, Roxburghshire (NT5142; VC.80) on 2.v.1998, a series of galleries were discovered that turned out to be the nest complex of the solitary wasp, *Ectemnius ruficornis* (Zett.). The approximate arrangement of the 3-dimensional nest is shown in Fig. 1a. Several galleries were left undisturbed but in most of those investigated the terminal ends of each gallery contained the head capsule and much of the exoskeleton of 2 or 3 largish flies that had served as the larval food. Next to these was the wasp's cocoon, after which the gallery had been sealed with a substantial amount of tightly-packed sawdust (Fig. 1b).

The 5 aculeate cocoons collected produced two different species of wasp. Firstly on 28.v.1998 the all-black ♀ of a *Crossocerus megacephalus* (Rossius) (Sphecidae)

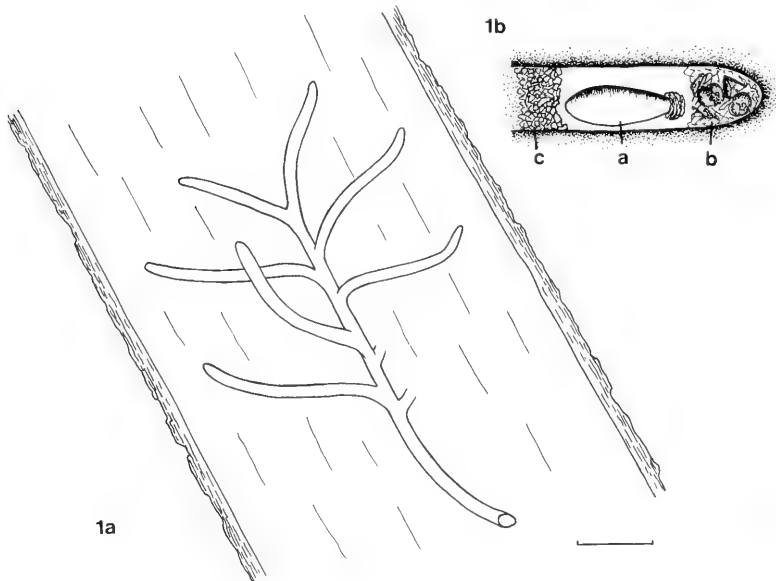


Figure 1a. Diagram showing the lay-out of the galleries made by *Ectemnius ruficornis* in dead birch stump. Scale-bar = 6 cm.

Figure 1b. Enlargement of the terminal end of one of the galleries showing the aculeate cocoon (a) with insect prey remains (b) packed into the terminal end and the proximal end sealed with a plug of sawdust (c).

emerged from the smallest cocoon. This presumably was the result of a female *C. megacephalus* finding a ready-made gallery and opportunistically taking it over as a brood chamber. Secondly, 2 ♂♂ and 2 ♀♀ *Ectemnius ruficornis* (Zett.), the rightful inhabitants of the nest, emerged between 1–28.vi.1998. The caches of food provided by *E. ruficornis* for its larvae had consisted entirely of hoverflies (Diptera: Syrphidae). The identifiable species present and their numbers were:

<i>Rhingia campestris</i> Meigen	7♂♂
<i>Meliscaeva cinctella</i> (Zett.)	1♂
<i>Chrysotoxum bicinctum</i> (L.)	1♀
<i>Platycheirus (Pyrophaena) granditarsus</i> (Forster)	1♀

The end of the gallery containing the smallest cocoon that produced the *C. megacephalus* was not noticeably different in its provisioning to the others. This may be a coincidence or it may indicate that it was provisioned by *E. ruficornis* before being taken over by *C. megacephalus*!

Ectemnius ruficornis does not appear to have been previously recorded from Scotland. However, as the present account indicates, the species is present and breeding at least in the Scottish Borders. Previous British records of the species are from south of a line from Grange-over-Sands to Scarborough (Edwards, 1998) or from north-east Ireland (Richards, 1980).

The ends of two galleries were almost devoid of larval food remains but were still sealed with a sawdust plug. In place of the aculeate cocoon there was a single long cylindrical dipteran puparium. These puparia were a shiny dark reddish brown and some 9 mm long. Detail of the posterior spiracular region is shown in Fig. 2. Between

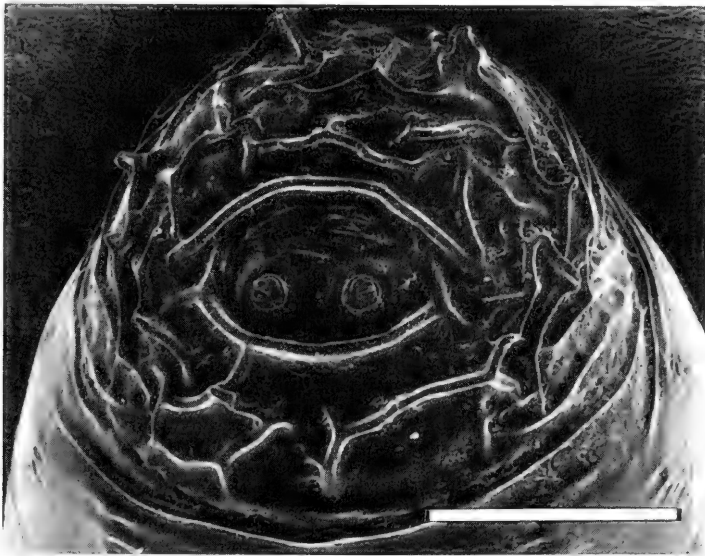


Figure 2. Details of the posterior end of the puparium of *Eustalomyia festiva*. Scale-bar = 1 mm.

19–23 vi.1998 these puparia produced 2♂♂ *Eustalomyia festiva* (Zett.) (Diptera: Anthomyiidae), a known cleptoparasite of solitary wasps. In spite of its large size, *E. festiva* only appears to have been reported once before from Scotland, namely when taken by J. M. Nelson at Methven Wood, Perthshire (VC.88) in 1980 (Nelson, 1984).

ACKNOWLEDGEMENTS

I am very grateful to Michael E. Archer of University College of Ripon & York for identifying all the specimens of solitary wasps, to Andrew Whittington of National Museums of Scotland, Edinburgh, for advice and assistance with syrphid identification and to Stephen Mitchell of Royal (Dick) School of Veterinary Studies, Edinburgh for the scanning electron microscope picture.

REFERENCES

- Edwards, R. (Ed.), 1998. *Provisional Atlas of the aculeate Hymenoptera of Britain and Ireland*, Part 2, 138 pp. Biological Records Centre, Monks Wood.
- Nelson, J. M. 1984. Records of some uncommon dolichopodids and other Diptera from southern Scotland. *Entomologist's Monthly Magazine*, **120**, 58.
- Richards, O. W. 1980. Scoliodea, Vespoidea and Sphecoidea; Hymenoptera, Aculeata. *Handbooks for the Identification of British Insects*, **6** pt.3(b), 1–118.

SHORT COMMUNICATIONS

***Ptomaphagus varicornis* (Rosenhauer) (Col: Leiodidae) in North Devon.**—According to Hyman (1994), *Ptomaphagus varicornis* (Rosenhauer) has been recorded from the Isle of Wight, East Kent, Surrey, Berkshire, Oxfordshire, Staffordshire, Nottinghamshire and Derbyshire prior to 1970, but since then from Surrey alone. On June 6, 1998, I found a single specimen by the quarter wall on Lundy Island, North Devon. A large piece of matted sheep's wool on a narrow track through heather and bilberry was found to contain this and a number of other beetles including *Quedius tristis* (Gravenhorst), *Aphodius fimetarius* (L.) and *Tachyporus pusillus* Gravenhorst. According to Brendell (1976), who reviewed all the known records of Coleoptera from Lundy, a number of other leiodid beetles have been recorded from the island, and these include *Ptomaphagus subvillosus* (Goeze) var. *sericatus* Chaudoir taken by Norman Joy in 1906. The present specimen of *P. varicornis* is a new record for Lundy. I have been unable to discover any previously published records for Devon, but further research revealed a single specimen of *P. varicornis* in the K. G. Blair Collection at the Hampshire County Museum, Winchester. The data label shows that Blair collected it at Braunton, North Devon, although there is no date attached. A number of other beetles in the collection carry similar labels, some of which are clearly marked 1928. As there are no specimens from Braunton marked with any other date it seems quite likely that Blair took his specimen in that year. The present finding is of considerable interest as Braunton is almost the nearest point on the Devon mainland to Lundy, a distance of just 15 miles. From this observation it would appear that *P. varicornis* has definite Devonian status although its presence, at presumably low density, has threatened to escape notice up to the present time. J. F. Campbell-Taylor, who contributed the section on Coleoptera to Palmer's (1946) *Fauna and Flora of the Ilfracombe District, North*

Devon, wrote that his list was "based on, and in fact consists of, an article written by K. G. Blair... under the heading of Braunton...". Although he also included *P. subvillosus* from Lundy, he did not mention *P. varicornis* from Braunton, a curious omission. Hyman (1994) states that "in south-eastern England, this species has been recorded from chalky districts. It is usually found in leaf-litter and moss. Adults have been recorded in April and May." This is interesting as Lundy is essentially a granite island and the area around Braunton is of Devon sandstone. I am grateful to Christopher Palmer, Keeper of Biology, for permission to examine the K. G. Blair Collection at Winchester.—Dr MICHAEL A. SALMON, Avon Lodge, Woodgreen, New Forest, Hampshire, SP6 2AU.

REFERENCES

- Blair, K. G. 1931. The Beetles of the Scilly Islands. *Proceedings Zoological Society of London Part 4*: 1211.
- Brendell, M. J. D. 1976. Coleoptera of Lundy. *Report of Lundy Field Society*.
- Campbell-Taylor, J. E. 1946. Beetles of the Ilfracombe district. pp. 113-147 in Palmer, M. G. *The Fauna and Flora of the Ilfracombe District of North Devon*. Exeter.
- Hyman, P. S. 1994. *A review of the scarce and threatened Coleoptera of Great Britain, Part 2*. JNCC, Peterborough.
- Joy, N. H. 1906. The Coleoptera of Lundy Island. *Entomologist's Monthly Magazine* 42: 1.
- Joy, N. H. 1909. A few additions to the list of Coleoptera of Lundy Island. *Entomologist's Monthly Magazine* 45: 110.
- Joy, N. H. & Tomlin, J. R. le B. 1907. Further notes on the Coleoptera of Lundy Island. *Entomologist's Monthly Magazine* 43: 27.
- Joy, N. H. & Tomlin, J. R. le B. 1908. The Coleoptera of Lundy Island. *Entomologist's Monthly Magazine* 44: 156.
- Last, H. R. 1946. *Ptomaphagus varicornis* Ros. (Col., Cholevidae) in Surrey. *Entomologist's Monthly Magazine* 82: 24.

Notes on the habitats of *Hebrus ruficeps* (Thomson) (Hemiptera: Hebridae)—*Hebrus ruficeps* is usually found amongst *Sphagnum* at the margins of acid water. So close and so frequent is this association that it sometimes seems to be exclusive. Brown (1948) for example, states that "*Sphagnum* appears to be an essential complement to a habitat for *Hebrus ruficeps*". Southwood and Leston (1959) refer to the bug occurring in "*Amblystegia*" as well as *Sphagnum*, but consider that it is confined to the margins of acid waters. Macan (1965) places it "usually in wet *Sphagnum*" without specifying the alternatives. Butler (1932), while reporting *H. ruficeps* from *Sphagnum*, suggests that Kirkaldy had found the insect in association with *Lemna*, which would suggest a quite different type of water body. In fact, it is doubtful that Kirkaldy really intended to make this association. His writing on the subject (Kirkaldy, 1899) is ambiguous, and could refer to either of the British species of the genus. Savage (1989) makes no mention of the association with *Sphagnum*, but the entries for *H. ruficeps* in the table of geographical and ecological distribution suggest that it is confined to waters with a pH less than six and a conductivity less than 100 micro-Sieverts per centimetre. Some authors at least in mainland Europe seem to allow *H. ruficeps* a broader ecological range than has been usual amongst British authors. For example, Stichel (1955) says that it occurs amongst *Polytrichum*, and also that it can occur away from moss, amongst plant remains at water margins. Wachmann (1989), in a recent popular guide to the German Heteroptera, makes no distinction between the habitats of *H. ruficeps* and *H. pusillus* (Fallén), whereas in

Britain the latter, though rarer, has long seemed much more catholic in its environmental tastes. Chalkley (1998) comments on the variation in opinion as to the habitat preferences of *H. ruficeps*, and points to the finding of the species amongst brown mosses beside non-acid waters in Northern Ireland reported by Nelson (1995).

In fact, *H. ruficeps* occurs reasonably frequently in at least some parts of Britain beside non-acid waters, and in the absence not only of *Sphagnum*, but sometimes of any moss at all. I have previously reported (Kirby, 1990) the finding of *H. ruficeps* in a saltmarsh. It seems worthwhile now to report a number of other recent records of *H. ruficeps* which, though less extreme, place the species outside the ecological conditions with which it is most commonly associated in Britain.

I took a single specimen of *H. ruficeps* on 19. iv.1991 from marginal vegetation at Holywell Fishponds, Peterborough, Northamptonshire, TL169980, a series of spring-fed medieval fishponds severely modified over the years and now set in improved grassland in a public open space. The margins of the pools are abrupt and almost devoid of moss. Measurements in one of the ponds on the site by the National Rivers Authority in 1990 gave a pH of 7.7 and a conductivity of 1295 micro-Sieverts per centimetre (G. E. Young *pers. comm.*). *H. ruficeps* was found by working partially submerged grasses growing on a slightly overhanging bank. Accidental introduction cannot be entirely ruled out at this site; animals and plants have certainly been introduced to the site. The possibility seems remote, however, if only because the garden ponds and fish tanks of Peterborough seem less likely to have suitable conditions for *H. ruficeps* than the pond in which it was found.

On 17.v.1992 I found a single *H. ruficeps* amongst drifted plant material taken from the edge of a large shallow pool in Dogsthorpe Star Brickpit, Northamptonshire, TF215027, a disused clay working. At the point from which the sample was taken the drifted material, mostly fragments and whole small plants of *Juncus articulatus* L., formed a band some 30 centimetres wide and several centimetres deep along a gently shelving margin of almost bare clay. *H. ruficeps* could, of course, have drifted with the plant material from elsewhere around the margin of the pool. No part of the pool margin, however, supported any significant amount of moss of any species. The conductivity of the pool on 3.v.1992 was measured as 2200 micro-Sieverts per centimetre at 25°C (J. H. Bratton *pers. comm.*), the high conductivity resulting from seepage from a saline aquifer in the Kellaways Beds. I have found *H. ruficeps* at one other flooded clay pit in the Peterborough area: Norman Cross Pit, Huntingdonshire, TL162908, 16.viii.1997, again in the complete absence of moss. I have no records of conductivity or pH for the Norman Cross Pit, but it is certainly not acidic or of low conductivity.

I have found *H. ruficeps* at two other, definitely non-acid, localities in the Peterborough area in recent years: it was rather common at Stibbington Pits, Huntingdonshire, TL098993, on 30.vi.1993, amongst reed litter and marginal vegetation in a disused gravel working beside the River Nene. At Sutton Heath & Bog SSSI, Northamptonshire, TF089000, *H. ruficeps* emerged in small numbers from sedge litter taken from a large sedge bed in a limestone valley on 28. iv.1996.

A survey of East Anglian fens undertaken for the Nature Conservancy Council by A. P. Foster and D. A. Proctor between 1988 and 1990 recorded *H. ruficeps* in pitfall traps at eleven sites. Of these, three definitely had no *Sphagnum* (Badley Moor, West Norfolk, TG012118, 31.v–13.vi.1989; Foulden Common, West Norfolk, TL760994, 10.vi–8.vii.1988; Reedham Marshes, East Norfolk, TG361195, 12–26.vi.1989) and two more, though supporting carpets of moss, had no *Sphagnum* in the trapping area (Thompson Common, West Norfolk, TL937964, 13–27. xi.1989; Walberswick, East

Suffolk, TM462732, 1–15.vi.1988, 15–29.vi.1988, 1–15.vi.1989, 1–15.vi.1990, 15.vi–1.vii.1990). Andrew Foster has also taken *H. ruficeps* at the margin of a *Sphagnum*-free drainage ditch in grazing levels at Sizewell, East Suffolk, TM467643, 5.vii.1989.

It is far from clear what environmental constraints determine the occurrence of *H. ruficeps*. The records above clearly show that they do not include water pH or the presence of *Sphagnum* or other mosses. Nor is it apparently unduly restricted by poor mobility, as might be considered likely for an habitually wingless species: the clay and gravel workings in which it has been recorded near Peterborough are of recent origin. Its scarcer congener *H. pusillus*, despite being winged, seems far more tightly confined to old wetland sites. However, even allowing for the fact that it is small and easily overlooked, *H. ruficeps* is clearly decidedly local in non-acid localities. Moreover, it appears to be similarly local in acid waters with *Sphagnum*: it may occur in large numbers when found, but the majority of sites investigated in most areas, in my experience apparently do not support the species.

Thanks go to Andrew Foster and Deborah Proctor for their records of *H. ruficeps*, and to Andrew Foster also for extracting the information from their database and for permitting me to use his record of *H. ruficeps* from Sizewell.—P. KIRBY, 21 Grafton Avenue, Netherton, Peterborough PE3 9PD.

REFERENCES

- Brown, E. S. 1948. A contribution towards an ecological survey of the aquatic and semi-aquatic Hemiptera–Heteroptera (water-bugs) of the British Isles; dealing chiefly with the Scottish Highlands, and east and south England. *Transactions of the Society for British Entomology* 9: 152–195.
- Butler, E. A. 1923. *A biology of the British Hemiptera–Heteroptera*. Witherby, London.
- Chalkley, A. 1996. The aquatic and semi-aquatic Heteroptera of Suffolk. *Suffolk Natural History* 34: 51–68.
- Kirby, P. 1990. An unusual habitat for *Hebrus ruficeps* (Thomson) (Hemiptera:Hebridae). *Entomologists Gazette* 41: 111.
- Kirkaldy, G. W. 1899. A guide to the study of British water bugs (aquatic Rhynchota). *Entomologist* 32: 3–8.
- Macan, T. T. 1965. A revised key to the British water bugs (Hemiptera–Heteroptera) with notes on their ecology. *Scientific Publications Freshwater Biological Association* 16: 1–74.
- Nelson, B. 1995. The distribution of aquatic and semi-aquatic Heteroptera in Northern Ireland. *Irish Biogeographical Society Bulletin* 18: 66–130.
- Savage, A. A. 1989. Adults of the British aquatic Hemiptera Heteroptera. *Scientific Publications Freshwater Biological Association* 50:1–173.
- Southwood, T. R. E. & Leston, D. 1959. *Land and water bugs of the British Isles*. Warne, London.
- Stichel, W. 1955. *Indistrierte Bestimmungstabellen der Wanzen*. II. Europa. 4. Amphibicorioromorpha. Hermsdorff, Berlin.
- Wachmann, E. 1989. *Wanzen beobachten—kennenlernen*. Neumann-Neudamm, Melsungen.

The specialist Hemiptera associated with mistletoe—Concerns about a supposed decline in mistletoe (*Viscum album*) led to a new national survey over the winters of 1995/6 and 1996/7 (Briggs, 1995; 1997). As an adjunct to this survey it was decided to look for the insects specifically associated with mistletoe.

Mistletoe is host to three specialist herbivores; *Psylla visci* Curtis (Hem.: Psyllidae), *Orthops visciicola* (Puton) (Hem.: Miridae) and *Celypha woodiana* Barrett (Lep.: Tortricidae, Olethreutinae). The predatory species *Anthocoris visci* Douglas (Hem.: Cimicidae) is also restricted to mistletoe, apparently feeding exclusively on

Psylla visci. *A. visci* was classified as a nationally notable species by Kirby (1992). This work concentrated on the Hemiptera, for which there are very few recent records (Bernard Nau, 1996 *pers. comm.*), because they seem to have similar life cycles, and can all be sampled in the same way.

Mistletoe was sampled on 31.viii./1.ix.1996 at three locations where access to mistletoe was relatively simple, using a beating tray and a sweepnet. Estimates of the abundance of the species were recorded, and shown in Table 1.

Table 1. The abundance of the specialist Hemiptera. Present < 5, Occasional 5–50, Frequent > 50

Location	Painswick Gloucester	Kemerton Worcester	The Ladin Hereford
National grid ref.	SO 8609	SO 9436	SO 6635
Habitat	Garden	Orchard	Orchard
Host	apple	apple, balsam poplar	apple
mistletoe abundance	1 tree	> 25 trees	> 35 trees
<i>Psylla visci</i>	Present	Frequent	Frequent
<i>Orthops viscidola</i>	Occasional	Frequent	Frequent
<i>Anthocoris visci</i>	Absent	Present	Present

As expected the predatory species was the least abundant, and not recorded from the smallest sample site. It is not clear if this absence was because the populations of prey species were too small to allow *A. visci* to persist, or a reflection of the chances of dispersal to a small habitat patch.

Most of the previous records for the mistletoe insects are from apple so it may be worth noting that all three Hemiptera were recorded from mistletoe growing on balsam poplar at Kemerton. Since there are also recent records from poplar and field maple (Nau, 1985), it seems likely that the preponderance of apple records reflected the accessibility of orchard mistletoe to entomologists (though see Le Quesne, 1954). The problem of access to mistletoe is also the most likely reason for the paucity of recent records.

This very limited survey showed that the insects associated with mistletoe are relatively easy to find, albeit where mistletoe is most common and abundant. The other recent records from Bedfordshire (Nau, 1985) and Warwickshire (Price, 1987), where mistletoe is much less widespread, may indicate that similar attention in other areas would produce more records.

We are grateful to the landowners who allowed us to sample mistletoe, and Jackie Denman of 'The Big Apple' who helped to arrange this. Thanks are due to Bernard Nau for his help over the recent records.— JOHN HOLLIER, 42 Rue Virginio Melnati, 1217 Meyrin, Switzerland, JONATHAN BRIGGS, 2 Ledgemoor, Watledge, Nailsworth, Gloucester GL6 0AU.

REFERENCES

- Briggs, J. D. 1995. Mistletoe—distribution, biology and the National Survey. *British Wildlife* 7: 75–82.
- Briggs, J. D. 1997. Mistletoe survey—another update. *BSBI News* 77: 42–44.
- Kirby, P. 1992. *A review of the scarce and threatened Hemiptera of Great Britain*. JNCC, Peterborough.

- Le Quesne, W. J. 1954. An easy way of obtaining *Lygus visicicola* Put. (Hem., Miridae) from inaccessible mistletoe, and a new county record. *Entomologist's Monthly Magazine* 90: 256.
- Nau, B. 1985. Mistletoe bugs. *Heteroptera Study Group Newsletter* 6: 8.
- Price, J. M. 1987. Mistletoe bugs in Warwickshire. *Heteroptera Study Group Newsletter* 7: 5.

Notes on the occurrence of the planthoppers *Reptalus panzeri* (L ow) (Hemiptera: Cixiidae) and *Asiraca clavicornis* (Fab.) (Hemiptera: Delphacidae)—The characteristic planthoppers *Reptalus panzeri* (L ow) (= *Oliarius panzeri*) and *Asiraca clavicornis* (Fab.) are considered by many hemipterists to be very uncommon. In the national review by Kirby (1992), both are listed as being nationally scarce (notable B). Each is reported to be associated with rough grassland, especially dry open areas or where patches of bare soil are present. Both entries in the review are based upon very limited lists of recent records. However, local survey work has shown that both species are widespread and sometimes very abundant in south London. *Reptalus panzeri* also occurs periodically but widely elsewhere in south-east England. The following records have been made in the last few years.

REPTALUS PANZERI

Beckenham Place Park, TQ385706, VC16, West Kent, 27.vii.1995, one by sweeping rough grass at the edge of a small wooded area and next to a sports field. The rough verge-like strip along the edge of the wood was a south-east-facing bank with varied grass and herb species. The park comprises a mixture of ancient woodland, old hedgerows and modern utilitarian recreational playing fields. RAJ.

Dulwich Park, TQ339736, VC17 Surrey, 8.vii.1996, one photographed sitting on a rhododendron leaf in an ornamental garden. This is a most unlikely locality; the rhododendron bushes make up part of an extensive series of ornamental beds surrounded by closely mown grass. There is, however, something special about the site since it supports large colonies of the now scarce rhododendron lacebug *Stephanitis rhododendri* (Horvath), and the elusive rhododendron leafhopper *Placotettix taeniatifrons* (Kirsch.). RAJ.

Crystal Palace, TQ339709, VC17, Surrey, 24 & 25.vii.1996, 5.viii.1996, very many found by sweeping the rough grass and herbage on the derelict top and south-east-facing slopes where the Crystal Palace building itself had once stood. On 25.vii.1996, several hundred specimens were seen and it was the commonest insect at this typically ruderal site. RAJ.

Pebsham near Bexhill-on-Sea, TQ766093, VC14, East Sussex, 6.viii.1996, 7.vii.1997, 11.vii.1997, several swept off creeping thistle in a meadow containing a south-facing slope. PJH.

Rocks Farm, Westfield, near River Brede, TQ8117, VC14, East Sussex, 7.viii.1996, one swept in marshy area, possibly off creeping thistle. PJH.

Par Brook, Billingshurst, TQ081249, VC13, West Sussex, 18.vi.1997, a few swept off streamside vegetation in clayey meadow. PJH.

Windsor Great Park, SU975734, VC22, Berkshire, 24.vi.1997, 19.viii.1998, several swept off grass at edge of woodland in deer park. PJH.

Woodlands Farm (Shooters Hill), near Bexley, TQ449768, VC16, West Kent, 20.vii.1998, 3.viii.1998, many by sweeping in open meadows, once arable, but disused fallow for about 10 years. The fields have apparently been mown once or twice and

although full of long grass and tall herbage, there are still many patches of bare soil. RAJ.

Morden Cemetery, TQ233672, VC17, Surrey, 15.vii.1998, 5.viii.1998, 5.ix.1998, many swept in "nature areas", flowery meadow-like grassland left unmown until late summer or autumn. RAJ.

ASIRACA CLAVICORNIS

"The Mudchute", Isle of Dogs, TQ380788, VC21, Middlesex, 25.viii.1984, many hundreds by sweeping and grubbing on dry sunny bank. The plant life on the bank was dominated by a small unidentified spurge species, possibly a garden escape. RAJ.

Nunhead Cemetery, TQ355755, VC17, Surrey, 9.v.1991, 11.iii.1993, 11.v.1993, several by sweeping in rough grassy area behind ruined chapel. A few other specimens observed in subsequent years. RAJ.

Blackheath Hill, TQ383766, VC16, West Kent, 3.x.1995, one swept on rough grass hillside overlooking derelict factory plot and high-rise flats; a very scruffy site. RAJ.

Chinbrook Orchard, TQ415715, VC16, West Kent, 18 & 27.vi.1996, 10.vii.1996, several swept on each occasion from this overgrown allotment plot. RAJ.

Gargoyle Wharf, TQ262754, VC17, Surrey, 10.vi.1996, one swept from this derelict plot, once the site of warehouses and industrial wharfs, and now mainly rubble with rough herbage and buddleia growth. RAJ.

Hither Green "Nature Reserve", TQ402728, VC16, West Kent, 6.vi.1996, several swept from this open rough grassland running beside a railway line. RAJ.

New Cross Railway Cutting, TQ364764, VC16, West Kent, 27.iii.1997, several swept from dry open grassy clearing next to railway line. RAJ.

Both planthoppers used to be more often and more widely recorded (Kirby, 1992), but seem to have retreated from previous outlying localities until they are now more or less confined to the Home Counties. In his review, Kirby (1992) suggests that scrub invasion may be one of the major factors involved with the insects' decline. Certainly, the ruderal habitats in the London area have plenty of bare soil and are also sites for many other unusual and warmth-loving species more usually associated with dry sandy or heathy areas. The presence of cracks in the ground, or at least bare patches of soil, may be extremely important in the life cycle of *Reptalus*, whose nymphs, like those of other cixiids, are thought to be root feeders. *Asiraca* nymphs like many delphacids may be found close to the ground, although the adults may be found by sweeping. One wonders whether these curious insects are actually more widespread than records indicate, and would be found more readily by grubbing rather than by sweeping.—RICHARD A. JONES, 135 Friern Road, East Dulwich, London SE22 0AZ & PETER J. HODGE, 8 Harvard Road, Ringmer, Lewes, East Sussex BN8 5HJ

REFERENCE

- Kirby, P. 1992. *A review of the scarce and threatened Hemiptera of Great Britain*. UK Nature Conservation No. 2. Peterborough, Joint Nature Conservation Committee.

BENHS INDOOR MEETINGS

10 November 1998

Mr R.D. HAWKINS showed two species of leaf beetle (Coleoptera: Chrysomelidae) beaten from balsam polar, *Populus trichocarpa*, at Send, Surrey on 24.ix.98. A specimen of *Phyllodecta laticollis* Suffrian was found to have a deformed left antenna. The basal segments were misshapen and enlarged. Beyond that point the antenna split into two branches of normal-shaped segments. Also beaten from the poplars were two specimens of *Zeugophora subspinosa* (Fab.). These were 3.7 mm long and significantly larger than the published size range of 2.5–3 mm. Mr Hawkins also showed an ichneumon wasp, *Diphyus quadripunctorius* (Müller) taken on 17.v.98 at Highridge Wood, near Brockham, Surrey.

Dr I.F.G. MCLEAN reported finding a male wasp of *Vespa germanica* (Fab.) in his house at Brampton, Cambs. on 5.xi.98. This is a very late data for this species.

Dr J. MUGGLETON reported that the 1998 Exhibition had been a success with the number of exhibits (157) slightly up on last year. The event was also better attended with 213 members and 68 visitors signing the attendance book (174 and 66 in 1997). Diptera, Coleoptera and Hymenoptera exhibits were well represented but Lepidoptera exhibits seemed to take up less bench space than usual. An excellent Exhibition Dinner was appreciated by about 45 members and guests. Two problems raised were the high cost of parking at Imperial College and the inadequate lighting for looking at small insects. Dr Muggleton said that suggestions for alternative venues would be considered but it was not easy to find such a place. Ideally the hall will be of adequate size with seating and catering facilities for lunch and the Dinner. It also needs to have parking and access by public transport. The University of London's Senate House and Kempton Park race course were suggested as possible alternatives.

The Exhibition venue has to be booked well in advance and so Imperial College is being booked again for 1999. However, following discussions at the Exhibition, the Society will try and book the Sherfield Hall for a Saturday in late November instead of October. This will avoid clashes with half-term holidays and Halloween parties, and will also give members more time to prepare their exhibits.

Mr N.A. CALLOW showed slides of a wide range of insects and other invertebrate animals taken in Britain and during a visit to Kazakhstan.

Mr R. SOFTLY showed slides of five geometrid and five noctuid moths which have green coloration or have a green connection through their common or Latin names.

8 December 1998

The President, Mr B.C. EVERSHAM announced the death of Mr M. G. Ventom, who had died in January 1996.

Mr S. FALK showed a bee he had collected on 20.viii.96 at the Edge Hill military area in mid-Warwickshire. He had been searching flowers for the local bee *Hylaenus signatus* (Panzer) when he was surprised to find a North American carpenter bee, *Xylocopa virginica*. He was even more surprised to find that there was another specimen in the museum at Coventry that had been collected locally by J.W. Saunt earlier in this century.

Mr M. PARSONS showed a pyralid moth new to Britain which had been taken at light at Lydd, Kent between 5–26.viii.1998 and handed to him by Mr S.P. Clancy. It

is *Vitula biviella* (Zeller) and it closely resembles *Ephestia* spp. *Vitula biviella* is associated with conifers on sandy soils and has been spreading in recent years into western Europe from further east.

Dr J. MUGGLETON announced that next year's Annual Exhibition would be held at the later date of 20th November 1999 in the Sherfield Hall, Imperial College.

Mr S. MILES displayed several conservation publications. These included a JNCC Wildlife and Countryside Link project to review the operation of species protection legislation in Britain. The BENHS had contributed to this review. Also shown were some Butterfly Conservation papers. These were 'Conservation Strategy 1998–2002', which outlines action plans for over 40 species of Lepidoptera, and a code of conduct on collecting, breeding and photographing. There is also a DETR paper on SSSI Consultation—better protection and management. The BENHS will be making a response to this paper.

Mr S. FALK reported that Coventry City Council had recently reviewed its unitary development plan. New sites of importance for nature conservation had been designated, including some brown-field sites. Surveys conducted by Mr Falk have shown that some post-industrial sites in Warwickshire are of considerable value to insects and other invertebrates.

Mr R. D. HAWKINS noted an error in O.W. Richards' R.E.S. key to the Scolioidea, Vespoidea and Sphecoidea. The text in the couplet defining male *Vesputa vulgaris* (L.) is correct but one figure referred to is inaccurate.

The following persons have been approved by Council as members: Mr Hugh Barton, Dr Roger Booth, Mr Stephen Brady, Dr Peter Costen, Mr Gordon Craine, Mr Adrian Dutton, Mr Patrick Goodwin, Mr Rex Harvey, Miss Anna Juvonen-Lettington, Mr Roger Kiddie, Mr Tony Lee-Magee, Mr Tom Lloyd, Mr Maurice Pledger, Mr Graham Richardson, Mr Peter Taylor, Mr David Warner and Mr D. Willetts.

Mr S. FALK spoke on "Chasing the chestnut sparrow", an account of two visits made to China in 1993 and again in the spring of 1998. In addition to pictures of the bird life Mr Falk showed many slides of the parks, temples, towns and cities that he had visited.

12 January 1999

The President, Mr B.C. EVERSHAM announced the death of Mr J.E. Maskrey who had died in July 1997.

Mr B.C. EVERSHAM showed a live specimen of the snow flea, *Boreus hyemalis* (L.) (Mecoptera: Boreidae). This was collected at Thetford Warren in the Suffolk Breckland on 10.i.99 by William Seale and the exhibitor. A large population occurs at this site with over 30 being seen in November. The snow flea is relatively inactive during the day, when only a few individuals were seen, but larger numbers appear at dusk and it remains active for three to four hours after dark. Although tolerant of low temperatures and sensitive to overheating, there were more individuals active at 3–5°C than at or close to freezing point. The snow flea feeds on mosses and appears to be associated with *Polytrichum* spp., including *P. commune*, *P. formosum* and *P. juniperinum*.

Mr R.D. HAWKINS showed a specimen of the shield bug *Holcostethus vernalis* (Wolff) (Hemiptera: Pentatomidae). It was one of two specimens swept by P.J. Hodge in woodland clearings south of Boulogne near the coast of northern France on 12.ix.98. This species has been recorded in Britain but is of rare occurrence.

Mr B.S. NAU showed some photographs of the shield bugs *Holcostethus vernalis* (Wolff), *Dolycoris baccarum* (L.) and the winter form of *Palomena prasina* (L.). The last two are common species with which *H. vernalis* might be confused. Mr Nau also displayed some distribution maps for shield bugs in Bedfordshire. This county has been well worked for this group of insects. Some species have shown a significant increase in their distribution in recent years.

Mr R. SOFTLY showed colour transparencies of some shield bug adults and nymphs.

Mr R. SOFTLY reported that the dark chestnut moth *Conistra ligula* (Esper) had been taken in his light trap at Hampstead in late December and early January. He had also noted a drone fly (*Eristalis* sp.) on a wall during a spell of mild weather.

Mr N.A. CALLOW had seen a peacock butterfly on 6.i.99.

Mr R.D. HAWKINS referred to a radio programme before Christmas that reported that the short-haired bumblebee was extinct in Britain. He wondered which species had been given this unfamiliar common name. The species concerned is *Bombus subterraneus* (L.).

Dr S. JUDD spoke on the subject of "British Shield Bugs". This group of bugs comprises the Acanthosomidae, Cydnidae, Scutelleridae and Pentatomidae families. These bugs all have five antennal segments and many of the species are shield-shaped when viewed from above. There are also some shield-shaped bugs in the Coreidae family but these have four antennal segments. The shield bugs are Britain's largest bugs and many are easily identified in the field, making them an ideal starting point for entomologists wanting to study the Heteroptera. Dr Judd displayed some useful books on the Heteroptera and showed slides of adults and nymphs of British shield bugs. The nymphs are often of different colour to the adult insects and sometimes have bright metallic colours. Most species overwinter as adults, which emerge and lay clusters of eggs in the spring and early summer.

The parent bug, *Elasmucha grisea* (L.), feeds on birch and shows parental care for its eggs and young nymphs, which are covered by the female's body. Another member of the Acanthosomidae is the juniper bug, *Cyphostethus tristriatus* (Fab.). This used to be a scarce insect feeding on juniper, but has become widespread in gardens since it adapted to feeding on *Chamaecyparis* spp. The Cydnidae have fossorial spines on their tibiae and have a body shape that is more rounded than shield-shaped. Some have a much enlarged scutellum which covers most of the abdomen. Cydnid bugs deposit their eggs in cavities in the soil and use the spines on their legs to burrow into the ground. They feed by sucking sap from plants. The Scutelleridae are mainly associated with grasses and the most frequently encountered are the tortoise bugs, *Eurygaster* spp.

The largest shield bug family in Britain is the Pentatomidae with about 19 species. Some, like *Picromerus bidens* (L.), are predators of soft-bodied insects such as caterpillars and chrysomelid beetle larvae. The predatory types have thicker rostrums compared with sap-feeding bugs. Exotic species are sometimes imported into Britain with vegetables and other plant material. A regular import is a European green shield bug, *Nezara viridula* (L.).

23 February 1999

The President, Mr B.C. EVERS HAM announced deaths of Major A. Bedford Russell and Mr R.G. Warren.

Mr A.J. HALSTEAD referred to his article on the mealybug ladybird, *Cryptolaemus montrouzieri* Muls., surviving frosts at RHS Garden, Wisley in the winter of 1997-98

(*Br. J. Ent. Nat. Hist.* 11, pp.163–164). He reported that the ladybird had recolonized the same plant of New Zealand flax, *Phormium tenax*, in the following summer and that good numbers of adult and larval *C. montrouzieri* were seen in October 1998. A single live adult was seen on the plant on a sunny day on 6.i.99, confirming that this Australian ladybird is more cold tolerant than is generally thought.

The ordinary meeting was then followed by the Annual General Meeting, Officers' Reports and the Presidential Address. [See issue 12:2].

16 March 1999

Mr R. D. HAWKINS showed four species of hoverfly collected during 1998 at Bagmoor Common, a heathland site in Surrey. These were *Chrysotoxum festivum* (L.), *Xanthogramma pedissequum* (Harris), *Volucella bombylans* (L.) and *Sericomyia silentis* (Harris). The freshly killed specimens had been placed in a domestic freezer in a small wooden box and covered only by tissue paper. After three months they were removed, by which time they were quite dry and with the colours well preserved.

The following persons have been approved as members by Council: Dr Peter R. Brough, Mr Peter H. Clarkson, Mr Andrew D. Law, Mr Jonathan W. Spencer, Mr Steven M. Williams, Mr Richard I. Wilson, Mr Robert J. Brooker, Mr Dorje K. Mundle and Mr Andrew Salisbury.

Mr R. SOFTLY reported finding a green shield bug, *Palomena prasina* (L.) on flowers in his home at Hampstead a few days previously. This had the typical green summer coloration rather than the dark form encountered during winter diapause. In *Land and water bugs of the British Isles*, Southwood and Leston give May as the time that overwintered adults emerge. Dr I. McLean had seen a brimstone butterfly in Cambridge on 13.iii.99. Mr S. Miles reported that he and some other members involved in the Society's investigation into two heathland Biodiversity Action Plan flies had visited Thursley Common, Surrey on 13.iii.99. Several solitary bees, *Andrena* spp. were active, as were brimstone butterfly and the spider wasp *Anoplius viaticus* (L.). Mr R. Uffen said that *Andrena clarkella* (Kirby) was active on sallow catkins in Hertfordshire.

Dr S. BROOKS spoke on "How midges play a key role in our understanding of global climate change". There have been some dramatic climate changes in the Northern Hemisphere since the last Ice Age and there is currently concern that the climate is becoming warmer, largely as a result of Man's activities. By recording assemblages of chironomid midge species found at the present time in a range of water types and temperatures, comparisons can be made with the historic record provided by remains of midge larvae found in lake or peat sediments. Similar studies have been done with beetles, ostracods and pollen, although these are not always accurate indicators of the past climate. Plants, in particular, can be slow to colonize new areas in response to climate change and so the pollen record may show a time lag. Chironomid midges are particularly suitable for this type of study because they are well represented in temperate regions. Their larvae develop in water and have hard chitinous head capsules which survive in lake sediments and can be used to identify the species present in past times. The winged adults can fly and quickly colonize new sites when the opportunity arises.

Surveys of lakes and other water bodies have been conducted to record modern species assemblages and relate these to characteristics such as water temperature, type of lake substrate, water depth, pH, salinity and dissolved oxygen levels. The lakes chosen for surveying were those with little human disturbance, and core

samples were taken from the lake bed to compare with the modern fauna. The optimum temperature range for a midge species is taken as being that where the greatest numbers are found today. By comparing modern assemblages with those in lake sediments it is possible to discover the environmental conditions that occurred in the past.

Dr Brooks described several case studies which showed how the chironomid midge fauna had changed in some Scottish and Norwegian lakes in response to changing climate and other environmental factors. At Whitrig Bog in Scotland there was a change to warmer water species when the last Ice Age ended and then a return to colder water species as melting polar ice pushed the Gulf Stream further south. The pollen record for the same site suggested a tundra-type vegetation at the time when warmer water chironomids were present. This suggests that mobile insects, such as these flies, are a more accurate climate indicator when changes occur over a relatively short period of time. Some Norwegian lakes in more recent times have shown an increase in low pH water species as a result of acidification of the water by acid rain and the presence of conifer forests in the water catchment area. A Scottish lake has been limed to restore it to its former pH level. This has resulted in changes in the chironomid fauna in favour of higher pH species but the historic record shows that the species assemblage is not the same as before acidification.

13 April 1999

Mr S. MEREDITH showed some A4-sized pictures made by a colour printer from transparencies of butterflies, other insects and orchids seen on the recent BENHS expedition to Belize.

Dr J. MUGGLETON announced that applications for the Society's Research Fund should be sent to him by 31.ix.99. There is likely to be £2000 for distribution in sums of about £4-500. The Fund, which is also open to non-members of the Society, will support research projects relating to conservation, distribution and taxonomy of insects and/or spiders.

Mr S. MILES reported that he had attended a meeting organized by the RSPB on Rainham Marshes, Essex, to discuss management of the Marshes and raise awareness of their environmental importance. He also drew attention to a publication produced by the Ancient Tree Forum. In their *Bulletin No. 4*, March 1999, was a request from Dr M. Simmonds of Royal Botanic Gardens, Kew, Surrey for information on death watch beetle, *Xestobium rufovillosum* (Degeer) in its natural environment in trees.

Mr S. MEREDITH reported seeing a brimstone butterfly and three small tortoise-shells on a hillside in Somerset on 14.iii.99. This is a proposed large blue introduction site. Heavy rabbit grazing was damaging thyme which had been given some protection by covering it with twigs. Mr Meredith noted that blackthorn twigs, bearing eggs of the brown hairstreak, were being used!

Mr R. UFFEN reported seeing male *Andrena praecox* (Scop.) at Frogmore Lakes, St. Albans, Herts. on 2.iv.99. A female was seen on 8.iv.99 at Amwell Quarry. Although this site has plenty of willows, Mr Uffen only counted four male plants. He suspected that the willows had been planted and mostly been propagated from a female clone. Female willows are of limited value to sawfly-associated bees as they produce no pollen. Mr Uffen thought an aggregation of approximately 150 holes in the soil between paving stones at Fryent Country Park, Middx. that had been reported by another member, was likely to be a nest site of the solitary bee *Lasioglossum malachurus* (Kirby).

Dr K.N.A. ALEXANDER spoke on the subject of "Life in old trees". Britain is relatively rich in ancient trees compared with other parts of Western Europe. Such trees have a large number of insects that are associated with dead wood and wood-rotting fungi. Aging is a natural process and trees such as oak go through recognizable stages as their vigour declines. Branches at the top of the tree die back, leading to a thinning of the crown. Growth lower down is maintained so that ultimately the tree's crown is lowered. Various fungi attack the heartwood, leading gradually to the development of a hollow trunk. Although trees in this state may look unhealthy, Dr Alexander stressed this was a natural state of affairs and hollow trees continue to make active growth. During the early stages of wood decay more specialist insects are likely to be present, often associated with a particular type of fungal rot. When the decay is advanced the rotten wood is of a more homogeneous nature and supports more general feeders. Dr Alexander made a plea for entomologists to identify the species of fungi on trees as well as the type of tree when recording dead-wood insects. He showed a series of slides of beetles and other insects that are associated with old trees.

Some attempts at providing artificial breeding sites for rot-hole and other dead-wood insects have been successful. The best sites for dead-wood insects have histories that date back to medieval times. River banks and old parkland can be good sites and may be better than ancient woodland. The ideal site has a mixture of old, young and middle-aged trees with nectar plants for the adult insects. New trees must be planted to ensure continuity of trees for the future.

The roots of ancient trees can be damaged by ploughing close to the trunks. Overgrazing can also be detrimental by compacting the soil under the canopy and harming mycorrhizal fungi through dung causing over-enrichment of the soil. Other problems for ancient trees are the removal of lower branches to allow access for farm machinery and the excessive removal of dead wood for aesthetic reasons. Careful tree surgery can be beneficial in regenerating ancient pollarded trees and clearing scrub growth from around veteran trees. Where trees have to be felled for safety reasons it is sometimes possible to leave a safe standing trunk after the branches have been removed. Caring for ancient trees means rediscovering old skills and management techniques need to be appropriate for local environmental conditions. The Ancient Tree Forum has been set up as a means of recording and exchanging information on this subject.

11 May 1999

The following persons have been approved as members by the Council: Mr Ashley P. Leftwich and Mr Martin W. George.

Mr S. MILES displayed a copy of the JNCC Report on the Review into the Operation of Species Protection Legislation in Great Britain. He also made available Minutes of the March 1999 JCCBI meeting and a list of lead partners for Species Action Plans. The letter includes the BENHS as lead partner for three heathland fly species. These papers will be placed in the Society's library at Dinton Pastures.

Dr J. MCLEAN announced that the JNCC would be reporting to the Department of Environment, Transport and Regions (DETR) on the effectiveness of the Wildlife and Countryside Act Schedules. They would use the above mentioned report and also incorporate the views of other conservation agencies. Consultation on Part II of the Wildlife and Countryside Act, which concerns sites, took place in 1998. Various non-governmental organizations are pressing through Wildlife and Countryside Link for stronger site protection. Dr McLean noted that there was pressure on the

government's legislation programme. It is possible that there might be some new conservation legislation in autumn 1999 as part of the Access to the Countryside proposals but it may be delayed for a year. The new Scottish Assembly has powers to deal with wildlife legislation but is unlikely to do so before autumn 2000.

Dr J. MUGGLETON reported taking in his moth trap at Staines, Middx. on 2.v.99 a lesser yellow underwing, *Noctua comes* Hübn. and a sycamore moth, *Acronicta aceris* (L.). These normally appear about the third week of June. The *N. comes* was seen on the same egg box as an early grey, *Xylocampa areola* (Esp.).

Dr N. RAVENSCROFT spoke on "Micro-habitat overlap in Alpine and Scottish Burnet Moths". During the 1990s he had studied *Zygaena* spp. in Western Scotland and in the Alps. Three burnet moths, the transparent burnet (*Zygaena purpuralis*), the slender Scotch burnet (*Z. loti*) and the New Forest burnet (*Z. viciae*) are restricted in Britain to basalt outcrops on the western coast of Scotland. The Scotch burnet (*Z. exulans*) occurs on mountain tops near Braemar. Of more widespread occurrence in Scotland and elsewhere is the six-spot burnet (*Z. filipendulae*). The narrow-bordered five-spot burnet (*Z. loniceriae*) occurs in the Isle of Skye as a separate subspecies. In Scotland *Z. viciae* has just one site, *loniceriae* has three (all on Skye) and *loti* has ten sites (all on Mull); *purpuralis* has 30 sites and *filipendulae* occurs on over 100 sites. There is no overlap in sites with the three rarest species.

Dr Ravenscroft studied the vegetation at burnet sites on the undercliffs and on land slips and found the distribution of the moths was related to plant height. *Z. loti* occurs in less acidic areas with short vegetation; *Z. purpuralis* is found in more acid areas with bell heather, and *Z. filipendulae*, *loniceriae* and *viciae* occur where there is tall vegetation. In the Alps, Dr Ravenscroft found that the distribution of these species was related to altitude. Up to 800 m, all five species occur together. In terms of abundance at increasing altitude the ranking of the five species is *viciae*, *loniceriae*, *filipendulae*, *loti* and *purpuralis*, with *viciae* being most abundant at lower altitudes and *purpuralis* going highest up the mountains up to an altitude of about 2400 m.

15 June 1999

Mr S. MILES showed an egg and adults of the hoverfly *Chrysotoxum cautum* (Harris) and adults of *Chrysotoxum octomaculatum* Curtis. As part of the BENHS Heathland Flies Biodiversity Project, he had visited a known Surrey locality of *C. octomaculatum* on 27.v.99. At 9.30 am, with the temperature at about 23°C, a number of this rare and elusive heathland fly were seen visiting the flowers of broom. In a small area of sedges, *Carex* spp., both hoverflies were seen visiting buttercup flowers and sitting on the foliage of sedges and bramble. At 3.20 pm, a *C. cautum* was observed depositing eggs on the foliage of *Carex acutiformis*. The eggs are sausage-shaped, white, 0.75–1 mm long and deposited vertically on to the leaf blade. The sedge was growing in a damp but not wet area with fine silty soil where ants commonly build up soil around the stems of *Carex*.

Mr R.D. HAWKINS showed specimens of the hoverflies *Brachyopa pilosa* Collin and *Brachypalpus laphriformis* (Fall.). These resemble respectively a muscid fly and a mining bee, and because of this may be overlooked. Both were taken at Nower Wood, near Leatherhead, Surrey. The *B. pilosa*, a male, was taken on beech logs on 3.v.99 and *B. laphriformis*, a female, on 22.v.99 at the base of an oak tree.

Mr S. MILES stated that English Nature has offered matching funds for the BENHS five-year Heathland Diptera Study.

Mr S. PASTON reported finding the yponomeutid moth, *Argyresthia trifasciata* (Staudinger), on 28.v.99 at Norwich, Norfolk. This mines the shoots of juniper and has been known in recent years from the London area, N. Hants and Cheshire.

Mr P. BARNARD introduced a programme of talks under the heading "What future for British insect checklists?" by presenting a historical review of British insect checklists. This was followed by Martin Honey with a review of Lepidoptera checklists, and finally, Ian McLean spoke about Diptera checklists and about the use of electronic databases for checklists.

Peter Barnard's historical review of British insect checklists began with Forster's catalogue of about 1000 names published in 1770. Subsequent authors added more species, more synonyms, and more additional information. A recurrent theme was of over-ambitious projects never being finished. In more recent times, Kloet and Hincks' checklist (1945) included about 20000 insects. During the 1970s, a second edition was produced in parts, and with the publication of Peter Chandler's Diptera checklist (1998), the Royal Entomological Society has started a third series of British insect checklists.

In summing up, Peter Barnard referred to the trade-off between keeping a list up-to-date, and maintaining nomenclatural stability. The Natural History Museum has a co-ordinating role to play in future checklist developments through the National Biodiversity Network (NBN: see <http://www.nbn.org.uk/>) checklist project.

Martin Honey reviewed the recent history of British Lepidoptera checklists. Lepidopterists have been particularly prolific at producing local lists, and have also been notable for assigning English names and code numbers to many species. The numbering system introduced by the 1979 Recorder's log book and label list (Bradley and Fletcher) is widely used today. Emmet's life history chart in MBGBI Vol. 7(2) is a checklist with very detailed ecological information. Recent continental Lepidoptera checklists have opted for full synonymy, and the European checklist is being published on CD-ROM as well as paper format.

Ian McLean described the work leading up to the publication of a British Diptera checklist in 1998. Following on from work done for the Palaearctic Catalogue, three years of intensive work on a British checklist started in 1994. In 1997 alone, the editor, Peter Chandler, visited RES and NHM libraries 30 times, and co-ordinated a major collaborative effort, with 48 specialist contributors and 100 worldwide correspondents. This checklist provides explanatory notes for changes and quotes sources.

Computers have many advantages for those who compile and use checklists, though they may never entirely replace paper lists. JNCC is actively involved in developing computerized checklists with the NBN.

Open discussions were held, with all present contributing their views on a range of issues, including the pro's and con's of computers and of English names. Checklists can take a global, continental or national perspective. Though it is laudable to attempt a global checklist, this approach is very complex. National lists have an important part to play but should be integrated with larger projects.

BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY PUBLICATIONS

A field guide to the smaller British Lepidoptera—edited by A. M. Emmet.

2nd edition, 1988, 288 pages.

Paperback £18.00 (plus £1.60 p.&p.) (members £12.00 + £1.60 p.&p.). Case bound £22.50 (plus £2.00 p.&p.) (members £15.00 + £2.00 p.&p.).

This book is packed with information about the life histories of almost all the 1500 species of micro-lepidoptera recorded from the British Isles. An index of foodplants refers the reader to all spp. known to feed on each particular plant; this makes possible the speedy identification of larvae found (or at least narrows the field to a small number of spp.).

British hoverflies: an illustrated identification guide—by A. Stubbs, with colour plates by S. Falk.

2nd edition, 1996, incorporating the first supplement as an appendix, 270 pages of text plus 12 colour plates. Casebound £26.00 (plus £3.15 p.&p.) (members £18.00 + £3.15 p.&p.).

This is the most comprehensive book yet published on the British hoverflies. 256 spp. are described and their identification is made easy by the extensive keys, profusely illustrated with line figures. The superb plates show 263 specimens, depicting 190 different spp.

British hoverflies: second supplement—by A. Stubbs.

Published 1996, 55 pages.

Paperback £6.00 (plus £0.55 p.&p.) (members £4.00 + £0.55 p.&p.).

Among the features of this supplement:

A review of some advances in the study of the biology of hoverflies

Advances in conservation studies and methods

Guides for identification of the 15 spp. new to the list since 1983. This includes new, fully revised, illustrated keys to British *Sphaerophoria* and *Platycheirus*.

A key to female *Neocnemodon* (which could not be identified before)

A further bibliography of about 300 references. Over 100 line figures.

New British beetles: species not in Joy's practical handbook—by P. J. Hodge and R. A. Jones

Published 1995, 192 pages.

Casebound £24.00 (now out of print). Paperback £18.00 (plus £2.00 p.&p.) (members £12.00 + £2.00 p.&p.).

There are over 650 British beetles not included in Norman Joy's *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 spp. have been 'split'. Joy omitted many rare or doubtfully indigenous spp. Several of these have recently increased or been confirmed as certainly occurring (or having once occurred) in Britain. Many 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 a new look at the changes that have taken place in the 63 years since Joy's publication. The most up-to-date and useful keywords are listed, together with other helpful and interesting references. For each 'new' species, a short description and comparison with other related spp. is followed by journal and book references through which identification can be made and confirmed.

All prices are for single copies dispatched to addresses in the UK. Postage will be higher for multiple copy orders or where delivery is required overseas. Send orders to Mr G. Boyd, Sales Secretary, 91 Fullingdale Road, Northampton NN3 2PZ. Tel. 01604 410056.

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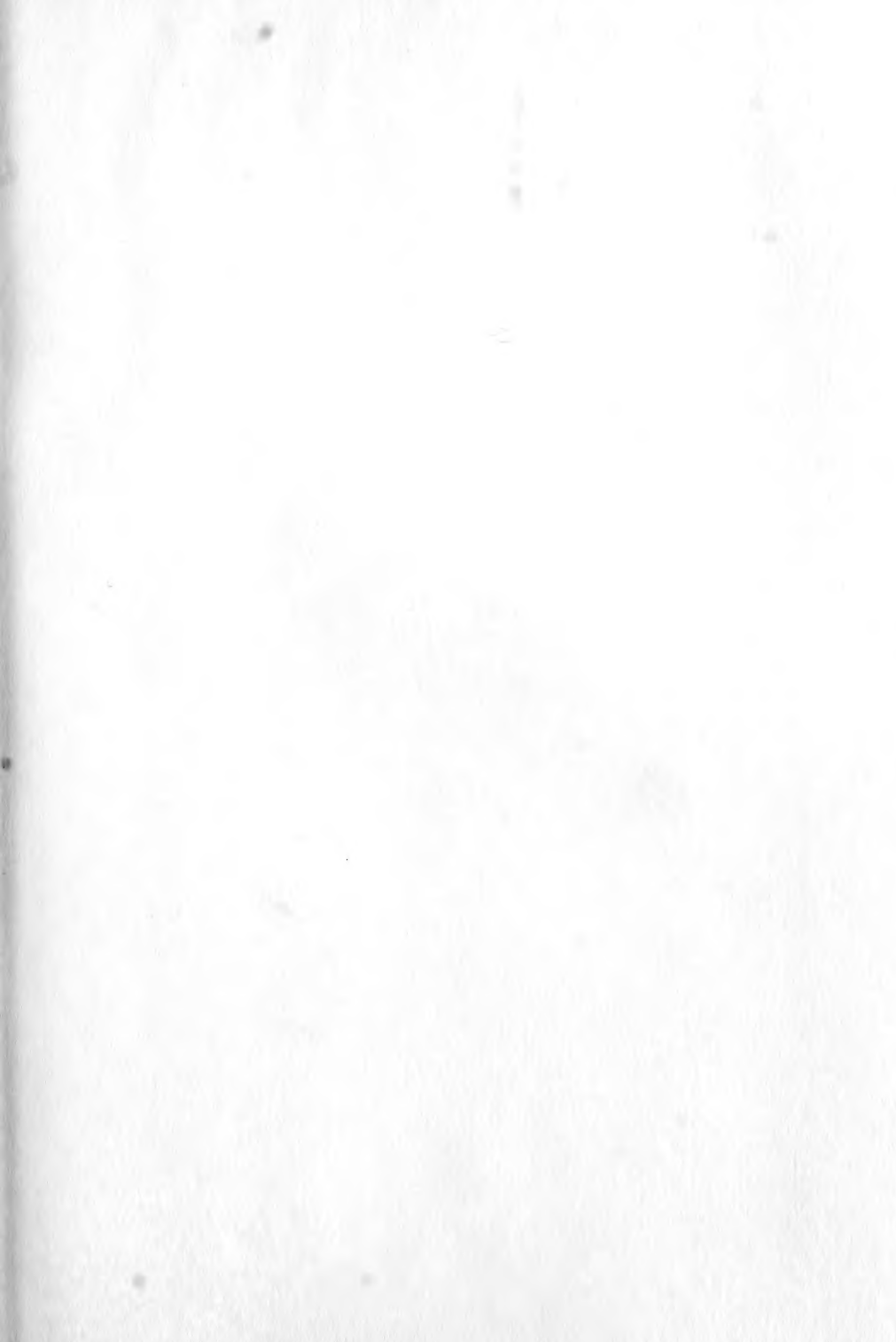
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