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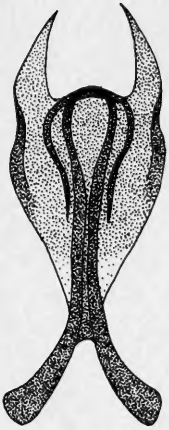

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A COMPARISON OF THE EARLY SPRING EMERGENCE OF THE MACRO-MOTHS 1989–1991 TAKEN AT FRESHWATER, ISLE OF WIGHT AT MERCURY VAPOUR LIGHT

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The winters of 1989 and 1990 were two of the mildest in living memory leading to very forward springs producing a number of interesting early emergences of some of our macro-moths. By comparison, 1991 was an 'average' year and illustrates well the out of season emergence of the two previous years. The months studied were from the beginning of January to the end of March, and over the three years 38 species were recorded in a private garden in the middle of the village of Freshwater.

The Winter of 1988–89 was exceptionally mild, the November of 1988 being the sunniest on record with 115.5 hours; almost double the 70-year-old average for that month. December was mild and dry but with only 51.0 hours of sunshine. I had a Christmas card from the late E. C. Pelham-Clinton stating that he had taken *Orthosia stabilis* (D. & S.) at light on 13.xii.88 and this was the last entry in his diary. The first three months of 1989 were all exceptionally mild. Southerly winds blew during early January and at the end of March which resulted in a few of the commoner migrants being caught.

The Winter of 1990 was even milder but much wetter than that of 1989. January will be remembered for its severe gales and on 25 January storm-force south-westerlies were the most notable since the hurricane of 16 October 1987. There were also severe gales during February, the wettest since 1951 with 6.89 inches of rain. December 1989, January and February 1990 were the wettest months on record with a total rainfall of 18.32 inches compared to the winter average of 9.07 inches. This beat the previous record of 15.92 inches in 1924–25. March was the driest since 1961 with 162.6 hours of sunshine, well above the average of 129.5 hours and no air frost was recorded. There was considerable migrant activity during the end of February and in March along the South Coast when a number of the rarer migrants were recorded. This mild spring was followed by a prolonged hot summer, the warmest year since 1659.

The winter of 1990–91 was 'average' with a cold period and snow in December and early February although February recorded the lowest temperatures for four years. The later half of January was dry but overcast although Manchester recorded its sunniest January ever. March was a mild and wet month with south-easterly winds but unlike 1990 there was no migration. The later half of March was much drier and quite sunny but with frosts at night. Many of the nights' total number of moths averaged over 30 during this month with a maximum of 11 species being recorded during one night for each of the three years at the end of March.

Amongst the moths which emerge in the spring I took *Orthosia stabilis* (D. & S.) as early as 15.ii in 1989. It was a week later in 1990 and nearly four weeks later in 1991. There was only a day's difference with the emergence of *Xylocampa areola* (Esp.) which was out on 21.ii in 1990 and 22.ii in 1989 but this compares with 12.iii in 1991. *Orthosia gothica* (L.) did not emerge until 12.iii in 1991 and 16.iii in 1989, compared to 21.ii in 1990. This seems to show that it was not affected by the mild winter in 1989. *Orthosia cruda* (D. & S.) hatched in March and this species does not seem to have been affected by the mild weather as it was recorded earliest in 1991 on 13.iii compared to 16.iii in 1989 and 28.iii in 1990. There was only a day separating the emergence of *Orthosia incerta* (Hufn.) during the three years, it always being taken at the end of March. There does not seem to be a general temperature factor

affecting the orthosias and their emergence was not consistent with the mild weather.

Selenia dentaria (F.) showed a marked variation in emergence over the three years with the earliest date of 25.ii in 1990 compared to 16.iii in 1989 and as late as 1.iv in 1991. *Biston strataria* (Hufn.) was three weeks later in 1991 compared to the earlier two years. *Phlogophora meticulosa* (L.) was taken as early as 11.i. in 1990 compared to the end of March in 1989 and 1991.

Brief mention should be made of the rarer moths that were recorded over this period. There is only one previous record of *Apocheima hispidaria* (D. & S.) for the Isle of Wight (Goater, 1974) being taken by Lobb at Cranmore in 1964 and I took two of this species in 1991 during the end of February and early March. There were two hibernating moths that I had not recorded since the early 1960s and these were *Lithophane socia* (Hufn.) on 30.iii.90 and four *Conistra rubiginea* (D. & S.) in 1991. It is also worth mentioning that the latest dates for *Conistra vaccinii* (L.) and *Conistra ligula* (Esp.) were 14.v and 15.iii respectively.

The warm southerly winds that were a feature of the winters of 1989 and 1990 caused a migration at the end of March 1989 when *Autographa gamma* (L.) and *Agrotis segetum* (D. & S.) were taken, and at the end of February and during the whole of March 1990, when some of the rarer migrants were recorded along the South Coast. These included *Mythimna loreyi* (Dup.) which I took on 9.iii.90, the earliest known record for this country with June being the previous earliest month. There were also numerous early sightings of *Macroglossum stellatarum* (L.) in the south and my brother Mr J. W. Knill-Jones saw one feeding on hyacinth on 22.iii.90. In 1989 the mild January produced records of *Peridroma saucia* (Hübn.) on 1.i.89 and *Agrotis ipsilon* (Hufn.) on 10.i.89. I have now recorded the latter species in every month of the year. I had the moth trap out only once during January 1991 when I took the pyralid *Udea ferrugalis* (Hübn.) on the 21.i.91. I also took this species on 13.iv.90.

In order to make a comprehensive comparison of these years a brief mention of the early spring butterflies should be made. *Pararge aegeria* (L.) was seen as early as 18.iii.90 and 28.iii.89 and much later on 15.iv.91. *Pieris rapae* (L.) was three weeks later in 1991 and *Celastrina argiolus* (L.) was over two weeks later. Table 1 shows the 38 species of macro-moth taken for the years 1989–91 in chronological order.

There were two exceptionally out-of-season species which I took on 31.iii.90: *Opisthograptis luteolata* (L.) and *Pheosia gnoma* (F.) which do not usually emerge until May.

To conclude, it would seem that the plant life was even more affected than entomology during these years as the daffodils were out in last week of January and the trees were in bud by the end of March in 1989 and 1990 whereas they were a month later in 1991. The butterflies were later by up to four weeks compared to an average of two to three weeks for the moths in 1991 which was a little less advanced than the plant life.

Acknowledgement

I should like to thank my brother Dr R. P. Knill-Jones for reading and commenting on the manuscript.

Reference

Goater, B. 1974. *The butterflies and moths of Hampshire and the Isle of Wight*. Classey.

Table 1. The 38 species of macro-moth taken for the years 1989–91 in chronological order. The earliest date is given for each species in each year. A dash indicates that the moth was not recorded during the period 1 January to 31 March.

Species	1989	1990	1991
Peridroma saucia (Hübn.)	1.i	—	—
Operophtera brumata (L.)	1.i	11.i	—
Erannis defoliaria (Cl.)	—	9.i	—
Conistra ligula (Esp.)	10.i	10.i	15.i
Agrotis ipsilon (Hufn.)	10.i	24.ii	—
Phlogophora meticulosa (L.)	29.iii	11.i	13.iii
Conistra vaccinii (L.)	26.iii	16.i	27.ii
Orthosia stabilis (D. & S.)	15.ii	21.ii	11.iii
Biston strataria (Hufn.)	21.ii	23.ii	13.iii
Xylocampa areola (Esp.)	22.ii	21.ii	12.iii
Orthosia gothica (L.)	16.iii	21.ii	12.iii
Selenia dentaria (F.)	16.iii	25.ii	1.iv
Apocheima pilosaria (D. & S.)	—	—	26.ii
Alsophila aescularia (D. & S.)	31.iii	5.iii	7.iii
Apocheima hispidaria (D. & S.)	—	—	6.iii
Agriopis leucophaeria (D. & S.)	—	—	6.iii
Gymnoscelis rufifasciata (Haw.)	29.iii	6.iii	31.iii
Theria primaria (Haw.)	7.iii	—	11.iii
Agriopis marginaria (F.)	—	8.iii	14.iii
Mythimna loreyi (Dup.)	—	9.iii	—
Eupsilia transversa (Hufn.)	—	—	10.iii
Orthosia cruda (D. & S.)	16.iii	28.iii	13.iii
Conistra rubiginea (D. & S.)	—	—	17.iii
Eupithecia abbreviata (Steph.)	—	17.iii	13.iv
Macroglossum stellatarum (L.)	—	22.iii	—
Orthosia incerta (Hufn.)	28.iii	28.iii	27.iii
Orthosia munda (D. & S.)	–	—	28.iii
Colostygia multistrigaria (Haw.)	28.iii	—	1.iv
Pachycnemia hippocastanaria (Hübn.)	—	28.iii	—
Anticlea badiata (D. & S.)	29.iii	31.iii	13.iv
Autographa gamma (L.)	29.iii	—	—
Agrotis segetum (D. & S.)	29.iii	—	—
Scoliopteryx libatrix (L.)	—	30.iii	—
Dasypolia templi (Thunb.)	—	—	30.iii
Anticlea derivata (D. & S.)	30.iii	—	—
Lithophane socia (Hufn.)	—	30.iii	—
Pheosia gnoma (F.)	—	31.iii	—
Opisthograptis luteolata (L.)	—	31.iii	—
No. of species for the 3 months	21	25	24

SHORT COMMUNICATIONS

A relict old forest beetle fauna from Powis Castle Park, Montgomeryshire.—A morning spent in the old deer park of Powis Castle (SJ216064), 9.vi.1990, revealed a rich variety of beetles and other insects within dead and decaying timber. Beetles of particular note are *Melasis buprestoides* (L.) which appears to be new to Wales (Mendel, 1988), and *Dorcatoma chrysomelina* Sturm which appears to be the second record for Wales (the first reported in Alexander, 1988). Pieces of *Melasis* were found

under bark on an ancient oak, while dead specimens of the *Dorcatoma* were found amongst red-rot within a lying dead oak trunk.

Other beetles found include: *Ctesias serra* (F.), larvae plentiful under loose bark on oak trunks; *Xestobium rufovillosum* (Deg.), elytra under oak bark; *Thymalus limbatus* (F.), under oak bark; *Cryptolestes ferrugineus* (Steph.), under oak bark; *Pediacus dermestoides* (F.), larvae under bark on recently split fallen oak boughs; *Sinodendron cylindricum* (L.), adult in dead hawthorn timber; *Bitoma crenata* (F.), under bark on oak logs—a rare species in Wales; *Triplax aenea* (Schall.), frequent on a soft fungus growing on a lying beech trunk; *Leiopus nebulosus* (L.), swept from bracken beneath oaks; *Scolytus intricatus* (Ratz.), in oak bark.

Nine of these species are listed in Harding & Rose (1986) as associated with sites where there has been long continuity of old trees and associated deadwood habitats. The park includes many ancient oaks and a scatter of hawthorns within a matrix of bracken-invaded acidic grassland.

My thanks to Roger Key and the Nature Conservancy Council for arranging access to this private estate.—Keith N. A. Alexander, 22 Cecily Hill, Cirencester, Glos. GL7 2EF.

References

Alexander, K. N. A. 1988. *Dorcatoma chrysomelina* Sturm (Coleoptera: Anobiidae) and *Xylophagus ater* Meig. (Diptera: Xylophagidae) new to Pembrokeshire. *Br. J. Ent. Nat. Hist.* **1**: 127.

Harding, P. T. & Rose, F. 1986. *Pasture-woodlands in lowland Britain*. Institute of Terrestrial Ecology, Huntingdon.

Mendel, H. 1988. *Provisional atlas of the click beetles (Coleoptera: Elateroidea) of the British Isles*. Biological Records Centre (N.E.R.C.).

***Epuraea distincta* (Grimmer) (Coleoptera: Nitidulidae) in North Somerset.**—Alexander (1991) reported this species from Devon and Cornwall in 1989, evidently new to south-west England. On 20.iv.1990 I took two specimens from a fungus, probably *Daedaleopsis confragosa* (Bolt. ex Fr.) Schroet., in woodland at the Street Heath reserve of the Somerset Trust for Nature Conservation (ST 4639), this being the first record for Somerset. On 6.v.1991 I took another at Shapwick Heath National Nature Reserve (ST 4240) and on 8.v.1991 a further singleton from Catcott Heath STNC reserve (ST 4040), by tapping hard fungi growing on fallen branches in mature birch woodland. Associated on all three occasions were numerous *Mycetophagus multipunctatus* F. (Coleoptera: Mycetophagidae), which may prove to be an indicator species. As *Epuraea distincta* has now been found quite readily at these sites, and just from the one or two fungi that were examined on each visit, I have little doubt that this species is now firmly established and perhaps even abundant in the spring in birch woods on the Somerset peat moors.

My thanks to A. A. Allen for confirming my first specimen. The Somerset Trust for Nature Conservation and English Nature (formerly Nature Conservancy Council) are to be thanked for granting permission to study beetles on their reserves.—A. G. Duff, 4 Amberley Close, Keinton Mandeville, Somerton, Somerset TA11 6EU.

Reference

Alexander, K. N. A. 1991. *Epuraea distincta* (Grimmer) (Coleoptera: Nitidulidae) in Devon. *Br. J. Ent. Nat. Hist.* **4**: 83.

NOTES ON THE POPULATION OF *LUPERINA NICKERLII LEECHI* GOATER (LEPIDOPTERA: NOCTUIDAE) AT ITS SITE IN CORNWALL, 1987 TO 1989

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INTRODUCTION

Luperina nickerlii (Frey.) (the sandhill rustic) has four distinct populations in Britain. The nominate subspecies is found in Essex, and there are three subspecies living in coastal areas in North Wales and Lancashire, in Ireland, and in Cornwall. The subspecies in Cornwall is *Luperina nickerlii leechi*, which was discovered in 1974 (Goater, 1976) on a strip of shingly sand about 500 metres long and 240 metres wide. The moth has silvery grey forewings marked with a dark brown median band. The subspecies in North Wales (*gueneei* Doubl.) is paler, whilst the Irish subspecies (*knilli* Boursin) is dark brown. The nominate species is widespread over Europe, with two subspecies *graslini* (Obth.) and *tardenota* (J. Joan.) (Leraut, 1980). Some examples of *Luperina nickerlii nickerlii* were taken at Bradwell in Essex which were originally thought to be migrants, but it has now been shown that the species is resident from Canvey Island to Harwich (Emmet & Pyman, 1985) and the Isle of Sheppey (Skinner, 1985). It may be that *L. nickerlii* migrates, as an unnamed subspecies was found at Farringdon on 22.ix.1950 (Goater, 1974) and a single female (the nominate form) was found at Bude in Cornwall on 6.viii.1990 by David Wedd and exhibited at the 1990 BENHS exhibition (Wedd, 1991).

An account of the biology of *Luperina nickerlii leechi* is given in Heath & Emmet (1983). The owners of the site have requested that its name and location be kept secret.

AIMS AND METHODS

The aim was to estimate the population and distribution of the adult stage of *Luperina nickerlii leechi* at its site in Cornwall.

Population counts of moths are usually made with mark/release/recapture schemes, using light traps as the means of capture. This method works very well with moths that fly, but, by repute, *L. nickerlii* rarely flies and does not come to light. The habitat was divided into 14 areas of equal width, marked off with bamboo poles, and the position of each moth was recorded. The moths could be seen at night resting on the stems of the foodplant, *Elymus farctus*, and were easily caught. The best method was to kneel on the shingle, getting down to 'moth-level', and to sweep the area with a powerful quartz-halogen searchlight. The moths were easily seen this way, especially when the searchlight reflected in their eyes. Each moth caught was marked on its forewing with red felt-tip pen. Each mark on the wing represented a different number (1, 2, 4, 7, 10, 20, 40, 70, 100, 200) according to its position, so that up to 454 moths could be individually marked. The number of males, females and pairs was noted and all recaptures were recorded. In the first year, the whole habitat was searched, including those areas without the foodplant. The habitat was too large to search in one night. On two occasions (24 & 25.viii.1987 and 28 & 29.viii.1987), the whole of the area was searched on two successive nights in order to get an idea of the total population.

In 1988, two attempts were made to attract the moths to light, on 4.ix.1988 using a portable Heath trap and on 7.ix.1988 using a 125-watt m.v. lamp on a white sheet.

RESULTS

Table 1. Numbers of *Luperina nickerlii leechi* on site, 1987–1989.

Year	Males	Females	Pairs	Total
1987	47	28	0	75
1988	35	34	9 (=18 moths)	87
1989	64	145	0	209
Total	146	207	9	371

Table 2. Numbers of *Luperina nickerlii leechi* throughout season, 1987–89.

	1987		1988			1989		
Date	Males	Females	Males	Females	Pairs	Males	Females	Total
14.8	2	0	0	0	0	0	0	2
19.8	5	0	—	—	—	—	—	5
20.8	—	—	0	1	—	—	—	1
24.8	4	2	—	—	—	—	—	6
25.8	3	0	—	—	—	1	5	9
26.8	—	—	1	1	0	—	—	2
28.8	7	4	—	—	—	—	—	11
29.8	9	4	—	—	—	19	33	65
30.8	—	—	—	—	—	25	44	69
31.8	—	—	—	—	—	18	56	74
2.9	9	11	8	4	4	—	—	36
3.9	4	1	8	17	5	—	—	35
4.9	—	—	17*	4	0	—	—	21
7.9	—	—	1	7	0	—	—	8
8.9	3	4	—	—	—	—	—	7
9.9	1	2	—	—	—	0	5	8
15.9	—	—	—	—	—	—	1	1
19.9	—	—	—	—	—	—	1	1
24.9	—	—	—	—	—	1	0	1
28.9	—	—	—	—	—	0	0	0
3.10	—	—	0	0	0	—	—	0
TOTAL	47	28	35	34	9	64	145	371

—no search that night; 0, search took place without any captures; *16 to light.

The numbers seen are recorded in Table 1. Numbers found varied from year to year, the largest number (209) being found in the hot, dry summer of 1989. In 1987, 75 moths were found in a total of 41 hours 40 minutes (an average of 33.33 minutes per moth found), but it should be noted that the whole habitat was searched In 1988, most search time was spent in the most productive areas and 71 moths (excluding 16 moths to a light trap) were found in 10 hours 17 minutes (an average of 8.69 minutes per moth). In 1989, 209 were found in 12 hours 21 minutes (an average of 3.5 minutes a moth). Not only were moths easier to find in 1989 they continued later into September (Table 2), at least until 24.ix.1988. The earliest moths recorded were in 1987, on 14th August, with peak numbers on 2.ix.1987, 3.ix.1988 and 31.viii.1989 (when 74 were seen). The central part of the site (with a large area of *Elymus farctus*) was the most productive throughout the 3-year survey (115 moths being recorded in one of the 14 subdivisions).

In 1987, the whole habitat was searched twice for moths. On 24.viii.1987, 6 moths were found (4 males, 2 females) in half the habitat and 3 moths (all males) in the other half on the following night (9 moths in total). On 28.viii.1987, 11 moths were found (7 males, 4 females) in half the habitat and 13 moths (9 males, 4 females) in

the other half. The population on these two nights may have been as low as 24. In 1988, the whole habitat was searched twice; 20 moths were found on 2.ix.1988 and 35 moths on 3.ix.1988. In 1989, only the most productive areas were searched; 69 moths were found on 30.viii.1989 and 74 moths on 31.viii.1989.

The relative emergence dates of males and females is shown in Table 2. In 1987, the first males were found 10 days before the first female, whereas in 1988 a female was found 6 days before the first male. In 1989 females and males were found together. Males formed 62.67% of the total in 1987, 50.57% in 1988 but only 30.62% in 1989.

The number of recaptures was very low. There was 1 recapture (a male) in 1987 out of 76 moths, 6 recaptures (4 males, 2 females) in 1988 out of 87 moths and 1 moth was recaptured twice. Six of these recaptures were at light (2 to tilley lamp, 4 to the Heath trap). Four were recaptured on the following night, 1 was recaptured on the same night, and 1 was recaptured 2 nights later. There were 5 recaptures (1 male, 4 females) in 1989, 1 on the same night, 4 on the succeeding night. One male with crumpled wings was captured at the same place the following night and may not have moved in this time.

On 4.ix.1988 39 moths were caught in the Heath trap placed near the centre of the site. The slight wind (possibly force 2) decreased during the night. The minimum temperature was 13.5°C at 06.45 a.m. *L. nickerlii* was the most common moth caught, with 1 recaptured female, 3 recaptured males and 16 fresh males, 2 of which were darker than usual. The next most common moth was *Luperina testacea* (O. & S.) (15 caught). On 7.ix.1988, an m.v. lamp was run on a white sheet from 22.50 p.m. to 12.10 a.m. No *L. nickerlii* were caught. Several Diptera and Trichoptera were attracted to the light, as well as crawling opiliones, in addition to the moths *Autographa gamma* (L.), *Tholera decimalis* (Poda), and *Luperina testacea* (2).

Discussion

In many mark/release/recapture schemes, such as Bailey's triple catch method and the Lincoln index method, the population is required to be well mixed after marking before population estimates can be made (Southwood, 1978). These methods provide an estimate of the total population, including those moths present but not seen. As the moths rarely fly, mixing the *L. nickerlii* population was difficult and these methods were unsuitable. One moth was seen the following night apparently not having moved. Marking the specimens provided an actual habitat count, with no estimate of possible total numbers.

The totals of 75, 87, 209 for the years 1987–1989 are numbers recorded. The actual totals in these years may have been much higher. The colony was only sampled on a few nights during the flight period, e.g. in 1987 the colony was sampled on 10 nights in a flight period of at least 27 nights. The population may have been three times higher than recorded. The flight season is a long one. The first and last sightings were 2 males on 14.viii.1987 and 1 male on 24.ix.1989.

The number of recaptures (12 in 3 years) was too low for any estimates of population size to be made from these figures. Six of the recaptures were to light. The low recapture rate is puzzling and there are several possible explanations. (a) The moths may have a very short lifespan. One moth caught in 1988 was recaptured twice and was the only moth shown to live for over 2 days. (b) A high proportion of those moths present could have been overlooked, including marked specimens (my technique improved with practice), however, the marked moths were easier to see than the unmarked ones. (c) The survey methods may have affected the results and marked moths may have been more prone to predation. (d) Some moths may have migrated

or have been blown by strong winds from the site. This is unlikely, as the species seems well adapted to its wind-swept habitat.

Numbers found varied from night to night (dropping from 35 on 3.ix.1988 to 21 on 4.ix.1988). Emergence rates might be erratic and vary according to unknown factors. Strong winds may keep moths clinging to *Elymus farctus* stems, but fewer moths (20) were caught on 2.ix.1988 in a strong wind than on 3.ix.1988 in a light wind (35 moths caught). Peak numbers (74) were found on 31.viii.1989, when only the most productive areas were searched, and the total population was probably higher than this.

Between 1987 and 1989 total numbers increased considerably (from 75 to 209). Part of the habitat had been affected by construction work in 1986, when a large area of *Elymus farctus* had been bulldozed away. By 1989, *Elymus farctus* had recolonized this area and moth numbers here increased from 12 (16%) in 1987 to 101 (48.33%) in 1989. The population of *L.n. leechi* seems to vary from year to year. Details of moth records provided by Colin Hart show that 60 moths were found on 23.viii.1975 and on 28.viii.1984, whilst 50 moths were recorded in under 30 minutes on 29.viii.1981. In 1976, G. Senior recorded about 150 moths in 1 hour. I know of no records for 1980, when according to Colin Hart little vegetation was visible. The subspecies seems to do well in hot, dry summers such as 1976 and 1989.

With several moth species, it is usual for the males to emerge before females and for males to be more common than females. However, with some species living in difficult environments or when the females fly little or are immobile, the females may emerge first (Novak, 1980). In 1987 2 males were found 10 days before the first female, but in 1988 a female was found first. In 1989 females and males were found together, and no pattern can be read into these figures. The proportion of males seen declined between 1987 and 1989. The totals for 1988 include 16 males caught at light. If we subtract this catch from the 1988 total, the proportion of males in 1988 (32.18%) is close to the 1989 proportion (30.77%). These figures do not include flying moths, many of which are likely to have been males. Further research is needed to establish the mean ratio of males to females.

In 1988, 21% of the catch consisted of mating pairs. It may be that pairing only takes place when the weather conditions are suitable. The minimum temperatures on the 2 nights when pairing was observed were 9°C and 8°C respectively, although the first night was very windy. No pairing was observed before midnight, or in 1987 and 1989.

Conclusion

The numbers of *L.n. leechi* vary from year to year. The regrowth of *Elymus farctus* on part of the site has been followed by an increase in the moth population. The population seems to increase in hot, dry summers. The peak population seems to be at the end of August. The low numbers of recaptures is puzzling and suggests that a large number of moths may have been missed in the survey.

Acknowledgements

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BOOK REVIEWS

Blackflies (Simuliidae), by I. A. Rubtsov. Fauna of the USSR. Vol. 6, Part 6. Second edition, 1956. English translation by Dr B. R. Sharma for Oxonian Press Pvt Ltd, New Delhi, 1990, 1042 pp. Distributed by E. J. Brill, Leiden, 300 Dutch Guilders. A general introductory account is given on the biology of this group of blood-sucking flies, which are a prominent component of the insect fauna in boreal and sub-boreal regions and implicated in transmission of diseases of domestic animals.

Descriptions and keys are provided (to all stages where known) for the 280 species recorded from the USSR at the time of writing and 48 species known from adjacent parts of Europe. The text is well illustrated with diagnostic features of all stages. Information on distribution is supplemented by discussion of the biogeography of genera and species groups.

Rubtsov (or Rubzov as his name is otherwise rendered in English) continued to work on the group and has described many additional species in the intervening years since publication of the Russian edition. He contributed the keys to the Palaearctic species published in Lindner's 'Die Fliegen' series (1959–1964) and was a co-author of the list for the family in the recent Palaearctic catalogue (1988), from which it can be gleaned that more than 400 species of Simuliidae are now recorded from the Soviet Union. In the British Isles we have only 35 species recorded, of which only 23 are dealt with in this work so it is of limited usefulness for identification of the British fauna.

This work was, nevertheless, a thorough synthesis of information on the group and includes a full list of references up to 1955. Although not up to date taxonomically it provides a good summary of knowledge of the family, and a basis for further studies.

P. J. CHANDLER

Zoologia Neocaledonica. Volume 2 Mémoires du Museum national d'Histoire naturelle, Paris. Sér. A, tome 149, 1991, 358 pp, Edited by J. Chazeau & S. Tillier, 155 Dutch Guilders, available from Universal Book Services, Dr W. Backhuys, Warmonderweg 80, 2341 KZ Oegstgeest, The Netherlands (mainly in French, some chapters in English).—This includes chapters 15–32 of the results of French expeditions to New Caledonia. Each is a contribution on a different group of animals; most are

entomological but lizards, flatworms and spiders (detailed accounts of two groups) are also represented. There are eight chapters on Diptera, including the fourth contribution by Loïc Matile on the fungus gnats of New Caledonia, but Coleoptera, Lepidoptera, Collembola and Coccoidea are also covered. The need for conservation is also treated in the first chapter of this work.

There is a consistently high standard of text and illustrations in this series. Some colour plates are included in an item on moths of the family Hepialidae. In the section on Ceratopogonidae there are some photographs of moths bearing biting midges which specialize in piercing wing veins of Lepidoptera.

Many species described are endemic to New Caledonia, which is in the Australasian region and a fragment of the former Gondwanaland land mass, although some groups included a higher proportion of more widespread species. A new genus of Dolichopodidae (Diptera) with five species, is so far known only from New Caledonia.

Further volumes in this series are awaited with anticipation.

P. J. CHANDLER

A coleopterist's handbook (third edition) by Jonathan Cooter *et al.* Feltham, Amateur Entomologists' Society, 1991, 294 pages, hardback, £14.—This popular handbook has been completely rewritten by Mr Cooter and 18 other well-known and experienced coleopterists, to such an extent that it is really a completely new book. After introductory chapters on the practical aspects of just how to go about finding, collecting, storing and identifying beetles, each family is examined in depth. These individual chapters vary in their coverage by necessity of space; the five British species of Throscidae have 1½ pages, but the Staphylinidae with 900 species only have 3 pages. But, with the emphasis always on the practical means of looking for beetles, every chapter is clear, informative and interesting.

Three chapters on beetle associations—with plants, stored products and ants—are again of practical use, but where previously beetles were arrayed against a list of plants, now plants follow a list of beetle species, and there is no index to these plants!

The final parts of the book cover beetle larvae and how to breed them; biological recording and conservation, and finally a glossary and index.

At 294 pages it is more than twice as big as the previous editions, and being hardback it has changed from being a handy booklet to a truly handy book, a must for any coleopterist.

RICHARD A. JONES

BEMBIDION ARGENTEOLUM AHRENS (COLEOPTERA: CARABIDAE) IN THE BRITISH ISLES

HOWARD MENDEL

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On 15.viii.1987 I was excited to find a single *Bembidion (Chrysobracteon)* (characterized by the opaque fields or 'silver spots' on the third elytral inverval) at Denge Beach near Dungeness, Kent. It was under a piece of wood on bare, damp sand not far from water in a flooded gravel pit and appeared to be in a 'cell' just beneath the sand, rather than merely under the piece of wood. Under the same piece of wood was a single *B. pallidipenne* (Ill.) and nearby I recorded *Omophron limbatum* (F.) and *Dyschirius obscurus* (Gyll.).

Using the key to *Bembidion* in Lindroth (1985), hopes of a species new to British Isles were soon dashed. It was clearly not *B. litorale* (Ol.) but the margin of the pronotum had setae only at the obtuse hind-angles (ruling out *B. velox* (L.) and *B. lapponicum* Zett.). The specimen, a somewhat teneral female, keyed easily to *B. argenteolum*, not new to the British Isles but previously recorded only from Ireland. Subsequent visits to the site over the years following the initial capture (by myself and other coleopterists) have failed to produce further examples. The species was not represented in samples collected in an intensive invertebrate survey of the shingle beaches at Dungeness (including part of Denge Beach) in 1988 and 1989 (Morris & Parsons, 1991).

B. argenteolum was first recognized as a British species by Johnson & Halbert (1902), following the capture of several specimens at Ardmore, Co. Armagh on the shore of Lough Neagh, in June 1899. The specimens were initially thought to be *B. litorale (B. paludosum)* and reported as that species by their captor (Johnson, 1899). Recognition of their true identity cast serious doubt on previous records of *B. litorale* from the Lough Neagh area.

Kemp (1902) visited Lough Neagh in mid-June, 1902 and collected six specimens of *B. argenteolum* at 'the south-east corner of the lake' (possibly at Ardmore Point). The following month, Johnson (1902) revisited the original locality at Ardmore and with his wife 'managed to take a dozen' examples. The beetles were found on the sandy and shingly parts of the shore, and hid either just below the surface of the sand or under small stones. In the sunshine they emerged from their hiding places. Interestingly, *Dyschirius obscurus* was among the beetles taken with *B. argenteolum*. Johnson (1902) also reported other records of *B. argenteolum*, a specimen labelled 'Shane's Castle, 1831' (Robert Patterson Collection—*B. paludosum* in Patterson, 1838) and 'Glenavy, Co. Antrim, on the eastern shore of Lough Neagh' (H. L. Orr) concluding that the evidence 'points to the presence of the beetle in suitable places all round the lake'.

In spite of this prediction, even though *B. argenteolum* was found repeatedly at Shane's Castle and Ardmore Point (Speight *et al.*, 1983) no additional sites at Lough Neagh are known. The species has not been recorded from Lough Neagh since it was found at Shane's Castle by O. E. Janson on 20.vi.1923 (Janson, 1924; Anderson, pers. comm.). Anderson (1979) failed to find it at apparently suitable sites on the shore of the Lough and the lack of modern records led Speight *et al.* (1983) to presume that *B. argenteolum* was extinct in Ireland.

B. argenteolum is found widely in the Netherlands, Belgium and northern France (Turin *et al.*, 1977), and flies readily in warm sunshine (Lindroth, 1985). The site at Denge Beach, a famous locality for migrant Lepidoptera, is less than 30 miles

from the coast of northern France. It would be easy to conclude that the single *B. argenteolum* found there was a chance migrant from the Continent. However, there are good arguments against this conclusion.

The Denge Beach specimen was slightly teneral which would suggest that it had emerged in the immediate area. It was in a 'cell' in the sand and at the time of collection I thought that this might have been the pupal chamber, even though the larval and pupal 'skins' were not evident. However, Lindroth (1985) remarks that when inactive these beetles usually stay in burrows in the sand and, most likely, the 'cell' that I observed was the remains of such a tunnel.

Denge Beach is part of an incredible expanse of sand and gravel between Lydd and Dungeness. Although not obviously similar to the shores of Lough Neagh there are interesting faunal parallels. *Dyschirius obscurus* was for many years thought to be confined to the sandy shores of Lough Neagh until it was reported from Rye Harbour, East Sussex (Shephard, 1970), which may be regarded as part of the same sand and gravel complex as Denge Beach. It has since been found to be established in the area between Lydd and Dungeness (Luff, 1987). Johnson (1902) recorded *D. obscurus* with *B. argenteolum* at Lough Neagh and I found the two species in the same area at Denge Beach although *D. obscurus* seemed to prefer firmer, damper substrate. The two localities seem to provide a similar microhabitat and substrate is probably the important factor (Andersen, 1978).

It is interesting to note that Lydd is the only locality in south-eastern England from which *Zorochros minimus* (Boisd. & Lac.) has been recorded (Mendel, 1990). This northern and western species in the British Isles is known from Lough Neagh (Johnson & Halbert, 1902; Janson, 1924) and was found at Lydd in 1973 (W. West/R. D. Weale Collection, Colchester and Essex Museum). It was in the course of trying to establish the continued presence of *Z. minimus* in the Lydd area that I found *B. argenteolum*.

It is possible that *B. argenteolum* is a recent arrival to south-east England from the Continent. However, I would be surprised indeed if it was not established in the Denge Beach area.

Acknowledgements

I thank the British Ecological Society for a grant to record and study Elateridae in the British Isles and Mr J. J. Heath (Colchester and Essex Museum) for the loan of Coleoptera from the West/Weale Collection. I am grateful to Dr R. Anderson for advising me of the most recent Lough Neagh record of *B. argenteolum* known to him and Dr M. L. Luff for general advice on continental Carabid literature.

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SHORT COMMUNICATION

Changing breeding habits of Mythimna albipuncta (D. & S.).—In past years including 1989 I have noted that when breeding this species the adults have emerged during December and early January from eggs laid during October from moths taken at mercury vapour light at Freshwater, Isle of Wight. The larvae, which were kept indoors and subject to central heating, fed up quickly on soft grasses pupating in late November and early December.

However during 1990 there was a change of habit in the larvae, experienced by Mr J. L. Fenn and myself from stock obtained during October 1990 from Freshwater. Some of the larvae fed up quickly producing moths in December, the earliest being on 19.xii.90. However some of the larvae partially hibernated during the winter months and produced adults then and on into the spring with the last emerging on 22.iv.91.

I suspect that this recent change of habit is the result of the 1989 generation being one which had over-wintered successfully. The winter of 1989/90 was exceptionally mild and this species may have survived and become temporarily established along the South Coast.

I wonder whether members of the Society to whom I gave ova at the 1990 BENHS Annual Exhibition experienced a similar change in breeding habits in this moth. S. A. Knill-Jones, Roundstone, 2 School Green Road, Freshwater, Isle of Wight.

LETTERS TO THE EDITOR

Euriphene specimen identified.—The specimen from Cameroon depicted in Figure 14 of Plate I of the Journal in Volume 4, Part 1, April 1991 is a female of *Euriphene canui legeriana* Hecq., and is identical to the hitherto unique type in my collection. This came from near Abak in eastern Nigeria west of the Cross River. The male of the subspecies has not yet been described. The nominate subspecies is, I believe, from the island of Fernando Po (currently called Bioko). This species is,

as pointed out in the report on page 34, close to *E. duseni*, an uncommon species that occurs in Cameroon and the south-eastern corner of Nigeria.—R. G. T. St Leger, Beaumont, Hollesley, Near Woodbridge, Suffolk AP12 3QU.

Letter from Mr Horace Last upon being elected a Special Life Member.—Would you please thank the Council for the honour they give me in electing me as a Special Life Member of the Society. Although this is statutory, it is nevertheless comforting to know that one is still remembered, especially when one has not attended meetings for a number of years.

I used to go out collecting on my own. One day I took a train from Sutton (I lived at Banstead then) to Ashtead and on making my way from the station I saw a number of men with collecting impedimenta. One of them stopped me, asking if I belonged to 'The South London', and thus I joined the Society. This man was F. D. Coote, then president.

I was introduced to several members, among them F. J. Coulson, a kindly man and helpful to the tyro. Later on, in sorting out our three species of *Disopora* (Coleoptera: Staphylinidae), I was able to name one in his honour, *Disopora coulsoni*, in 1952.

Baron de Worms was a character in those days. When we used the lantern, and the lights were extinguished, it was not long before the Baron was in the land of nod, sometimes quite audibly!

F. Stanley-Smith was the secretary at that time, and I can still hear him reading the minutes, which were 'carried nem con'!—Horace Last, Woodville, Hillside Walk, Storrington, Sussex.

BOOK REVIEW

Insects of the British cow-dung community, by P. Skidmore, Shrewsbury, Field Studies Council, 1991, 166 pages, paperback, £8.25—Although aimed at those people wishing to do ecological work in a very specific habitat, this excellent little guide will assist anyone living in the neighbourhood of cows to identify the insects associated with the cow dung. As with all of these 'AIDGAP' keys, a clear and precise dichotomous key is amply illustrated with equally clear and precise thumbnail sketches of characters and whole insects. Despite covering all insects, the keys identify down to species in a remarkable number of places, or down to genus if identification is too 'critical'. The keys are appended with ecological notes on various insects groups and communities, a bibliography, a glossary and an index. The study of this important insect habitat, and the complex role of insects in the nutrient cycle of pastures is accessible to all entomologists. That the undegraded dung of only five cows removes from useful production one acre of Australia each year has caused some concern, and not a little expense has been incurred trying to establish a cow-dung community there. Closer to home, it is becoming apparent that some powerful drugs given to cows to prevent warbles renders the cows' dung lethal to insects and other invertebrates thus preventing the breakdown and recycling of nutrients, and cluttering the fields with barren and useless detritus.

RICHARD A. JONES

NEW SPECIES AND ADDITIONS TO THE BRITISH LIST OF THE FUNGUS GNAT GENERA *ZYGOMYIA* WINNERTZ AND *SCEPTONIA* WINNERTZ (DIPTERA, MYCETOPHILIDAE)

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The British species of these two genera of small mainly dark-coloured gnats have not been revised since the work of Edwards (1925b, 1941) who figured the genitalia of most *Zygomyia* and all *Sceptonia* known to him. Little more is known of their biology since Edwards (1925b) indicated that they had not been reared and were possibly saprophagous. The present paper deals with seven additional species and other taxonomic changes affecting the British fauna, a new *Zygomyia* from eastern Europe and also one new Oriental *Zygomyia* species.

Zygomyia WINNERTZ

In addition to the five *Zygomyia* species recognized by Edwards, Barendrecht (1938), Plassmann (1977), Caspers (1980b) and Zaitzev (1989) have described and figured another six good palaearctic species, five of them from Europe. One of these, *Z. pseudohumeralis* Caspers, a new species of the *humeralis* (Wiedemann) group and another apparently undescribed species near *valida* Winnertz have been found to occur in Britain. The opportunity is taken to describe another species near *valida* from Sri Lanka. This was found at high altitude in the central mountains and is the first record of the genus from the Oriental region.

Au: date?

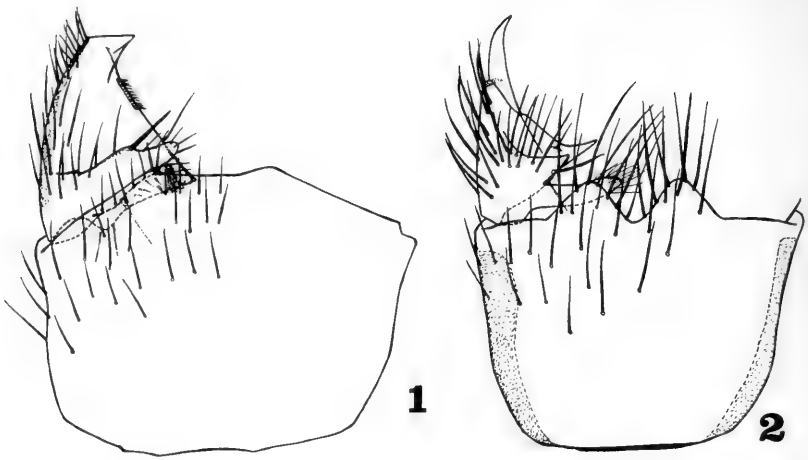
Zaitzev (1989) also transferred *semifusca* (Meig.) and its Nearctic sibling species *paula* (Loew) from *Mycetophila* Meig. to *Zygomyia*. Edwards (1925b) noted that *semifusca* was intermediate between these genera in its short weak posterior fork. Its genital structure, figured by Zaitzev (1989) suggests relationship with the *pictipennis* (Staeger) group of *Zygomyia*.

In the same paper Zaitzev described a new species, *jakovlevi*, similar externally to *pictipennis* and figured male genitalia of both species, based on specimens from Russian Karelia (the genitalia of *pictipennis* had not been figured previously, probably because of its distinctive wing markings). All British males I have examined (including the type of *binotata* Walker) as well as several from France (including Corsica), Finland and Denmark have proved to be his *jakovlevi*, while only one male seen from Yugoslavia represents his *pictipennis*.

Zygomyia pictipennis (Staeger, 1840)

Mycetophila pictipennis Staeger, 1840
Mycetophila binotata Walker, 1856
Zygomyia jakovlevi Zaitzev, 1989, syn. n.

I have examined Staeger's type of *pictipennis*, which was a Danish female previously examined by Edwards (1925a) and Danish examples of both sexes from Peder Nielsen's collection; the male is *jakovlevi* and the females are indistinguishable from British females. The type of *binotata* Walk. (in BMNH) is a male of *jakovlevi*. It seems that Zaitzev was incorrect in his identification of *pictipennis*. The single female examined by Zaitzev may have been associated with the wrong males, but this cannot be confirmed pending confirmation whether the sexual dimorphism in wing markings



Figs 1–2. Ventral view of male genitalia of *Zygomyia*: 1, *Z. pictipennis* (Staeger); 2, *Z. zaitzevi* sp. n.

applies to both species and it is established whether their females can be separated. The previous usage of the name *pictipennis* is here re-established (Fig. 1) and a new name proposed for *pictipennis* sensu Zaitzev.

Zygomyia zaitzevi sp. n.

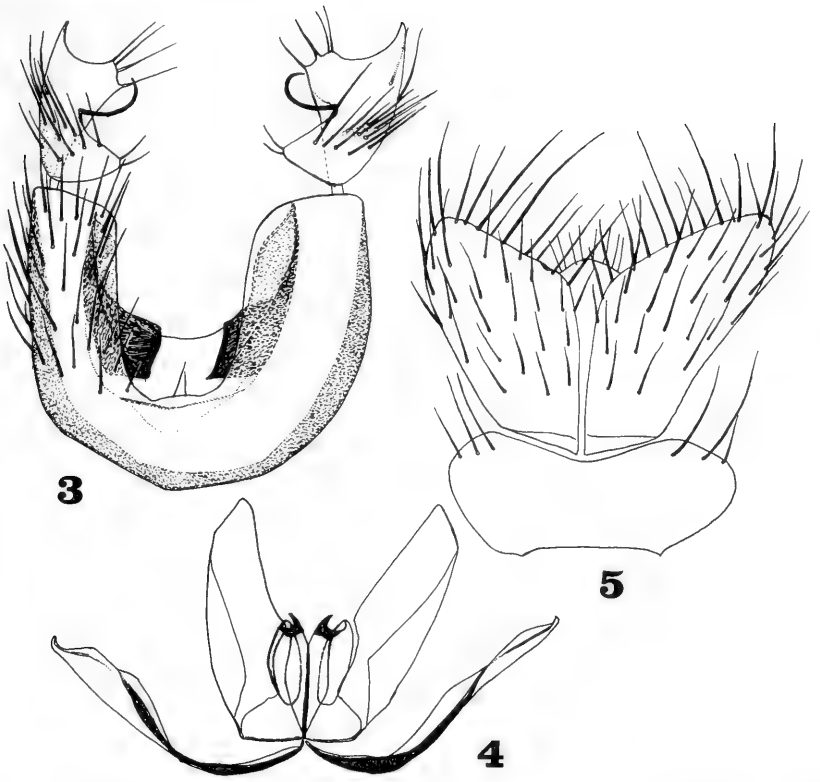
Zygomyia pictipennis sensu Zaitzev, 1989 (keyed and figured but not described, based on four males and one female from USSR, Karelia).

Male. Very similar to male of *pictipennis*, clearly differing only in male genitalia. Head and body slightly shining dark brown with dark bristling. Antennae brown, lighter on basal segments, flagellar segments almost twice as long as broad. Palpi brown. Legs mainly yellow, hind femur darkened on apical quarter and along dorsal margin. Four proepisternal bristles and 5 mesepimerals (as in *pictipennis*). Mid tibia with 2 a (3 in *pictipennis*), 4 d, 3 p on apical half, 2 v. Hind tibia with 6a, 5d. Wings yellowish with irregular brown patch over Rs, r-m and stem of median fork; a larger preapical brown marking including tip of R_1, reaching tip of R_5 and extended vaguely across M_1 (markings as in male of *pictipennis*). Costa, radial sector and most of r-m strongly setulose, M_1 and M_2 weakly setulose on apical part only (beyond preapical wing marking). Halteres yellow. Genitalia yellow (Fig. 2). Wing length 2.6 mm.

Holotype male: Yugoslavia, Slovenia, Kranjska Gora, vi.1988 (A. E. Stubbs).

Zygomyia valeriae sp. n.

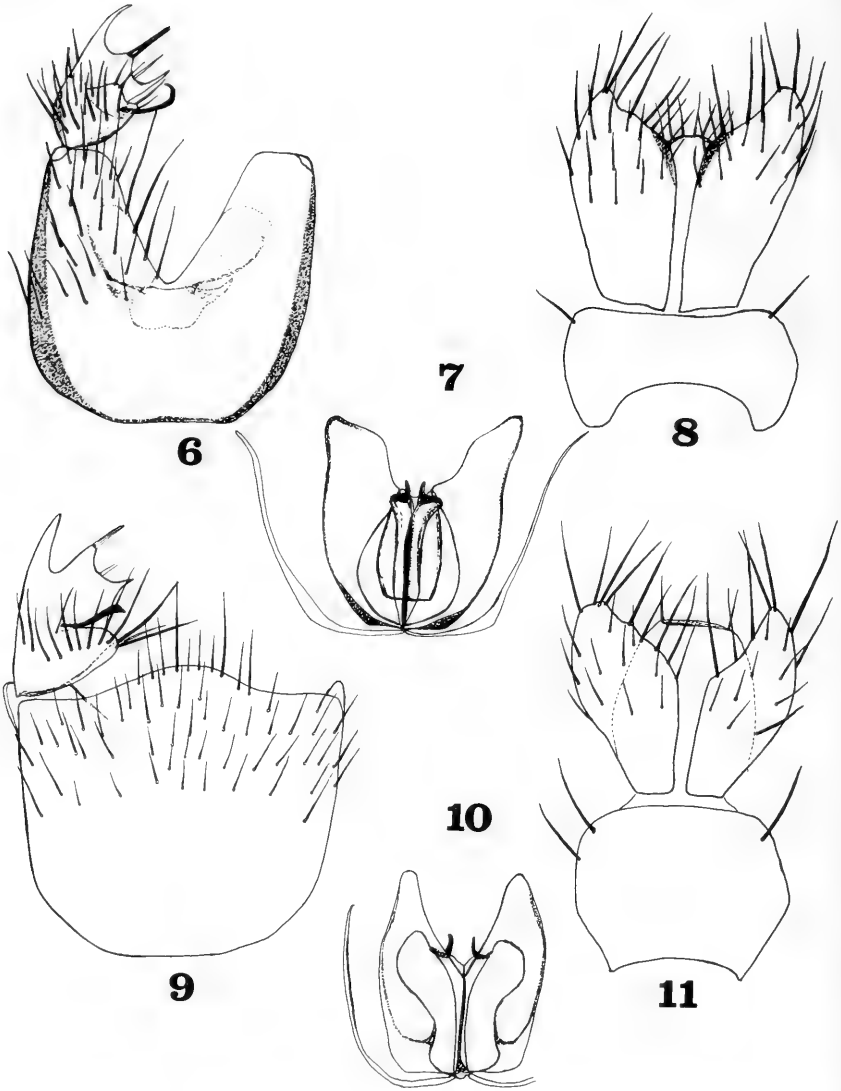
Male. Very similar in external characters to *valida* Winnertz. Body black, grey dusted with dark bristling. Antennae dark brown, with brownish yellow basal segments; flagellar segments 2.0–2.5 times as long as broad. Palpi yellow. Three proepisternals, 3–4 mesepimerals (as in *valida*). Legs mainly yellow, with hind femur dark apically



Figs 3–5. Male genitalia of *Zygomyia valeriae* sp. n.: 3, ventral view; 4, aedeagus; 5, tergite 9 and cerci.

and along dorsal margin, and hind coxa narrowly dark at base externally. Mid tibia with 2 a, 4 d, 1 strong p at apical third with 2 weaker p basal to it, 1 p-v beyond middle of shaft. Hind tibia with 6–7 a, 4–5 strong p with 1–3 weaker bristles. Wings clear, faintly yellowish; C, R, R_1 R_5 and adjoining part of r-m strongly setulose, M_1 and M_2 with weak setulae on apical part. Genitalia brownish yellow, Figures 3–5. Wing length 2.4–3.0 mm.

Holotype male: Ireland, Kerry, Muckross, Monk's Wood, 4.v.1981 (P. J. Chandler). Paratype males: Glos., Wilderness, 29.viii.1973 (A. M. Hutson, BMNH); Wilts., Vernditch, 16.v.1974 (C. H. Andrewes, BMNH); Cambs., Cambridge, 28.viii.1913 (F. Jenkinson, Cambridge University Museum); Carmarthen, Cors Goch Llyn Llwych, 11.vii.1989 (Holmes, Boyce & Reed, PJC collection); Devon, Cove (north of Tiverton), 9.v.1989 (A. E. Stubbs, PJC collection); Devon, Windbury Woods, 17.vi.1989; Yorks., Monk Fryston, 7.vi.1988 (2 males); Yorks., Duncombe Park, 12.x.1990; Glos., Ashwell Grove, 25.vi.1972; Glos., Cirencester Park, Oakley Wood, 30.ix.1989; Roxburgh, Newtown St Boswells, 25.x.1990 (2 males); Argyll, Glencoe alderwood, 13.vi.1976; Kerry, Muckross Abbey Wood, 16.x.1973; Kerry, Killarney, Ross Island woods, 17.x.1973 (2 males) (above 9 localities, PJC).



Figs 6–8. Male genitalia of *Zygomyia valida* Winnertz: 6, ventral view; 7, aedeagus; 8, tergite 9 and cerci. Figs 9–11. Male genitalia of *Zygomyia valepedro* sp. n.: 9, ventral view; 10, aedeagus; 11 tergite 9 and cerci.

This species has been confused with *valida* in collections, differing principally in the male genitalia with a deeper ventral excavation and small differences in the stylomeres. Females with fore tarsi less thickened than in *valida* are tentatively considered to belong to *valeriae*, but differences in ovipositor structure are slight and they have not been included among the paratypes.

Z. valeriae is widespread in Europe and I have seen males from Yugoslavia, Spain, France (including Corsica), Italy (Sardinia), Greece (Crete and Cephalonia) and Czechoslovakia. *Z. valida* is generally more common in Britain and Europe; its genitalia are figured here for comparison (Figures 6–8).

Zygomyia valepedro sp. n.

Male. Head black, grey dusted. Antennae dark brown with yellow basal segments. Palpi yellow. Thorax shining dark brown, only thinly dusted, with small yellow humeral patch. Legs mainly yellow with hind femur marked as in *valida* and *valeriae*; tibial chaetotaxy also as in these species. Wing characters as in *valida* and *valeriae*. Abdomen mainly dark brown, sternites 1–4 and side margin of tergites 3–4 yellowish. Genitalia yellow, Figures 9–11. Wing length 2.5 mm.

Female. External characters as male except abdomen all dark and segments 2–4 of fore tarsi thickened ventrally as in allied species. Ovipositor brownish yellow.

Holotype male: Sri Lanka, slopes of Pidurutalagala above Nuwara Eliya, Pedro Forest Reserve, 27.ii.1974 (P. J. Chandler). Paratype female: Sri Lanka, Nuwara Eliya, open bog by golf course, 26.ii.1974 (PJC).

This is close externally to the above species, differing in the male genital structure with a convex apical margin to the gonocoxopodite (genital capsule).

The *Zygomyia humeralis* (Wiedemann, 1817) group

Edwards (1925b) recognized two species of this group, *humeralis* and *notata* (Stannius, 1831). These differ from other European species in having stronger tibial bristles and a series of short p-d bristles on the apical half of the hind tibia, as well as the dorsal and ventral stylomeres of the male genitalia being discrete and not fused as in other groups of the genus. Leonard Kidd and Michael Ackland recognized some years ago that there were two further species in this group in Britain (specimens and drawings in Liverpool City Museum) and one of these has since been described from Germany as *pseudohumeralis* by Norbert Caspers (1980b). This is added here and the other species, closer to *notata*, is described as *kiddi* sp. n.

These four species have similar wing markings with a brown patch over Rs and r-m and fainter clouding of the radial sector beyond it. It should be pointed out that the colour character used to separate *humeralis* from *notata* by Edwards does not hold good as some *humeralis* males have the thorax almost entirely dark; *pseudohumeralis* usually has the yellow humeral patch but may have it reduced, while *kiddi* has the thorax dark in most examples but a yellow patch is sometimes present. The chaetotactic character (2 anterior bristles on mid tibia in *humeralis*, 3 in *notata*) evidently holds good for these species; *pseudohumeralis* agrees with *humeralis* and *kiddi* with *notata* in this character. Male genitalia are the only reliable means of recognition of the four species and females have not been associated.

I have found that much material I had referred to *notata* actually belongs to *pseudohumeralis* or *kiddi*. The species figured by Zaitzev (1989) as *humeralis* is apparently *pseudohumeralis* while his *notata* is *kiddi*. Of the localities cited by Edwards (1925b), those for *notata* are correct except that one of two examples from Felden, Herts (15.iv.1897) is *pseudohumeralis* with a dark thorax, while the Ffrith record under *humeralis* is *kiddi* with a small yellow humeral patch (the holotype cited below).

Zygomyia pseudohumeralis Caspers (1980b)

This species is new to Britain. Caspers (1984) recorded it from Austria, Plassmann (1988) recorded it from the German North Sea Islands and I have seen it from Czechoslovakia, France, Spain and Finland. It is widespread throughout Britain (23 males from 14 counties examined); similar numbers of *humeralis* and *kiddi* have also been examined and I have confirmed 17 British males as *notata*. Male genitalia are figured (Figures 12–14) and those of *notata* (Figures 15–17) and *humeralis* (Figures 18–20) are figured for comparison.

Zygomyia kiddi sp. n.

Male. Head black, grey dusted. Antennae dark brown, basal segments and base of first flagellar segment lighter, more or less yellowish; flagellar segments almost twice as long as broad. Palpi brownish yellow. Thorax dark brown to black, thinly grey dusted, with small irregular yellow humeral patch sometimes developed (including holotype). Prothorax and pleural sutures yellowish to brown. Three proepisternals and 3 mesepimerals (as other species of *humeralis* group). Legs mainly yellow, hind femur darkened on apical fifth and narrowly along dorsal margin as in allied species. Mid tibia normally with 3 a (a few examples have only 2 on one leg), 5 d, 3 p (bristles in above series all progressively longer apically), 3 v (median longest), a-d row of setulae long and fine, subequal to width of tibia. Hind tibia with 7–8 a (4th–6th shorter), 5 d (2 basal shorter), a series of 6–8 short close set p-d on apical half, 1 short p near tip. Wings yellowish, a little darker in radial sector with brown patch over Rs and r-m. Costa, radial veins and r-m brown, strongly setulose, other veins yellowish, M_1 with weak setulae almost to base and M_2 on apical three-quarters (as other species of *humeralis* group). Halteres yellow. Abdomen black, more or less shining, genitalia brown (Figures 21–23). Wing length 2.2–3.0 mm.

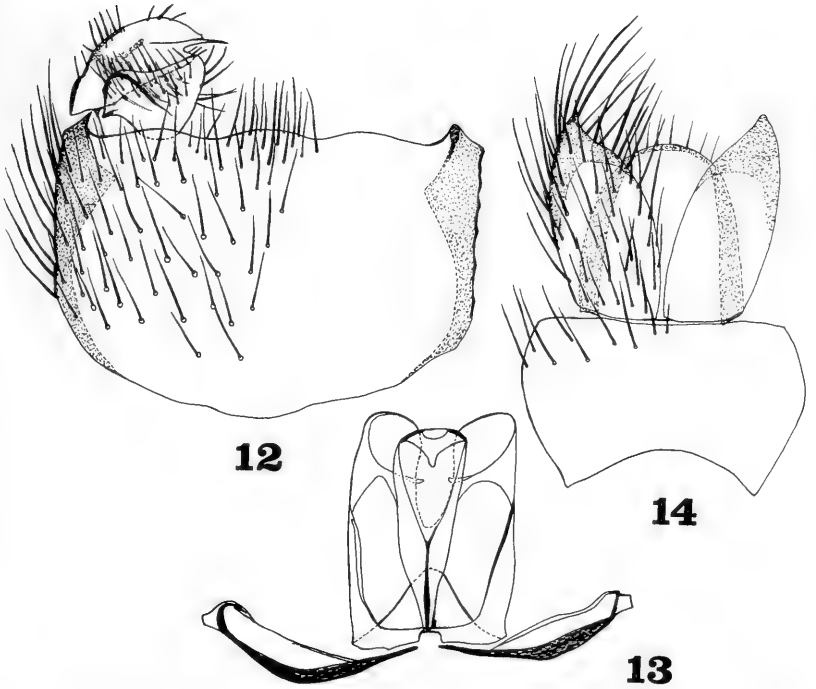
Holotype male: Dyfed (Flintshire), Ffrith, 7–9.vi.1919 (F. W. Edwards, BMNH). Paratype males: 'N. Wales', Coed Camlyn, 23.viii.1965 (A. Brindle, Liverpool City Museum); Cheshire, Cotterill Clough, 31.x.1930 (2 males, H. Britten, Liverpool City Museum); Norfolk, Blickling, osier carr, 14.x.1983; Devon, Yarner Wood NNR, 9.x.1980; Devon, Lowen House Woods, 12.x.1980; Sussex, Rake Pond, 13.x.1989; Somerset, Shapwick Heath, 17.x.1986 (above 5 localities, P. J. Chandler).

A further 16 British males, from Cambs., Wor., Hants, Surrey, N. Yorks, Durham, Northumberland, Powys and Gwynedd and some Finnish specimens have also been examined.

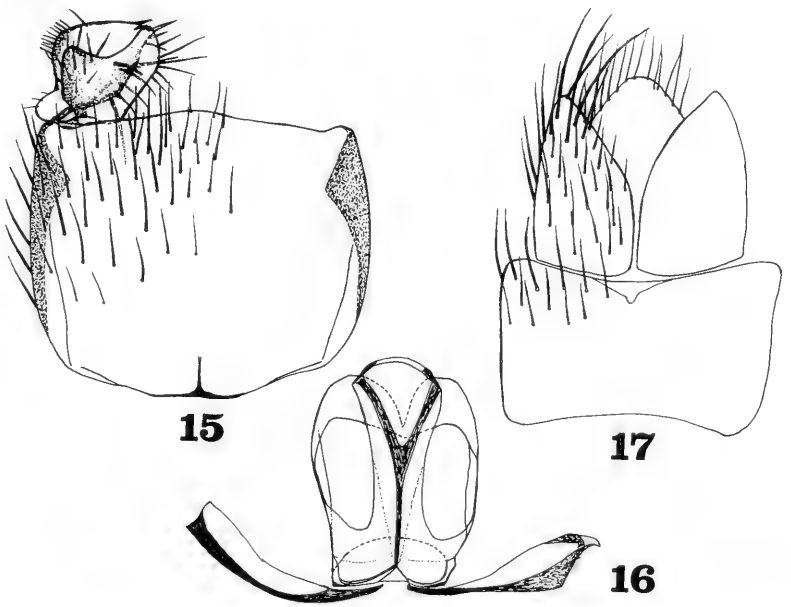
Sceptonia Winnertz, 1863

Edwards (1925b) recognized and figured the genitalia of eight species, five of them described as new and (1941) added another new species, *S. humerella*. Examination of additional material has disclosed that at least four further species occur in Britain, but some of these and others remain little known.

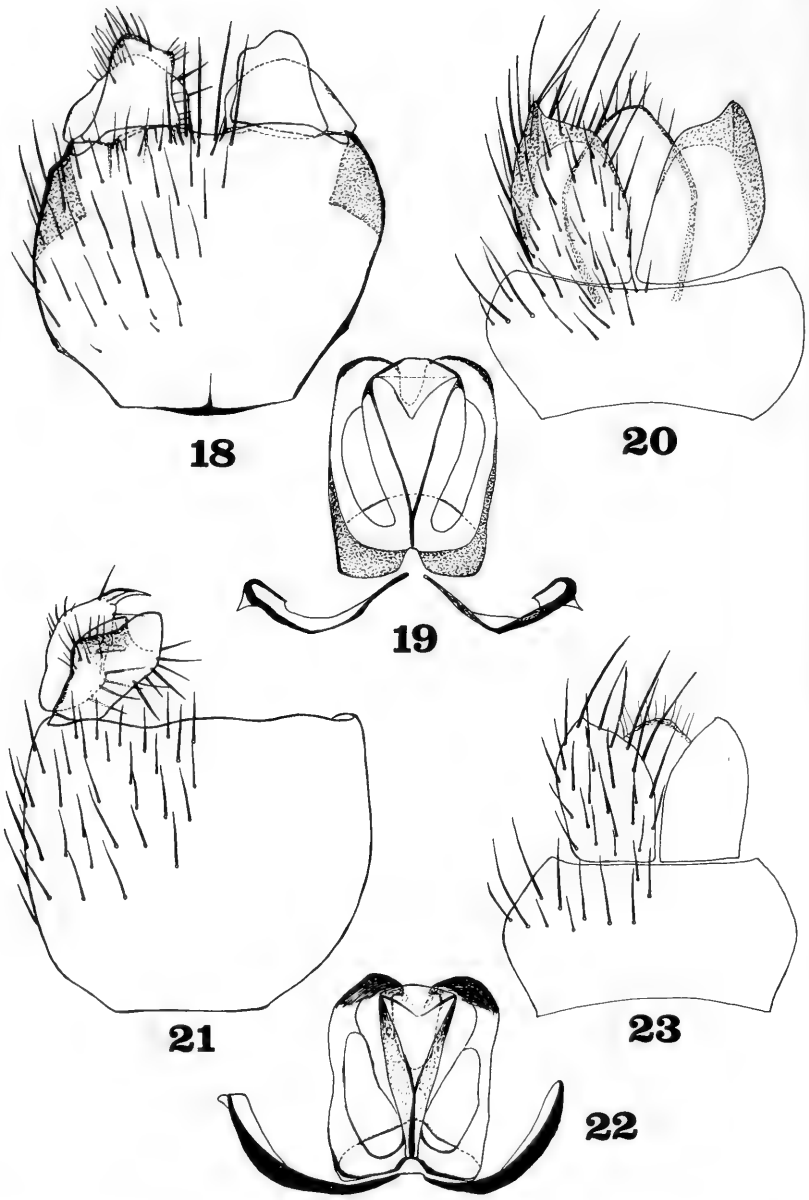
Of the previously known species, *nigra* (Meig.), *membranacea* Edw. and *fumipes* Edw. are generally common. Edwards separated *fumipes* from other members of the *concolor* Winnertz group by its strongly darkened legs; however, specimens of *fumipes* with the legs mainly yellow and only the hind femur darkened apically as in other members of the group, are not infrequent. Of the species added here, one belongs to the *nigra* group, while the other three run to couplet 5 in Edwards' key and these species can only be reliably separated by examination of the male genitalia.



Figs 12–14. Male genitalia of *Zygomyia pseudohumeralis* Caspers: 12, ventral view; 13, aedeagus; 14, tergite 9 and cerci.



Figs 15–17. Male genitalia of *Zygomyia notata* (Stannius); 15, ventral view; 16, aedeagus; 17, tergite 9 and cerci.



Figs 18–20. Male genitalia of *Zygomyia humeralis* (Wiedemann): 18, ventral view; 19, aedeagus; 20, tergite 9 and cerci.
Figs 21–23. Male genitalia of *Zygomyia kiddi* sp. n.: 21, ventral view; 22, aedeagus; 23, tergite 9 and cerci.

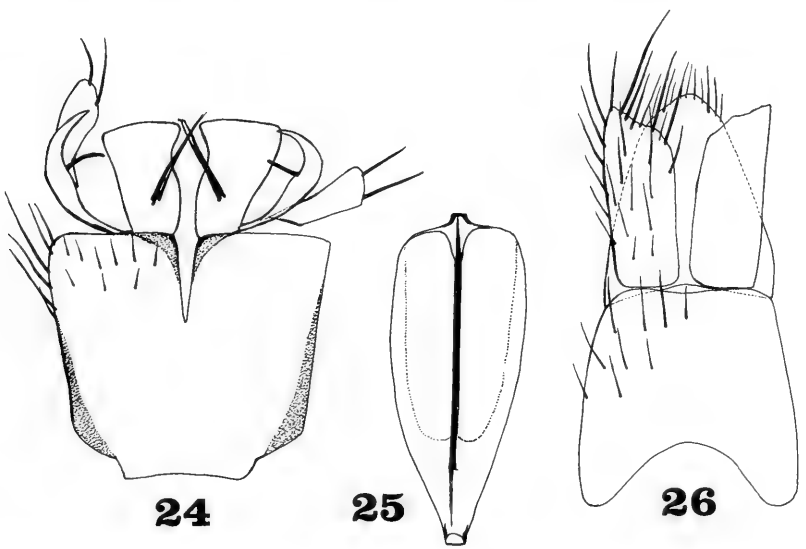
S. costata (van der Wulp), *S. fuscipalpis* Edw. and *S. flavipuncta* Edw. are proving to be widespread, while *tenuis* Edw. is apparently scarce (two new records: Norfolk, Thompson Common, by pingos, 1.vi.1985, PJC; Oxon, Spartum Fen, malaise trap, 20.ix.–3.xii.1988, K. Porter). No new records have become available of *concolor* Winnertz or *humerella* Edw.

Sceptonia cryptocauda sp. n.

Male. Head shining black. Antennae brown with basal segments yellow, about subequal to fore tarsus in length. Median flagellar segments nearly twice as long as broad. Thorax shining black except narrow posthumeral angle. Legs yellow except hind coxa narrowly black at base (up to basal third in Thompson Common and some Leckford examples) and hind femur black on about apical half (a little more in Thompson Common example). Mid tibia with 2 a, 3 d, 1 fine p-v. Hind tibia with 6 a (4th and 5th shorter) and 3 strong d. Abdomen mainly shining black but tergites 1–3 more or less broadly yellow at side margins, this colour extended dorsally along sutures as triangular markings; genitalia yellow (Figures 24–26). Wings yellowish with all veins yellow, R_5 little more than its width removed from R_1 where these veins run parallel; r-m and basal part of M_1 slightly suffused brownish; C, R_1 and R_5 bristled, other veins bare. Halteres yellow. Wing length 2.0–2.5 mm.

Female. Very similar in most respects. Antenna shorter than fore tarsus, median flagellar segments about 1.5 times as long as broad. Markings on tergites 1–3 as male; apical margin of tergite 6 and ovipositor yellow. Wing 2.4 mm.

Holotype male: Ireland, Roscommon, Lough Key Forest Park, 28.ix.1977 (P. J. Chandler). Paratype males: 1 with same data as holotype; Glos., Ashwell Grove, 25.vi.1972; Wilts., Savernake Forest, 25.viii.1973; Somerset, Murder Combe,



Figs 24–26. Male genitalia of *Sceptonia cryptocauda* sp. n.: 24, ventral view; 25, aedeagus; 26, tergite 9 and cerci.

2.vii.1985; Somerset, Ebbor Gorge NNR, 3.vii.1985; Avon, Blaise Woods, 4.vii.1985 (2 males); Norfolk, Thompson Common, 16.x.1983; Hants, Leckford, Reserve D, 23.ix.1977 (2 males) (above all PJC); Hants, Leckford, Reserve C, 3.x.1970 (A. E. Stubbs, PJC collection); Oxon, near Cothill, 7.ix.1989 (J. W. Ismay); Oxon, Barrow Farm Bog, malaise trap, 18.viii–19.ix.1987 (K. Porter); London, Sydenham Hill Wood, 26.ix.1987 (A. Godfrey). Paratype females: Avon, Blaise Woods, 4.vii.1985 (PJC); Isle of Wight, Farringford, 25–29.vi.1921 (F. Jenkinson, Cambridge University Museum).

This species was mentioned by Chandler (1978) as being a new species of the *nigra* group, with genital structure differing a little from the other species, yellow marking on the abdomen as in *costata* (Wulp) but dark marking on the hind coxa usually less extensive (a male *costata* from Logie, 4.ix.1909, F. Jenkinson, Cambridge University Museum, has the hind coxa only narrowly darkened). *S. costata* is usually larger (male wing 2.3–2.7 mm, female wing 2.7–2.9 mm) with the sides of tergites 2–3 usually more broadly yellow, hind coxa usually black on at least basal third and hind femur black on more than apical half. The male genitalia of *cryptocauda* differ in that the ventral stylomere is formed more as in *membranacea* with the tuft of long hairs internal and directed across its fellow rather than directed posteriorly in an apical position as in *costata*. *S. nigra* and *S. membranacea* usually have the body entirely black, but a few examples with yellow abdominal markings as in *cryptocauda* have been examined; both may have the hind coxa broadly darkened basally but *membranacea* usually has the darkening as narrow as in *cryptocauda*. *S. membranacea* differs from *nigra* in a distinctly longer male antenna with median flagellar segments more than twice as long as broad, and the radial veins slightly brownish contrasted with the remaining yellow veins.

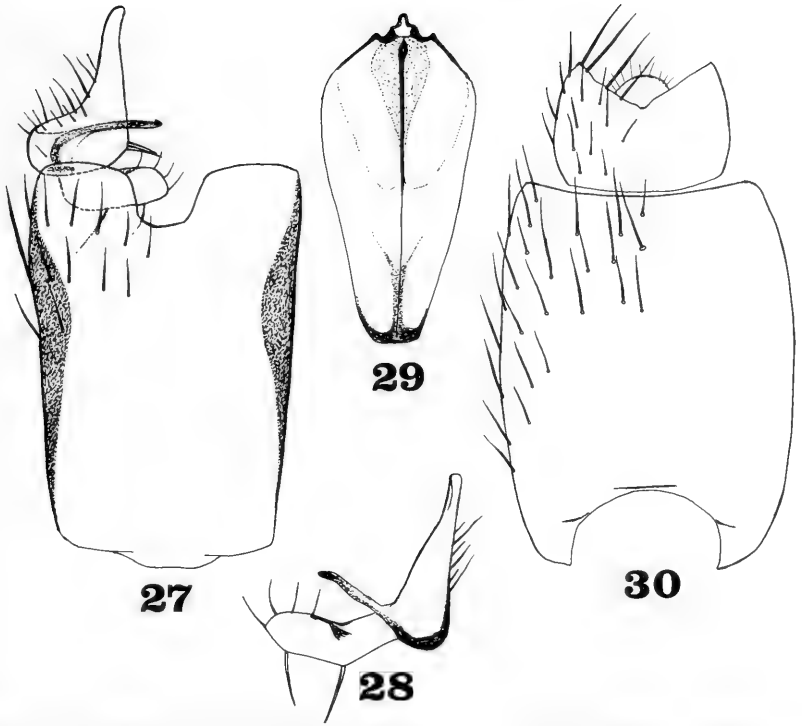
Sceptonia pughi sp. n.

Male. Head and body entirely shining black. Antennae dark brown, a little lighter on basal segments, about as long as hind tarsi; median flagellar segments about twice as long as broad. Palpi brown to brownish yellow. Legs yellow except apical half or a little more of hind femur blackish. Middle tibia with 2 a, 3 d, 1 p-v near two-thirds length. Hind tibia with 6–8 a (4th/5th–6th shorter), 3 d (all bristles 2–3 times tibial width). Wings yellowish, more strongly near costa, with all veins yellow, R_5 about three times its width removed from R_1; C, R, R_1 and R_5 (but not Rs) setose, other veins bare. Halteres yellow. Genitalia brownish yellow, Figures 27–30. Wing length 1.9–2.1 mm.

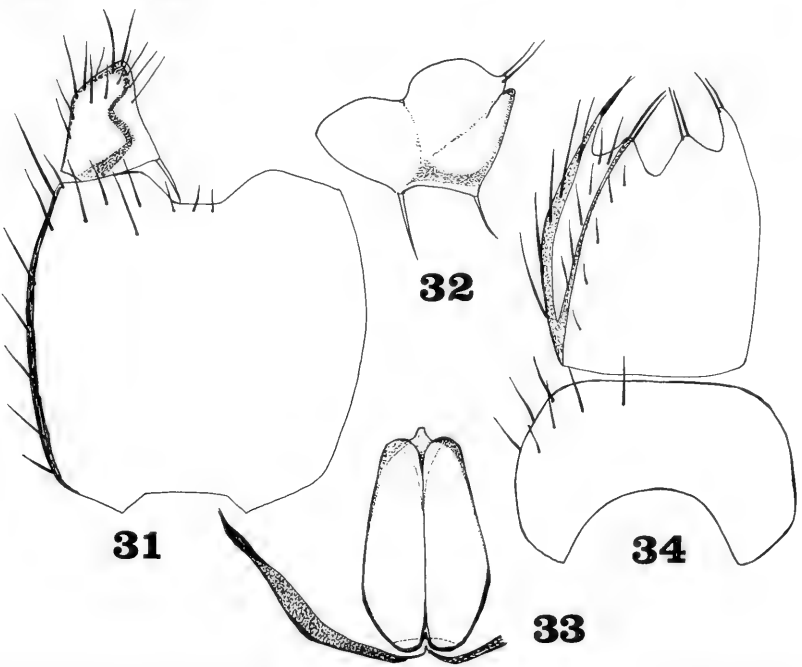
Holotype male: labelled 'Dolgelley, 13.6.87', i.e. Wales, Gwynedd (Merioneth), Dolgellau, 13.vi.1887, G. H. Verrall, Oxford University Museum. Paratype males: England, Devon, Chudleigh (woodland at Chudleigh Rocks), 11.x.1980 (M. Pugh, PJC collection); France, Lot, south of Labastide-Murat, shaded track at edge of meadow, 24.vi.1980 (P. J. Chandler).

Sceptonia regni sp. n.

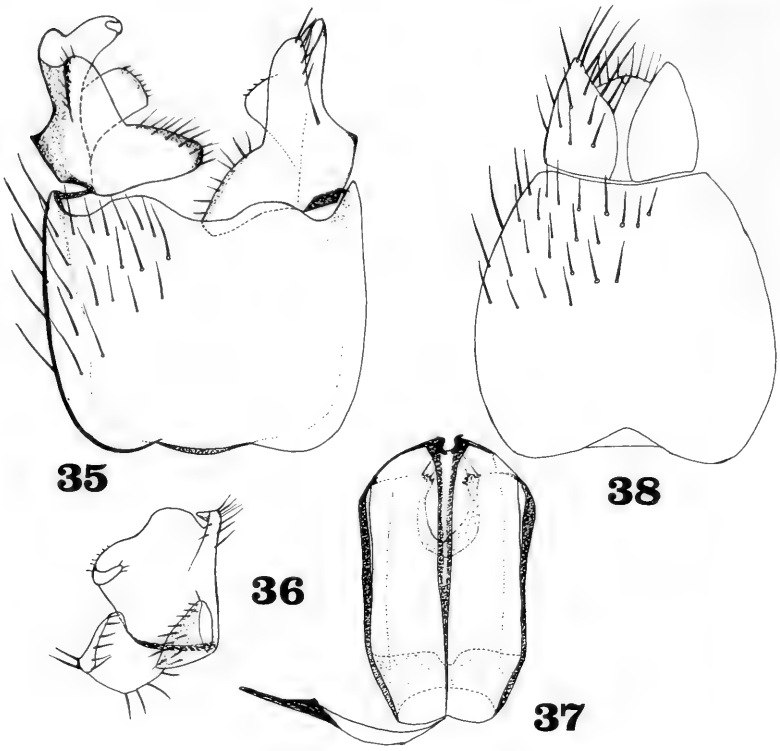
Male. Closely resembling *S. pughi* in external characters. Body shining black, antennae and palpi entirely dark brown. Legs yellow, with hind coxa blackish near basal margin and hind femur blackish on almost apical half. Middle tibia with 1 a, 3 d, 1 short p-v at apical third. Hind tibia with 6 a (4th/5th a little shorter), 3 d. Wings as *pughi*. Halteres missing in holotype. Genitalia brownish yellow, Figures 31–34. Wing length 2.0 mm.



Figs 27–30. Male genitalia of *Sceptonia pughi* sp. n.: 27, ventral view; 28, internal view of stylomeres; 29, aedeagus; 30, tergite 9 and cerci.



Figs 31–34. Male genitalia of *Sceptonia regni* sp. n.: 31, ventral view; 32, internal view of stylomeres; 33, aedeagus; 34, tergite 9 and cerci.



Figs 35–38. Male genitalia of *Sceptonia pilosa* Bukowski: 35, ventral view; 36, internal view of stylomeres; 37, aedeagus; 38, tergite 9 and cerci.

Holotype male: Sussex, Crowborough, 14–25.vii.1912 (F. Jenkinson, Cambridge University Museum).

Sceptonia pilosa Bukowski, 1934

A species new to Britain of the *concolor* group.

Male. Head and body shining black. Antennae dark brown, with basal segments yellow; median flagellar segments about 2.5 times as long as broad. Palpi yellow. Legs yellow except apical two-fifths of hind femur black. Mid tibia with 2 a, 3 d, 1 p-v. Hind tibia with 6–7 a (4th/5th shorter), 3 d (4th basal d on one leg in Weston Wood specimen). Wings as *pughi*. Halteres yellow. Genitalia brown, Figures 35–38. Wing length 2.8–3.0 mm.

Female. Similar to male. Front tarsi with segments 2 and 3 a little enlarged ventrally. Wing length 3.0 mm.

Material examined: England: Avon, Weston Wood, 16.x.1986, male (R. K. Merrifield); Hants, Selborne Common, 28.v.1988, male (P. J. Chandler). France: Seine-et-Marne, Forêt de Fontainebleau, 15.v.1989, male (PJC); Gard, Forêt de Valbonne, 21.ix.1977, male (L. Matile). Yugoslavia: Croatia, Plitvice Lakes, 22–26.ix.1987, 9 males, 1 female (A. E. Stubbs).

S. pilosa was described from 29 males, 18 females from the USSR, Crimea. Bukowski's figures of the genitalia fit the specimens cited here quite well. Caspers (1980a) recorded one male of *pilosa* from Germany.

Acknowledgements

I have to thank the authorities of the British Museum (Natural History) and of several other Museums in the British Isles for the opportunity to examine material. Loïc Matile kindly facilitated my examination of the collections at Paris during my visit there in 1989 and I am indebted to Verner Michelsen for the chance to see Danish examples of *Z. pictipennis*.

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EDITORIAL

House Style 2. Plurals

Many technical terms in entomology are taken from Latin and Greek, and defy the usual English conventions when taking the plural form. The following list contains some typical and atypical examples. It is worth remembering, when writing a description or a key, that insects have one of certain parts of their bodies (head, sternum, abdomen, scutellum, etc). When describing, for example, wing pattern, do not state 'forewing with three black spots', but '*each* forewing with . . .'.

aedeagus	always singular	genus	genera
antenna	antennae	habitus	always singular
apophysis	apophyses	haltere	halteres
appendix	appendices or appendixes	hexapod	hexapods
		humerus	humeri
bacillus	bacilli	hypandrium	hypandria
carina	carinae	hypophysis	hypophyses
cercus	cerci	imago	imagos or imagines
chaeta	chaetae		
chelicera	chelicerae	index	indexes (indices only in mathematics)
chrysalis	chrysalides or chrysalises		
clavus	clavi	lamella	lamellae
corium	coria	lamina	laminae
costa	costae	larva	larvae
coxa	coxae	maxilla	maxillae
cuneus	cunei	nucleus	nuclei
data	always plural	ocellus	ocelli
elytron	elytra	ovum	ova
epimeron	epimera	palp	palps
epipleuron	epipleura	palpus	palpi
exuviae	always plural	phylum	phyla
falx	falces	pleuron	pleura
fascia	fasciae	pupa	pupae
femur	femora	seta	setae
flagella	flagellae	species	singular and plural
foramen	foramina	stigma	stigmata
fossa	fossae	surstylus	surstyli
fovea	foveae	tarsus	tarsi
fundatrix	fundatrices	taxon	taxa
fungus	fungi or funguses	tegmen	tegmina
ganglion	ganglia	tergum	terga
gena	genae	tibia	tibiae
genitalia	always plural		

Although for the aesthetics of typography and grammar it should be avoided, the plural form has been applied to Latin names. Thus several *Bembidion*s may be running about together (note the Roman 's' after the italic name). This is not terribly helpful, because it does not distinguish between several specimens or several species. A series of ten *Bembidion nigricorne*s may be typographically correct, but is technically lacking, because no authority is applied. A series of ten *Bembidion nigricorne*s Gyll., is clumsy, and a series of ten *Bembidion nigricorne* Gyll.s, borders on the typographically offensive. It is better to report a series of ten specimens of *Bembidion nigricorne* Gyll.

Richard A. Jones

THE SEPARATION OF FEMALES OF BRITISH SPECIES OF *PANORPA* (MECOPTERA: PANORPIDAE)

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INTRODUCTION

The separation of females of British species of *Panorpa* has always presented problems to the entomologist. The existing key by Fraser (1959), whilst allowing for easy determination of the males, contains a printing error in the key to females. Furthermore, the characters used by Fraser are difficult to discern in many specimens and are unusable on insects which are not preserved in a fluid medium.

In addition, experience has shown that the shapes and relative lengths of the abdominal segments of female *Panorpa* species are far from constant. In teneral and pre-gravid animals the abdominal segments naturally overlap, with the more posterior ones inserting into their anterior neighbours. During gravidity, the distention of the abdomen causes the posterior segments to slide backwards so that a greater length of each segment is visible externally. This, inevitably, affects the relative lengths of the segments—the character upon which Fraser relied. Similar, more artificial, distortions occur in some fluid-preserved specimens whilst most pinned material contracts causing the segments to become more inserted than in life.

Hobby & Killington (1934) suggested that wing markings, venation and length of forewing may be used as criteria for determination. Recent experience, however, suggests that all three of these characters are too variable within the British fauna to be of use, even as confirmatory characters. To deal with these characters in reverse order, the unreliability of forewing length is demonstrated in Table 1 which shows a clear overlap of the lengths for all three species. The use of wing venation in such a variable group is fraught with difficulties. Hobby & Killington (1934) stated that the anterior arm of vein R_s in the forewing *normally* bears four branches in *P. communis* L. and three branches in the remaining two species. Of the 342 *P. communis* that I have personally examined, 298 had four branches and 44 had three branches, whilst of 267 *P. germanica* L. 19 had four branches to this vein. All of the *P. cognata* Rambur examined had three branches, however; this agrees with the conclusions of Hobby & Killington, though the present results are based on a sample of only 19 specimens. On the matter of wing patterning, the only constancy which I have been able to discover rests in the Scottish f. *borealis* Steph. of *P. germanica* which is always devoid of any markings. In general, the more boldly marked female specimens in which the apical black spot extends forwards around the wing tip and along the costa are *P. communis*. However, I have seen this character in nine examples of *P. germanica*

Table 1. Comparison of results of forewing measurements of British *Panorpa* species between the present study and Hobby & Killington (1934). The size of Hobby & Killington's samples are not clear from the results, nor is it known whether the measurements involved males, females or both. The sample sizes (*n*) used to obtain the present results are indicated. All of the examples used in the present survey were females and the samples include both dried and fluid preserved specimens.

	Length of forewing		
	P. cognata	P. communis	P. germanica
Hobby & Killington	12.5–14.0 mm	13.5–15 mm	11.5–13.0 mm
present study	12.0–13.5 mm ($n = 19$)	11.0–15.0 mm ($n = 342$)	11.0–14.0 mm ($n = 267$)

(though never in *P. cognata*). It is even less reliable to assume that the reverse is true, for whilst in most female *P. germanica* the apical spot is confined to the apex of the wing, this is also the case in a large number of female *P. communis*. The position of the pre-apical fascia, when present, is also variable. Hobby & Killington stated that in *P. communis* this runs from the pterostigma to the distal extremity of vein Cu_1, whilst it runs from the pterostigma to the distal extremity of vein M_4 in *P. germanica*. Although this is true in many cases, I have seen a number of examples of variation in females of both species. This fascia is quite often absent in any case. It is apparently always absent in *P. cognata*. The size, shape and position of all other wing patterning is extremely variable, particularly in *P. communis* and *P. germanica* and so is quite unreliable as a character for specific determination.

The wings of *P. cognata* are suffused brownish in the specimens I have examined, as indeed they are in the *borealis* form of *P. germanica*. In both *P. communis* and *P. germanica* females the wings are hyaline in all material seen by me.

Female genitalia

In many species of Lepidoptera, as well as other orders of insects, examination of the genitalia is the basis for critical determination. This method appears to have been overlooked by successive British mecopterists, however, and there seems to be only two papers in the British literature which refer to the genitalia. Ward (1979) discussed the structural variation of the male and female genitalia of species in the *P. alpina* complex, though none of the species within this complex are yet recorded as British. Later (Ward, 1983), he also discussed similar variations in the *P. cognata* complex, but although this paper provided six drawings of the female genital plate of *P. cognata* sensu stricto, none of the material illustrated was collected in Britain. Accordingly, I dissected and examined the genital plate of 19 examples of *P. cognata*, 342 *P. communis* and 267 *P. germanica*. Although there is some degree of variation within this structure, there does seem to be sufficient constancy to permit safe identification of the three species using this character alone. The opportunity is now taken, therefore, to illustrate the female genitalia of the three known British species of *Panorpa* and to provide a simple key for their separation.

Extraction and preservation of female genitalia

The abdomen should be detached with a pair of sharp scissors. It is not necessary to detach the entire abdomen but care should be taken to ensure that segments 7 onwards are with the detached section. This means, in practical terms, all of the darker coloured, narrow bit of the abdomen! The detached abdominal segments are then placed in 10% potassium hydroxide solution in a small glass tube and the tube is stood in a bowl of boiling water. The length of time that the specimen should be left varies from about 30 minutes in a fluid-preserved teneral specimen to 1.5 hours in a shrivelled and dried pinned specimen. The temperature of the water bath should be maintained throughout by regular replacement from the kettle. (With fluid-preserved specimens my personal preference is not to detach the abdomen but to digest the entire insect in the potassium hydroxide solution. The genitalia can then be later extracted but not detached, thus avoiding any possibility of loss in storage. However, if entire insects are treated this way then only the sclerotized parts remain and specimens are thus useless for internal anatomical studies.) The digested abdomen is then washed once in tap water and the genital plate should be clearly visible through the abdominal wall. Removal is effected by making an incision along the lateral

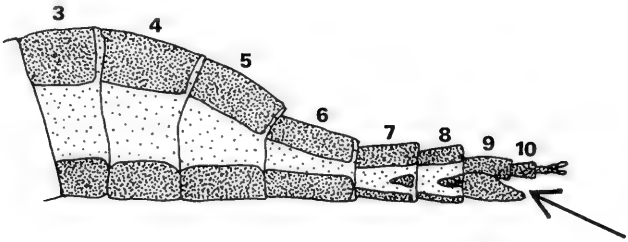


Fig. 1. Lateral view of abdomen of a female *Panorpa* species showing the position of the female genital opening between the ninth tergite and sternite.

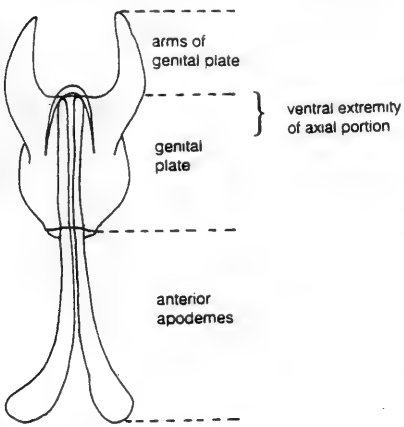


Fig. 2. Stylized drawing of the female genitalia of *Panorpa* indicating the terminology employed in the key.

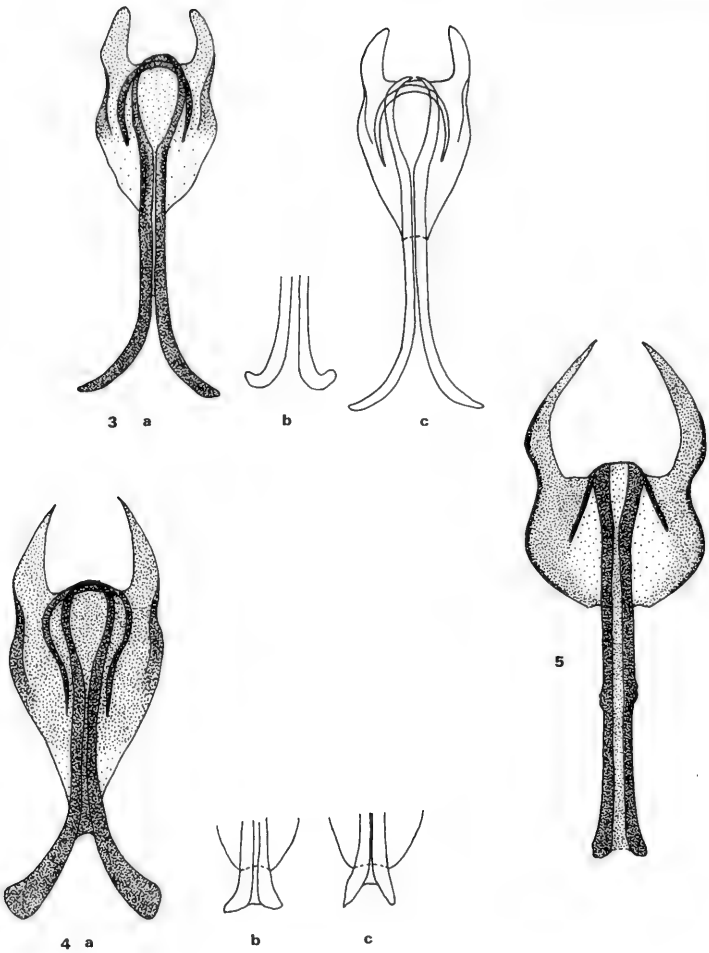
margin of the abdomen working from segment 9 (see Figure 1) forwards to segment 7 or by gently tearing the tergites and sternites apart with two pairs of fine forceps. Do not detach the plate unless it is proposed to make a microscope slide.

After examination the entire abdomen with genital plate still attached should stand for 30 minutes in clean water to allow all traces of potassium hydroxide to leach out. For pinned material, the abdomen is then removed, touched briefly on a tissue to remove excess water and glued to card with a water-soluble gum, taking care to arrange the plate so that its features are not obscured. For fluid-preserved material the abdomen can be stored in the tube with the specimen if desired.

A stylized genital plate and the terminology used is shown in Figure 2. The genital plates of the females of the British *Panorpa* species are shown in Figures 3 to 5.

Variation

Variation in the genitalia of female *P. cognata* has been discussed by Ward (1983) on the basis of specimens collected in France, Italy, USSR, Austria and Yugoslavia, though not in Britain. The genital plates examined varied in outline and in length, particularly in teneral examples in which the lateral extensions of the anterior apodemes were not always developed (i.e. the ends were not necessarily splayed). The few British specimens so far examined have demonstrated little variation and the two extremes of plate length are shown in Figure 3 (a and c). There seems to be a degree of constancy in the horseshoe shape of the lateral margins of the ventral extremity of the axial portion. This constancy is, however, rather lacking in the *P. communis* examined. These margins tend to converge towards the anterior end (269 examples—as in Figure 4a) but in the remaining 73 specimens the convergence was less marked and the



Figs 3–5. Dorsal aspect of female genitalia of British *Panorpa* species.

3. *P. cognata* Rambur (a, Folkestone, East Kent, 10.viii.1895, in J. C. Dale coll. at National Museum of Wales; b, tips of anterior apodemes of a second specimen, data the same as for a; c, Therfield Heath, Hertfordshire, 29.viii.1987, in author's collection.).

4. *P. communis* L. (a, Wyre Forest NNR, Worcestershire, 21.vii.1987; b, Teneral specimen—tips of anterior apodemes, Dunmow, North Essex, 17.v.1989; c, apparently mature specimen—tips of anterior apodemes, Bishop's Stortford, Hertfordshire, 18.v.1989). All in author's collection.

5. *P. germanica* L., Elsenham, North Essex, 18.v.1989, in author's collection.

margins are better described as being sub-parallel. There is evidently considerable variation in the form of the anterior apodemes of *P. communis* and this seems to depend on the maturity of the insect. Figure 4a represents a typical fully mature specimen, and Figures 4b and 4c show teneral examples. This clearly indicates a post-emergence development of the anterior apodemes to achieve the state shown in

Figure 4a—a result in keeping with Ward's observations on *P. cognata* above. However, just by way of complicating a simple situation, I have seen several apparently fully mature *communis* in which the anterior apodemes are undeveloped. This situation clearly requires further investigation employing specimens of known maturity. *P. germanica* is evidently the least variable of the British species. The lateral margins of the ventral extremity of the axial portion are always divergent, whilst the plate itself and its arms show only minor variation in outline and length; 243 examples demonstrated a rough swelling of the anterior apodemes at about the mid-point, although in some this was barely discernible. The remaining 24 examples seen lacked this swelling.

In spite of the variations observed in the sample, there seems to be sufficient constancy within each species to enable reliable determination. The following key is therefore presented.

Key for the identification of female *Panorpa* species known in Britain

1 Anterior apodemes absent or vestigial (Figs 4b, 4c) ..... *P. communis*
—Anterior apodemes well developed (Figs 3, 4a, 5) 2
2 Anterior apodemes closely parallel (Fig. 5) 3
—Anterior apodemes clearly splayed at their tips (Figs 3a, 4a) 4
3 Arms of genital plate about as long as the plate, narrow and with acutely pointed tips. Lateral margins of plate sinuate. Anterior apodemes usually with a rough swelling at about mid-point (sometimes absent). Lateral margins of the ventral extremity of the axial portion divergent. Overall impression is of a small square plate with very long, straight apodemes (Fig. 5) ..... *P. germanica*
—Arms of genital plate shorter than the plate and wider with blunt or rounded tips. No swelling on anterior apodemes. Lateral margins of ventral extremity of axial portion show a characteristic horse-shoe shape. Overall appearance of a long narrow plate with short, straight apodemes (Fig. 3) ..... *P. cognata* (teneral or damaged specimens)
4 Anterior apodemes short and flattened, or else very broad, diverging broadly throughout most or all of their length (Fig. 4a). Tips of arms of genital plate tapering to points ..... *P. communis*
—Anterior apodemes longer, and parallel for much of their length before the tips diverge 5
5 Tips of arms of genital plate rounded. Tips of anterior apodemes slender, usually rounded and only moderately flattened, and tapering (Figs 3a, 3c) ..... *P. cognata*
—Tips of arms of genital plate pointed. Anterior apodemes widening at the tips which are usually broadly flattened (Fig. 4a) ..... *P. communis*

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I am grateful to Adrian Amsden at the National Museum of Wales and to Steven Judd at the Liverpool Museum for the loan of specimens and for permission to critically examine these. I am also grateful to Peter Barnard at the BM(NH) for his comments on my drawings and for assisting in the near fruitless search of the literature for published works on the female genitalia of the Panorpidae.

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BOOK REVIEWS

Cerambycidae of northern Asia, by A. I. Cherepanov, Leiden, E. J. Brill, 1990: vol. 1, 642 pages, hardback, 225 Dutch Guilders; vol. 2, parts 1 & 2, 292 & 354 pages, hardback, 270 Dutch Guilders; vol. 3, part 1, 300 pages, hardback, 120 Dutch Guilders.—These four books are the first parts of an English translation of Cherepanov's mammoth six-book Russian work *Usachi Severnoi Azii* originally published between 1979 and 1985 (volume 3 parts 2 and 3 remain to be published in English). Of the 270 species included in these four parts, almost every one is illustrated as an adult, and most have figures of larva and pupa also. The extensive accompanying text runs to about 4–5 pages for each species, plus keys, plus notes on the genera.

The overlap with a British fauna is not great, with 29 out of a possible 53 British species (up to the genus *Mesosa* in vol. 3, part 1), although several other Asian species are irregularly introduced into this country in timber. Nevertheless, the books contain much on the biology and ecology of the beetles of interest to coleopterists with horizons wider than national boundaries.

RICHARD A. JONES

The role of ground beetles in ecological and environmental studies edited by N. E. Stork, Andover, Intercept, 1990, 424 pages, hardback, £40.—These are the proceedings of the 7th European Carabidologists' Meeting, held at the Royal Entomological Society in September 1989. Section one considers evolution in carabid populations, from subcortical populations in Eucalyptus trees to leg colour variants of *Pterostichus madidus*. Section two covers the impact of carabids on crop pests, and the influence of non-specific pesticides. Section three addresses the relationship between carabid beetles and 'environmental quality', and is probably the section of greatest interest to British coleopterists interested in ecology, conservation and the possible use of carabids as 'indicator' species. Two particularly interesting chapters from this point of view are those by M. D. Eyre and M. L. Luff, which attempts to classify European grassland habitats using carabid indicators, and by S. P. Rushton *et al.*, which seeks to compare the effects of grassland management on various individual carabid species. Section four covers life histories, population studies, migration and feeding. The final section covers the shorter papers given at the conference as posters. For the amateur the book is highly specialist and expensive and really aimed at academics, but keen coleopterists may still find something of interest in its pages.

RICHARD A. JONES

EFFECTS OF THE SUMMER OF 1989 ON THE PHENOLOGY OF THE WART-BITER, *DECTICUS VERRUCIVORUS* (L.), (ORTHOPTERA: TETTIGONIIDAE) IN BRITAIN

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SUMMARY

The summer of 1989 was unusually dry, warm and sunny. In comparison to the two previous years, adult recruitment in a population of the rare bush-cricket, *Decticus verrucivorus* (L.), was completed four to five weeks earlier, and there was less variance between individuals in the timing of final ecdysis. Nymphal densities were lower in 1989 than in 1988, while the converse was true for adult densities suggesting that nymphal survival may have been enhanced by the warmer weather of 1989. There were no consistent differences between years in four measures of adult size.

INTRODUCTION

The spring and summer of 1989 were unusually dry and sunny, with higher than average temperatures throughout much of the British Isles, but particularly in southern England (Northcott, 1990a, 1990b). The period May to October 1989 was equal fourth warmest, since records for central England began in 1659. There were more sunshine hours in this period than in any year since 1909 (Jones & Hulme, 1990). The atypical weather may have been expected to influence the developmental biology and survival of many species of invertebrates. However, with a few exceptions, quantitative evidence for most orders are sparse, mainly because base-line year-to-year observations are lacking.

The Butterfly Monitoring Scheme, along with the Rothamsted suction and light traps provided comparative data for the macro-lepidoptera, aphids and moths (Ward & Cannell, 1989; Ward, 1990). Although many species emerged early and attained high population densities, others were adversely affected by the lack of moisture. Overall, the responses of individual species were difficult to predict. However, a group of invertebrates likely to have benefitted from the weather of 1989 are those thermophilous species which are at the northerly edge of their range in southern Britain. The 'wart-biter' bush-cricket, *Decticus verrucivorus*, is one such species (Marshall & Haes, 1988; Cherrill & Brown, 1990a).

This paper quantifies the effects of the weather of 1989 on various aspects of the wart-biter's post-embryonic biology, using data from 1987 and 1988 (Cherrill & Brown, 1990a, and also unpublished data) as a basis for comparison. The results provide an insight into the extent to which the phenology of a large and rare thermophilous species at the edge of its range is constrained by the weather in more 'typical' years.

SPECIES, STUDY SITE AND WEATHER

In Britain, four wart-biter populations are known in southern England. Eggs hatch in mid-April, after passing a minimum of two winters in diapause (Ingrisch, 1984). There are seven nymphal instars and adults can survive until early October (Cherrill & Brown, 1990a). The study population occurs on contiguous south- and east-facing

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Table 1. Meteorological data for the period April–October (1974–1989) from near Brighton, East Sussex.

		April	May	June	July	August	Sept.	Oct.
Total sunshine (h)	1987	169.1	217.6	155.5	206.6	190.4	146.8	99.6
	1988	153.9	179.6	114.0	184.3	203.8	155.4	121.8
	1989	164.6	329.0	288.0	289.9	271.7	147.7	116.7
	1974–1986	173.5	197.7	212.7	217.2	211.3	151.1	111.2
Total rainfall (mm)	1987	61.0	39.3	114.9	143.1	65.3	46.6	239.1
	1988	46.5	38.1	7.2	75.3	40.8	47.3	88.2
	1989	61.1	2.9	26.9	47.5	26.6	57.6	86.5
	1974–1986	45.5	56.8	54.5	44.9	62.4	82.0	98.7
Mean daily temp. mode (°C)	1987	10.1	10.7	13.2	16.2	16.0	14.5	11.5
	1988	8.2	12.4	14.1	14.4	15.7	14.1	12.0
	1989	6.9	14.1	15.7	18.4	17.0	15.6	12.7
	1974–1986	7.8	11.0	14.3	16.3	16.2	14.0	11.0

unimproved chalk grassland in East Sussex (see Cherrill & Brown, 1990b, 1991). During the study, the height profile of the vegetation remained stable under a regime of light autumn/winter grazing. Weather data for April–October were obtained from a site 5 km distant and are summarized in Table 1. Similar meteorological conditions prevailed over much of southern England (Northcott, 1990a, 1990b).

Methods

The population was monitored on five 15-m-wide transects. Three on the east-facing slope were 55–60 m long, while those facing south were 110 and 115 m long. The post-embryonic stages were monitored from late June in 1987 and from mid-April in 1988 and 1989. In each year, monitoring continued until early October. Different methods were used for monitoring early instar nymphs (1988 and 1989 only) and late instars/adults (1987–1989). From mid-April to late May and early June in 1988 and 1989, densities were estimated on the three east-facing transects only. A 1-m^2 box-quadrat was repeatedly placed on each transect at co-ordinates selected at random. In 1989, 30–40 quadrats were taken on each transect at intervals of 3–11 days, depending on the weather. A similar regime was followed in 1988 (see Cherrill & Brown, 1990a). From 1 June (1987–1989), a walk survey method was used to estimate densities of late instars and adults on each of the five transects. Surveys were performed at intervals of approximately two weeks. The technique involved slowly walking across the central 5-m-wide core of each transect, at right angles to its length and at intervals of 0.75 m (see Cherrill & Brown, 1990a, for details). The numbers of wart-biters of each developmental stage in box-quadrats, and on each transect were recorded. All observations were made in warm sunny conditions and wart-biters were released at their points of capture.

In addition to the dates on which quantitative estimates of population density were made, the study site was visited two or three times weekly in 1987 and 1988 (but less frequently in 1989). On these occasions, the developmental stages of any wart-biters seen were noted. These data provided further information for assessing the timing of adult recruitment.

In 1987, the length of hind femur, forewing and ovipositor of adults of each sex were recorded. In 1988 and 1989, the length of pronotum was also measured. All measurements were made to within 0.5 mm in 1987 and to within 0.01 mm in 1988 and 1989 (methodology in Cherrill & Brown, 1990a). Student's *t*-test (modified for

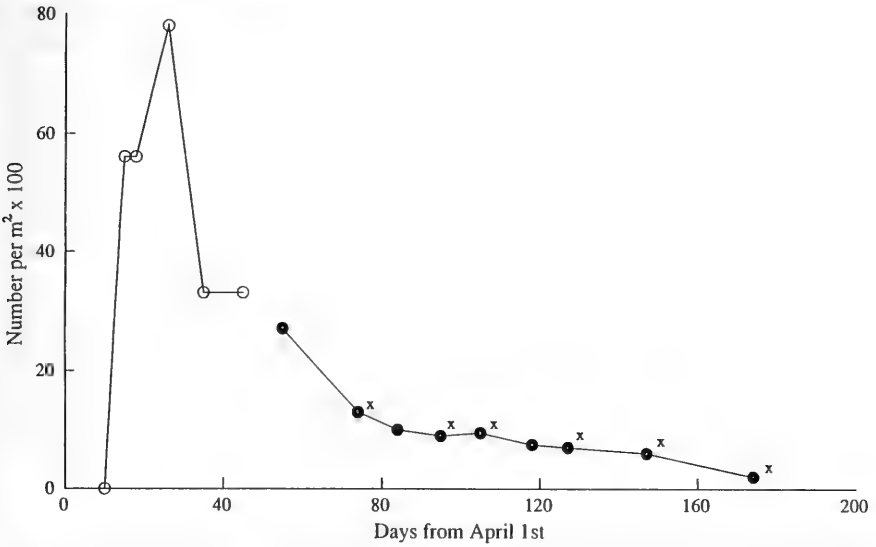

Fig. 1. Temporal variation in mean densities of *D. verrucivorus* on a south-facing slope (x) (walk survey estimates) and an east-facing slope (○, box-quadrat estimates; ●, walk survey estimates) in 1989.

unequal variances as appropriate) was used to compare means between years (Bailey, 1959).

Results

Here, data from 1989 are presented in detail, while those from 1987 and 1988 are summarized from Cherrill & Brown (1990a).

Temporal variation in density and timing of egg hatch

Figure 1 shows the estimated density of the post-embryonic stages throughout their period of occurrence in 1989. Most box-quadrats (i.e. 96%) contained no wart-biters and none yielded more than one nymph. Standard deviations for these means are consequently omitted from Figure 1. Observations from transects with the same aspect have been pooled to give overall estimates of mean density for east- and south-facing transects. The pattern of variation in densities between transects of the same aspect paralleled that seen in 1987 and 1988 (see Cherrill & Brown, 1990a).

The first nymph was recorded on 15 April and the greatest density was found on 26 April (Figure 1), at which time only first instar nymphs were present. The peak nymphal density in 1988 was recorded on 25 April, indicating that egg hatch occurred on approximately the same date in each year. However, in 1989 the peak mean density was 45% lower than that in 1988. No comparable data on nymphal density are available for 1987.

As in 1987 and 1988, adult densities in 1989 were relatively stable, but in both 1988 and 1989 densities fell dramatically during nymphal development. Adult densities in 1989 were very similar to those recorded in 1987, and in both years there were no obvious differences in densities between east- and south-facing slopes.

In comparison, adult densities on the east- and south-facing slopes respectively were around 75% and 30% lower in 1988. These data contrast with the greater nymphal densities in 1988, and tentatively suggest that, at least on the generally cooler east-facing slope, nymphal survival may have been greater in the warmer weather of 1989 than in 1988.

Development

In 1989, recruitment from the final instar to adult was complete four to five weeks earlier than in either 1987 or 1988 (Table 2). Development in 1989 was also more synchronous. Nymphs and adults co-occurred for at least 18 and 34 days in 1987 and 1988 respectively, but fewer than 14 days in 1989.

The more synchronous and rapid development in 1989 can be attributed to the consistently warmer and sunnier weather. The differences between the timing of adult recruitment in 1987 and 1988 were more subtle (Table 2). The first adult appeared slightly earlier in 1988 than in 1987. However, the weather in July 1988 was unusually cool and cloudy, prolonging the temporal overlap of nymphs and adults in that year (Tables 1 and 2).

Body size

Measurements of adult body size taken in 1987 (unpublished), 1988 (from Cherrill & Brown, 1990a) and 1989 are summarized in Table 3. Overall there were no consistent between-year differences in the four measures of adult size. Females had significantly longer ovipositors in 1989 than in 1987 or 1988; while male forewings were shorter in 1987 than in either other year. Neither sex differed between years for any other dimension measured ($P>0.05$ in all pair-wise comparisons).

Table 2. Dates on which the first adult and last nymph of *D. verrucivorus* were seen in three years.

Observation	1987	1988	1989
First adult	8.vii	1.vii	28.vi
Last nymph	25.vii	3.viii	14.vi

Table 3. Linear measures of body size for adult *D. verrucivorus* in three years. Figures are means with s.d. in parentheses. All measurements in mm. Figures with the same letter are significantly different ($P<0.05$).

Year	Sex	Hind femur	Pronotum	Forewing	Ovipositor	N
1987	M	26.81	—	20.71[ab]	—	42
		(1.19)		(1.38)		
	F	28.73	—	20.61	19.05[c]	31
		(1.42)		(1.40)	(1.07)	
1988	M	26.50	7.64	21.54[a]	—	26
		(1.00)	(0.41)	(1.50)		
	F	28.43	8.21	20.28	18.82[d]	27
		(0.87)	(0.31)	(1.71)	(0.71)	
1989	M	26.73	7.65	22.05[b]	—	8
		(0.77)	(0.26)	(1.39)		
	F	28.36	8.11	21.03	19.91[cd]	15
		(1.12)	(0.35)	(1.39)	(1.09)	

Discussion

Decticus verrucivorus is at the edge of its range in southern England. Previous observations at the present study site, near Brighton, Sussex, have suggested that its northerly limit is determined primarily by its thermophilous nature and climate (Cherrill & Brown, 1990a, 1990b). However, the extent to which different aspects of the wart-biter's life-history are constrained by environmental factors (notably the weather) in 'typical' years is poorly known. Previously, Cherrill & Brown (1990a) reported no difference in adult hind femur length, and only a slight difference in the timing of adult recruitment, between 1987 and 1988 (Tables 2 and 3). This may have reflected the relatively slight difference in the weather in these two years (Table 1). Here, however, new data from the unusually warm spring and summer of 1989 are presented for comparison, along with additional unpublished data on body size in 1987.

Ingrisch (1978) demonstrated that nymphal development rates are temperature-dependent in the laboratory, being most rapid at 33°C and ceasing below 20°C. None the less, the magnitude of the effect of the weather on developmental rates in 1989 was striking. Adult recruitment was completed four to five weeks earlier than in either 1987 or 1988 (Table 2). In contrast, there was little evidence that adult body size was affected by the difference in weather between years (Table 3).

In most years, the potential longevity of the adults must be severely constrained by meteorological conditions. Moreover, adult survival is high (Figure 1; Cherrill & Brown, 1990a) suggesting that the timing of adult eclosion may be an important determinant of reproductive success. Haes *et al.* (1990) argued that variation in reproductive success is the principle cause of fluctuations in population size in *D. verrucivorus* at the study site. Between 1967 and 1987, the numbers of adults in a given year were found to be strongly correlated with the number of sunshine hours in the summer two years before, but not with the weather one year before or in the year of observation (Haes *et al.* 1990). This was interpreted as the result of a two-year embryonic phase, and the dependence of reproductive output on sunshine and high temperatures. Implicit in this interpretation is that the survival rates of the egg and nymphal stages are relatively stable from year to year (at least in comparison to fluctuations in reproductive output).

To date, information on fecundity and egg survival are lacking. Data on nymphal densities are available for 1988 (Cherrill & Brown, 1990a) and 1989 (Figure 1), yet caution must be applied in equating changes in density with survivorship. Given this constraint, the smaller reduction in nymphal densities in 1989 than 1988 tentatively suggests that nymphal survival may have been enhanced by the warmer weather in that year. Such an observation would be typical of other ground-dwelling Orthoptera (Dempster, 1963; Pickford, 1966; Atkinson & Begon, 1988) and hence could be expected in the present study.

Due to the wart-biter's minimum two-year embryonic phase (Ingrisch, 1984), the full impact of the weather of 1989 will not be evident until 1991 onwards. The work of Haes *et al.* (1990), along with the direct evidence of early adult recruitment in 1989, suggest that a large number of eggs will hatch in 1991, thereby giving the potential for a large adult population. However, recent changes in the spatial heterogeneity of the vegetation may prevent realization of this potential. The drought conditions of 1989 greatly reduced grass growth. This factor, in combination with overgrazing by livestock in late 1989 and early 1990, resulted in a uniformly short turf throughout 1990 (Brown, Shaughnessy & Cherrill, unpublished). As a consequence, very few late instar nymphs and adults (which require dense tussocks) were recorded in 1990 (Cherrill & Brown, 1990b, in press, and also unpublished data). At the time of writing, in early 1991, the vegetation is still short, and it remains uncertain whether the potential

for a large population of adults will be realized in the absence of significant rainfall (allowing rapid grass growth).

Data from the continued monitoring of the population in 1990 and 1991 will be analysed in detail elsewhere. However, these initial observations emphasize the need for a flexible grazing regime, if the potential demographic benefits of hot, dry years are to be realized.

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OBITUARY

RUSSELL FREDERICK BRETHERTON C.B. M.A. F.R.E.S.

Russell was born at Gloucester on 3 February 1906 into a relatively prosperous middle-class family. He was educated at Clifton College and in 1923 became an undergraduate at Wadham College Oxford. Afterwards he became a Fellow of the college, where he remained until called into the Ministry of Supply on the outbreak of war in 1939. He later became an under-secretary to the Treasury.

Whilst at Wadham College he met Miss Jocelyn Nina Mathews who was an undergraduate at Somerville College Oxford and they were married in 1930, living at Cumnor Hill Oxford until 1945, then moving to Ottershaw near Woking, where they remained until 1963, when they finally moved to Birtley Green Bramley. They had four children.

Russell was interested in Lepidoptera from an early age and kept an entomological diary from the age of 15, the first entry recording a male brimstone caught in Leigh Woods, Clifton on 24 July 1921. In this year he also records a large blue at Sheepscombe Bank. His early expeditions were by tram, bus and bicycle, sometimes with the Clifton College Scientific Society, who published some of his records. His diary developed into a very detailed record and in 1923 contains a meticulous sketch map of the Gareloch, where he took his first Scotch argus on 19 August. He continued his interests and records as an undergraduate, his first Oxford record being that of a winter moth at light in the college on 2 December 1923. On a number of occasions he cycled from Oxford to his parents' home in Gloucester and his diary records all the Lepidoptera observed en route.

After he was married, he collected widely in the Oxford area from his house on Cumnor Hill. He did not own a car until 1938 and it had to be laid up during the war, so most of his Oxford collecting had to be done within bicycle range of his house, his favourite spots including Bagley Wood, Hell Coppice, Tubney Woods and Cothill. On his collecting expeditions he was frequently accompanied by his children and often they joined Professor E. B. Ford at Cothill where he was studying the genetics of *Callimorpha dominula* (L.). Russell was consulted by the Professor from the planning stage of the book which was to become number 1 in Collins 'New Naturalist' series, entitled *Butterflies* and his contribution is acknowledged in the preface as follows. "Mr. R. F. Bretherton has read the typescript in detail and I wish to thank him for the large amount of time which he has devoted to it and for his criticism and constructive suggestions. It has been extremely useful to have the benefit of his extensive knowledge both of practical entomology and of the literature of the subject."

One of Russell's wartime collecting expeditions to Cothill is particularly remembered by his eldest son, then a boy of 9 years old, who accompanied him. It was in early September 1940, following the fall of France, and the planes from nearby R.A.F. Abingdon were taking off and landing every few minutes. His bicycle had a carrier on the back to which he secured his beating tray and when they came to leave they were stopped by the village policeman who was convinced that the apparatus was for mounting a machine gun or some instrument of sabotage and that they were German agents. They were subject to a long period of close questioning before being allowed to go home.

One of his earlier writings was the 'Oxford list' of Lepidoptera recorded within 10 miles of Carfax, published by the Ashmolean Natural History Society in 1940. In all, he was the author of over 200 notes and papers on a wide range of entomological

subjects, concentrating in his latter years especially on migration and Continental Lepidoptera. A complete list of all these is being published elsewhere, so it suffices here to mention a very small selection of examples from some of the most notable. He and Michael Chalmers-Hunt annually wrote on the immigration of Lepidoptera into the British Isles, for publication in the 'Entomologists Record'. This journal also published his 'Early history of the swallow-tail butterfly in England' in 1951, the same year as the *Entomologist's Gazette* published his 'Our lost butterflies and moths'. In 1952, jointly with R. E. Ellison and W. B. L. Manley 'Lepidoptera in the Eastern Pyrenees, 1951' was published in the *Entomologist*. In 1955 'A list of the macrolepidoptera and Pyralidae of north-west Surrey' was published in the 'Proceedings and Transactions' of this society and in 1966 'A distribution list of the butterflies of western and southern Europe' was published by the Society for British Entomology.

Although his main work on European butterflies was carried out after the war, he had shown interest in these much earlier and his diary shows that he was doing some collecting in Brittany in 1922 and in Provence in 1924. His extensive collection of European butterflies was built up mainly after 1945 and his expeditions were often in the company of Baron Charles de Worms and J. L. (Bobbie) Messenger.

Russell's association with this society goes back to 1947, when he joined the South London Entomological and Natural History Society as it was then called. He became an ordinary member of Council in 1965 and in 1967 was elected President. From 1969 to 1978 he held the office of Honorary Treasurer and he was again an ordinary member of Council in 1981 and 1982. He was a very keen supporter of the society's field meetings and records show him as the leader of 18 of these. He regularly attended indoor meetings at which he often spoke and exhibited and he always provided interesting exhibits at the society's annual exhibition, his last exhibit being in 1987 when he made up from his collection a case of old specimens of species now believed to be extinct in the British Isles. At these exhibitions he was often recorder for foreign butterfly exhibits and wrote these up for publication. In recognition of his valuable services to the society, he was made an honorary member in 1972.

Although he very much regretted that over his last years his field work became restricted to visits to his garden moth trap, he carried on with other entomological work up to the time of his death and was corresponding on 1990 migrant records until then. He had extensive correspondence with entomologists both in the UK and in other European countries and he will be sadly missed, not only in the Society but in the world of entomology generally. He was a meticulous recorder and published his observations and records without delay, so all the work that he has done will be available for posterity. His extensive collection, together with his diaries and entomological books were bequeathed to the Reading Museum.

D. H. STERLING

BENHS INDOOR MEETINGS

22 January 1991

Mr K. E. J. BAILEY showed a case of British butterflies showing colour variations produced by temperature shock treatments at the larval and pupal stages.

The names of Alexander David Marshall and Trevor J. James were read for the second time and these persons were duly elected as members.

The President, Mr C. W. PLANT said that he had recently passed to Adrian Riley of Rothamsted Experimental Station some worn pug moths that had been collected by himself and Tony King in gardens in Bishop's Stortford, Herts. Adrian Riley has identified these moths by examining the genitalia and found that one moth taken by Tony King on 20.vi.89 was a female tamarisk pug, *Eupithecia ultimaria* Boisd. Mr Riley had previously found the moth in Guernsey in 1984 but this is the first record on the British mainland.

Rev. S. PITTIS noted that the moths exhibited at the meeting on 15 January by Mr C. W. Plant as the golden twin spot, *Chrysodeixis chalcites* Esp., cast doubt on previous British records of the Tunbridge Wells gem, *C. acuta* Walk. He asked whether the genitalia of any of these earlier captures had been examined to determine their true identity. Mr Plant said that this was being followed up by Bernard Skinner.

Mr K. E. J. BAILEY spoke on aberrations in wing pattern in butterflies and described his experimental methods by which he has produced a wide range of forms. Some aberrations are genetic in origin and may involve colour changes while the basic wing pattern remains the same. Spot patterns in lycaenid butterflies are also genetically controlled. Nymphalid butterflies may show marked variations in wing pattern and, while such aberrations are scarce in nature, when they do occur they may do so in clusters in places and in time, indicating that there is an environmental cause for this type of aberration. The speaker described his early attempts at producing aberrations by exposing pupae to short periods of intense cold, which produced erratic results. He gradually refined his equipment and techniques for exposing pupae to periods of freezing or hot temperatures by which he has been able to produce a complete range of forms from normal to extreme aberrations. The range of forms remains constant for a particular species of butterfly and aberrations generally start with the markings on the hind wings. Temperature shocks applied too soon or late in the butterfly's development lead to poor emergence and wing deformities. Aberrations can also be induced by keeping the larvae in cool dark conditions.

The treatments applied by Mr Bailey are unlikely to occur in nature and he speculated that naturally occurring aberrations may be due to chronic larval stress, perhaps caused by disease. He knew of colonies of silver washed fritillary and chalk hill blue where aberrations had been frequent but these populations crashed the following year. Aberrant butterflies released by Mr Bailey appeared to be normal as regards longevity, behaviour and ability to breed.

12 February 1991

The President Mr C. W. PLANT welcomed three foreign guests, these were: Dr Wolfrem Mey of the Zoological Museum Berlin, Dr Hua Baozheng from the Shanksee province of China and Dr Yuan Depeng from Beijing (Peking), China.

The President announced the death of Lt. Col. D. M. Chappel, who had joined the Society in 1973.

The President reported that whilst sorting through the 'leftovers' of moth traps as part of the Rothamsted Insect Survey, he had discovered a specimen of the lacewing *Wesmaelius balticus* (Tjeder) from a trap in Elgin, Scotland. This very rare species was previously known only from a handful of sand dune sites on the southern coasts of Britain from Norfolk to Cardigan, and this was the first record for Scotland and possibly the most northerly Palearctic record. It is associated with marram grass *Ammophila arenaria* (L.), which had recently been planted on the dunes only 10 miles from the Elgin trap site, suggesting that although this lacewing is regarded as a threatened species, it may suffer introduction to new localities.

Mr R. D. HAWKINS asked the President if his plea for records of the snow flea *Boreus hyemalis* (L.) had been successful. The President reported that a specimen had been found, in a pit-fall trap in a sphagnum bog in Epping Forest.

The lecture was given by Dr K. SATTLER of the B.M.(N.H.) who spoke on 'Life histories of Hawaiian Lepidoptera'. The chain of volcanic islands is famous for the adaptive radiation of its species through all groups of organisms. The 900 to 1000 species of Lepidoptera are thought to have originated from only about 60 original migrants. This would correspond to one successful migration every one million years. This has led to a rather unbalanced fauna, containing only 17 of the 200 Lepidoptera families known world-wide.

The islands' volcanic nature has given rise to some peculiar habitats which have been colonized by moths. Tree roots hanging in darkness through the roofs of caves and lava tubes provide food for a *Schrankia* species. The female is flightless despite being fully winged; the male flies with its long antennae extended.

Even some of the most barren volcanic debris has particular niches, exploited by specialized moth species. Under rocks on exposed wind-blown plateaux live caterpillars which feed on dead leaves which were blown their way. Both males and females of the adult moths are brachypterous, an unusual feature presumably evolved in response to the wind, and to avoid being blown away from the microhabitat.

Most of the life histories of Hawaiian moths are unknown, or poorly understood. One rather common case-bearing caterpillar would not feed, except occasionally to attack each other. It was subsequently discovered that it fed on the egg cases of spiders. All but one of the 12 *Eupithecia* species were also predatory, lying in wait along the edge of a leaf until an insect walked by. These aggressive predators would even take prey as large as themselves.

The plant family Lobeliaceae are particularly diverse in Hawaii, and several moth caterpillars feed on the leaves. These have adopted various strategies for coping with the plant's defence mechanism of exuding copious quantities of latex from damaged leaves. By chewing across the leaf, the mid-rib or by chewing a circular cut, the caterpillars can prevent the flow of latex and feed on the now undefended area of the leaf.

There are only two indigenous butterfly species in Hawaii, including a vanessid thought to have derived from the well known migrant species *Vanessa indica* (Herbst).

In the discussion which followed the lecture, Dr Sattler explained that there had been a tremendous influx of introduced species since the advent of the jumbo jet. These modern migrants, together with species which had been released for biological control have greatly changed the fauna of the islands in recent years.

26 February 1991

The President Mr C. W. PLANT announced the death of Mr J. Briggs, of Cumbria who died on 21 January 1991. He joined the Society in 1979.

Mr A. J. HALSTEAD showed four live specimens of the vine weevil *Otiorhynchus sulcatus* F. During the last 20 years, this beetle has become a major pest in gardens and commercial nurseries. This is possibly due to the increasing use of peat-based composts or perhaps the growing of nursery plants in pots instead of in the open ground. The adults cannot fly, and when presented with a pot they invariably climb and lay eggs in the surface of the compost. Hence container-grown plants may receive more eggs than a similar plant grown in open ground. The larvae feed on the roots, often causing the death of the plants.

Prof. J. A. OWEN reported that when attempting to repot a sickly-looking plant, the entire plant came away at the base of the stem; the roots having been eaten by at least 12 vine weevil larvae.

Mr R. SOFTLY enquired about the distribution of the vine weevil. Mr Halstead reported that it was widespread, and Prof. Owen said that it occurred right up to the central highlands of Scotland and on various of the islands.

Mr D. C. LEES showed a live female of *Urapterita mabillei* (Viette) (Lepidoptera: Uraniinae) from Madagascar's eastern rainforest at Perinet. It was bred from a larva collected on *Suregada boiviarum* Baillon (Euphorbiaceae), the first host-plant record for the genus. Uraniine moths specialize in feeding on plants containing polyhydroxyalkaloids, and this record has given biochemists at Kew Gardens a new plant to screen for novel medicinal compounds.

The name of Roland Herbert Rogers was read for the second time and he was duly elected a member.

The Assistant Treasurer Mr G. BURTON requested that any members unpaid for 1991 should pay immediately. To date there were 117 members unpaid or underpaid for 1991.

Mr K. MERRIFIELD reported that the bookshop of the Natural History Museum was selling *Insects and other arthropods of medical importance* by K. G. V. Smith at the very reduced price of £2.50, rather than the list price of £30.

Mr Burton predicted a plague of the brown-tail moth *Euproctis chrysorrhoea* L. on the Isle of Sheppey in 1991. The webs made by the caterpillars were much in evidence.

The ordinary meeting was then followed by the Annual Meeting

Annual General Meeting

Minutes of the Annual General Meeting of the Society held at the rooms of the Royal Entomological Society of London at 6.30 pm. Chairman: The President, Mr C. W. Plant. *Present:* 39 members.

Minutes of the last Annual General Meeting were read and signed.

The Secretary read the Council's report, followed by the Treasurer who read his report. The Editor, Librarian and Curator then read their reports and Dr M. Scoble read the report of the Hering Memorial Research Fund. The President proposed the adoption of the reports, the motion was seconded by Mr I. D. Ferguson. (See pages 184–191).

The President then read the names of the Officers and Members of Council recommended by the Council for 1991–92 and, as no other names had been submitted, he declared the following duly elected: President: A. J. Halstead; Vice-Presidents: C. W. Plant, Dr J. Muggleton; Treasurer: A. J. Pickles; Secretary: Dr J. Muggleton; Editor: R. A. Jones; Curator: P. J. Chandler; Librarian: S. R. Miles; Lanternist: M. J. Simmons; Ordinary Members of the Council: M. R. Brown, G. N. Burton,

G. A. Collins, Dr I. F. G. McLean, S. L. Meredith, D. A. Moore, R. K. A. Morris, Mrs F. M. Murphy, R. Norledge and D. Young.

The Secretary then read Bye-law 22(d) and invited motions or questions.

Mr C. MacKechnie-Jarvis asked about the state of the Joy collection of Coleoptera. Mr P. J. Chandler replied that the collection had been re-organized in the same order as that found in Joy's *A practical handbook of British beetles.*

Mr C. MacKechnie-Jarvis asked whether the decision to move the Society's collections and library to Dinton Pastures Country Park was irrevocable. The President replied that the decision was not irrevocable and that if suitable premises in London were found they would be considered.

Mr C. MacKechnie-Jarvis then asked if the Council was aware of the members' disquiet about the proposed move, and of what foreign members thought. The President replied that the response to his questionnaire had indicated that the membership was in favour of the move; of those who had replied 94% supported the move. If there were those who were unhappy about the move, they had not bothered to reply. Mr G. N. Burton said that the Council had made every effort possible to find accommodation in Central London but there was no satisfactory alternative to Dinton Pastures.

Mr E. Bradford asked whether it would be in order to hold another ballot regarding the Dinton Pastures scheme. The President replied that the Council would consider holding another ballot when the time came for a final decision to be made. He pointed out that the final decision would be made by the Trustees. Prof. J. A. Owen said that any ballot paper should ask for a yes/no response to a clear question about the move.

The Rev. Canon D. J. L. Agassiz asked whether it was possible that given the depressed property market, rents in London had decreased sufficiently to make renting a London premises possible. Mr R. A. Jones responded by saying that at current rents all the Society's funds would be used up in 10 years.

Mr R. A. Softly asked whether the reduced attendance at indoor meetings was caused by the fact that the collections and library were no longer available on meeting evenings. Dr J. Muggleton said that an examination of the attendance book showed that the reduced attendances had begun before the move from the Alpine Club, and that one surprising fact was that very few of the members living within the London postal area attended the evening meetings.

Mr B. R. Baker said that he had enjoyed looking at the collections when they were at the Alpine Club but the space in the basement had been very cramped; he asked whether there would be more space in the proposed building at Dinton Pastures. Mr P. J. Chandler replied that the floor space at Dinton Pastures would be twice that at the Alpine Club.

In a general reply to the points raised Mr A. J. Halstead spoke in favour of the move to Dinton Pastures and listed the points in favour of the move. Dr J. Muggleton supported Mr Halstead's comments and stressed that as the Council believed it had done its best to ensure the future of the Society, it was now up to those opposing the scheme to produce a workable alternative. None had been produced so far.

The President then read his report and gave his address.

The President then installed the new President, Mr A. J. Halstead.

The President proposed a vote of thanks to the retiring President, and this was seconded by Mr D. Young. The President asked for permission to publish the Presidential Address, this was given.

Mr R. S. Tubbs gave a vote of thanks to the retiring Officers and Council.

Auditors: the President proposed the election of Mr R. A. Bell and Col. D. H. Sterling as auditors for the coming year, this was seconded by Mr G. N. Burton and Mr R. Dyke, and passed unopposed.

12 March 1991

Mr R. PARKER showed slides taken by Mr R. Frost of some of the butterflies of Cyprus, in particular some of the endemic species and subspecies. These included: the swallowtail *Papilio machaon syriacus* Verity, the meadow brown *Maniola cypricola* Graves, and the Paphos blue *Glaucopsyche paphos* Chapman which has very characteristic large black spots on its underside that are visible even in flight. The butterfly fauna of Cyprus derives from various parts of the Mediterranean and shows interesting peculiarities such as having only a single fritillary *Pandoriana pandora* Denis & Schiffermuller. Questioned on the habitat conservation of the island, Mr Parker reported that despite development in tourist areas, parts of the Turkish north were no longer as agriculturalized as they were. Although some areas were very heavily grazed by goats, they had been so for centuries.

He also displayed a copy of *Linneana Belgica* (Pars 12, numero 8, December 1990) which was entirely devoted to a paper, illustrated by coloured plates, on the butterflies of Cyprus by L. Manil.

Dr J. MUGGLETON showed various slides from the Picos de Europa, the mountain range which separates the northern coast of Spain from the hinterland; and claimed to be one of the last unspoilt wildlife areas in Europe. This may perhaps be because of its isolation, and the difficulty in penetrating the region along unmetalled roads and tortuous mountain defiles using maps of varying degrees of inaccuracy whilst beset with unpredictable rain and cloud. About the only place easily accessible is a huge cirque of inland cliffs at Fuente De, but even here the cable car was not working.

Amongst slides of the wildlife of the area were the small flowered foxglove *Digitalis parviflora*, bee, man and tunnel orchids, a snake eating a lizard, a longhorn beetle *Agapanthia* sp, the lesser bloody nose beetle *Timarcha goettingensis* (L.) and the stag beetle once reputed to be British *Platycerus caraboides* (L.).

Mr R. A. JONES showed three slides of the moth *Monochroa moyses* taken by R. W. J. Uffen, who had recently described the species new to science (*Br. J. Ent. Nat. Hist.* 1991; **4**: 1–8). These showed larvae, mines and an adult moth (dead) on leaves of its foodplant sea club rush *Scirpus maritimus* L.

Mr Jones also showed photographs of insects taken close up, and of some curious gorse bushes, *Ulex europaeus* L., which had been cropped so closely by rabbits as to resemble cushion-shaped topiary.

Mr M. J. SIMMONS showed slides from a trip to the south of France and Andorra. The tiny principality of Andorra appears very built up when crossing the frontier, but away from the town insects could be found. These included the Piedmont ringlet *Erebia meolans*, a cinnabar moth, longhorn beetles and larvae of a spotted fritillary from which adult butterflies emerged on being brought back to England.

26 March 1991

The President, Mr A. J. HALSTEAD showed numerous specimens of the small chloropid fly *Thaumatomyia notata* (Meig.) sent to him in the post, having been found in such large numbers in a house in St Mawgan, near Newquay, Cornwall, as to be a nuisance to the owner. These flies sometimes occur in vast numbers in the autumn, and may have been overwintering in the roof space from which they had presumably begun to emerge. Also shown were specimens collected at the RHS Garden, Wisley, Surrey on 23.x.90, part of a vast swarm flying around a tall columnar conifer, *Chamaecyparis lawsoniana* Murray at 13.30 hours during mild weather.

Mr R. A. JONES showed two species of 'riffle' beetle (Coleoptera: Elmidae) found quite commonly in various streams around Rotherfield, West Sussex on 24.iii.91. These were *Limnius volckmari* (Panz.) and *Elmis aenea* (Muller, P. W. J.). They occur under pebbles in rocky streams and the best means of collecting them is to wade into the shallow running water, hold the net a few inches downstream and kick up the pebbles with the feet. Of the twelve British species in the family only these two, together with a third (*Oulimnius tuberculatus* (Muller, P. W. J.)), are at all widespread and these have a distinct northern and western bias. In Sussex riffle beetles are only very locally distributed, mainly because of the small numbers of stony rivers and streams.

The name of Mr P. J. Partridge was read for the second time and he was duly elected a member.

The Secretary, Dr J. MUGGLETON reported that 1991 library cards for the London Natural History Society library housed in Imperial College, were available to BENHS members upon request. He also displayed some literature on Worldwide Butterflies Ltd supplied by a member Mr Gooden, together with five complimentary tickets.

Mr P. W. CRIBB gave a lecture entitled "A naturalist in the Balkans" relating his various trips to these mountains in Greece and Yugoslavia together with the late Russell Bretherton to whose memory he dedicated the evening.

On a trip to the Tara Gorge, they hired a car to take them up into the hills where butterflies abounded amongst the rough limestone outcrops away from the more intensively sheep-grazed meadows. Many of the common butterfly species were familiar to British entomologists, but as extremely rare and improbable migrants like *Erebia ligea* (L.), the Arran brown and *Lycaena virgaureae* (L.), the scarce copper. In this region the Apollo, *Parnassus apollo* has reddish spots rather than yellow as does the Alpine race and the marbled whites, *Melanargia galathea* (L.) would have been more aptly named marbled blacks, so dark were they.

A trip to the lake district of central Yugoslavia proved slightly less interesting for butterflies but they did come across a bear, fully six feet high when it rose up on its hind legs. At night the air was thick with the calling of midwife toads. The call of this creature sounds just like a bell, and Mr Cribb recalled fondly how Russell Bretherton refused to accept that the noise they were hearing was produced by an animal until a live toad was brought into the house.

The Vrisic Pass leads over the Yugoslavian border with Italy. The road with its 23 hair-pin bends was built by Russian prisoners of war in World War I and it was here that they found a curious race of the green-veined white *Pieris napi* (L.) where the male is very like the British form, but the female is quite dark.

Whilst on a trip to the Greek mountains on the border with Bulgaria, Cribb and Bretherton nearly met their end when the car slipped momentarily out of control, left the road and came to rest balancing on the edge of a precipice. It was prevented from completely toppling over by a single strand of fence wire caught around the front bumper. Eventually they were towed back onto the road and continued on their journey, wondering at the fact that the two fence posts which had saved them were the only fence posts anywhere along the road to have any wire still left between them.

At the north end of the Pindas Mountains, just below the Yugoslavian border they came across large numbers of the nettle tree butterfly *Libythea celtis*. The absence of any nettle trees in the region led them to suppose that the insects had migrated to the mountains to overwinter, and that they would return to the plains, and the nettle trees, to breed.

As well as slides of butterflies and other insects, plants and animals, Mr Cribb showed pictures of much of the spectacular landscape of the area and regaled his audience with tales of travel and adventure in a foreign country.

23 April 1991

The President, Mr A. J. HALSTEAD, exhibited, on behalf of Mr K. Halstead, a colour photograph of a lacewing larva (*Chrysopa* sp., Neuroptera: Chrysopidae) with its covering of plant and prey debris. The head and jaws could be seen at the left end of the larva, with the jaws in the act of striking out at prey.

The President then showed pressed leaves of kingcups (*Caltha palustris* L.) showing damage by the small black weevil *Leiosoma deflexum* (Panz.) (Coleoptera: Curculionidae). He had been sent leaves showing similar damage from a garden at Cannington, Bridgwater, Somerset. Unable to find any reference to pests making small round holes in *Caltha* leaves he went to a boggy meadow at Mayford, near Woking, Surrey on 13.iv.1991 where he found similarly damaged plants. The weevils were found on the plants and were subsequently found to be responsible for the damage.

He stated that little seemed to be known of the biology of this beetle. According to Joy (*Practical handbook of British beetles*) it was found 'in moss and by general sweeping' while Fowler (*Coleoptera of the British Isles*) said that it was found 'in moss and at roots of grasses and appears to live on various Ranunculaceae, including *Anemone nemorosa* and *Ranunculus repens*.' In the garden at Cannington the damage affected all cultivars of *Caltha palustris* but did not affect *C. leptosepala* or *C. polypetala*, both of them non-native plants.

Mr G. W. DANAHAR exhibited *Pterostichus angustatus* (Duftschmid) (Coleoptera, Carabidae), a notable species taken by pitfall trapping beneath pollarded beech (*Fagus sylvatica* L.) at High Beach, Epping Forest, Essex, during 1990. This beetle is said to be associated with burnt wood, but he had found no evidence of this in the trapping site.

Mr R. SOFTLY showed a pupa of a butterfly of the genus *Eurodryas*, belonging either to *aurinia* (Rott.) subsp. *beckeri* or *desfontainii* subsp. *baetica*. This had been found on the trunk of an olive tree (*Olea europaea* L.) at about 2500 feet in the Serrania de Ronda, 30 miles west of Malaga, Spain. The original larval web was visible on a *Lonicera* shrub on which larvae were still feeding while mature larvae had wandered many yards to pupate on olive trunks. He stated that the precise identity would not be established until the butterfly emerges as these species were sympatric in the area. He remarked that while *E. aurinia* was widespread in Europe and North Africa, *E. desfontainii*, also found in North Africa, was restricted in Europe to the south of Spain and the East Pyrenees.

The Secretary, Dr J. MUGGLETON, announced that he still had some complimentary tickets for Worldwide Butterflies, available for distribution.

Miss S. LYNCH said that she was carrying out a survey of the gall-causing eriophyid mites during this year and made a plea for any British material of plants attacked by these mites to be sent to her at the MAFF Central Science Laboratory, London Road, Slough SL3 7HJ.

Miss S. LYNCH gave an illustrated talk on the mites (Arachnida, Acari) associated with bee hives. She specializes in mites of economic importance at the MAFF Slough Laboratory and was also a bee keeper, maintaining a hive in a wild area near to her Laboratory. She spoke of the range of habitats utilized by mites generally and the variety of food sources available to them in a hive which had led to a wide variety of mite species living in association with bee colonies. The first historical record of a mite was by Aristotle, who observed mites on the combs of a bee hive; although he had no visual aid his description could be recognized as referring to a *Glyciphagus* species. Later observations on mites in bee hives did not follow until the second half of the nineteenth century.

She outlined the life history of mites and stressed their rapid development (in as little as 10 days) and rate of proliferation. The taxonomic distinctions between the five major groups of mites and their range of form were illustrated. Differences in food choice and behaviour of representatives of three of these groups living in hives were described.

The Astigmata included scavengers and fungal feeders living mainly in hive debris and was the group including most stored product pests, but also included pollen feeders; the latter were not, however, really a significant problem to the bees. The method of using their chelicerae to crack open spores was described.

The Prostigmata included parasites, predators of other mites as well as fungal feeders and scavengers. They included species of *Acarapis* which are parasitic, living within the tracheae of bees, feeding on the haemolymph; the adult mite enters the bee to oviposit within 24 hours of its emergence from the pupa while the hairs around the spiracle are still flexible. A heavy infestation of *Acarapis* can lead to colony die out, due to suffocation of the bees. There were epidemics in Britain in the early part of this century, when it was described as Isle of Wight disease because of an outbreak beginning there.

The Mesostigmata also included scavengers, fungus and pollen feeders as well as predators and bee parasites. Among the latter was *Verroa*, a large heavily sclerotized ectoparasite of both adults and larvae of bees and its distinctions from the superficially similar 'bee louse' *Braula* (Diptera: Braulidae) were illustrated. *Verroa* is a severe pest of bees abroad, which has spread from Asia across Europe and is the mite equivalent of Rabies as its introduction into this country could have serious consequences. Some other tropical genera with similar habits were discussed but they should not be able to survive here.

28 May 1991

The President, Mr A. J. HALSTEAD showed specimens of two local tachinid flies. *Gymnosoma rotundatum* (L.) was found at rest on a leaf, and also seen sitting on hogweed flowers, at Whitedown, Surrey on 8.viii.87. It is said to be a parasitoid of pentatomid bugs. *Subclytia rotundiventris* (Fall.) was swept at Botley Wood, Hants, in a ride through conifer plantation, 9.vii.90. It is thought to be a parasitoid of the shield bug *Elasmucha grisea* L.

The names of Howard Mendel, Jon Barnard, Gerald Shepherd, Patrick Ploughden Roper and Steven Michael Crellin were read for the second time and these persons were duly elected members.

The President reported having seen large numbers of the St Mark's fly *Bibio marci* (L.) at the beginning of May. This fly is named after St Mark on whose day, April 25th, it is supposed to take to the wing. Mr Halstead wondered whether it were the cold weather or the loss of 12 days with the advent of the modern calender which had brought about this late appearance.

Mr R. A. JONES reported having seen a swarm of bees settled on the saddle of a push-bike in Knightsbridge on 22.v.91. Mr R. A. SOFTLY remarked that this was very early for bee swarms and wondered whether the old adage 'a swarm of bees in May is worth a load of hay' implied a good summer.

The lecture was given by Mr ROBERT BELSHAW of the Natural History Museum, on the topic 'Tachinid parasitoids'. He has been working on a completely revised edition of the Royal Entomological Society's handbook on the Tachinidae, due to be published in 1992.

The British Tachinidae can be characterized by a single uniform feature, a swollen subscutellum. There is a single species without this, but there are only two British records of it. Tachinids are internal parasitoids, mostly of other insects, and have evolved a number of strategies for parasitism. Some lay their eggs on the outside of the host, the larva then hatches out and burrows in. Some species have a more or less developed uterine incubation, and an egg hatches minutes or even seconds after being laid. Some species are practically larviparous. A piercing ovipositor has evolved, apparently independently, in different groups within the family, and eggs are laid directly into the host's haemolymph. In a few species, a highly active first instar larva hatches from an egg laid near the host and when approached by a feeding caterpillar, waves its body about in order to come into contact with the host. Some caterpillars ingest various tachinid's 'micro-eggs' when feeding. These eggs are stimulated by protease enzymes in the caterpillar's gut and the parasitoid larvae hatch.

There is great variety in size within the Tachinidae, from the huge bumblebee-like *Tachina grossa* L., down to minute 2-mm flies. There are a few metallic greenbottles, but most are mainly reds, yellows, browns and greys.

The host range is quite diverse; although moth larvae are the commonest hosts, various tachinid species specialize in parasitizing centipedes, cranefly larvae, shield bugs, sawfly larvae, beetles (both adults and larvae), orthoptera and earwigs. There are even a very few which attack spiders and scorpions.

Work on the handbook had brought to light many biases in the recorded distributions and host organisms of tachinids. Most breeding records were from Lepidoptera rather than other larvae, and most distribution patterns seemed to follow the distribution of dipterists.

Along with his work on the identification of tachinids, Mr Belshaw had studied the spacial distribution of tachinid species across various habitats at the experimental station of Imperial College's Silwood Park. Using malaise traps in various areas of plant succession, from bare earth, to grassland (5 year's growth) to scrub (12 year's growth), he compared catches according to numbers of specimens, numbers of species and particular groups of individual species. Despite the close proximity of the various succession sites, tachinid catches broadly followed quite closely the local availability of hosts within each site, although the presence of nectar and plant secretions distracted some species towards the more developed vegetation.

After a number of questions from the audience regarding the absence of hyperparasitism and the lack of any apparent strategies to avoid superparasitism, Mr Belshaw concluded that tachinids were rather 'unsophisticated' parasitoids.

Joint meeting with the British Arachnological Society

11 June 1991

The President, Mr A. J. HALSTEAD welcomed the British Arachnological Society.

The President, exhibited the rare cranefly *Ctenophora flaveolata* (F.), found at rest on a wooden post at Sheepleas, near West Horsley, Surrey, 27.iv.91. The larvae develop in rotten wood, and appear to be associated with over-mature beech. It is accorded 'red data book' 1 status, is known mainly from the New Forest area, and there are only six 10-km-square records since 1960. The latest of these is reported in *Br. J. Ent. Nat. Hist.* 1991; 4: 64 by K. N. A. Alexander, from Gloucestershire.

He also showed a live male of the tephritid fly *Goniglossum wiedemanni* (Meig.), found on a white bryony flower (*Bryonica dioica* L.) at R.H.S. Garden, Wisley, Surrey, 11.vi.91. The larvae develop in the fruits of this plant.

Lastly, he showed a live specimen of *Norellia spinipes* (Meig.) (Diptera: Scathophagidae), bred from a mine found at the base of a daffodil leaf (*Narcissus pseudonarcissus*) at R.H.S. Garden, Wisley. The mined leaf was collected on 16.v.91, and the adult emerged on 11.vi.91. This fly was described new to Britain by Chandler, P. J. & Stubbs, A. E. 1969. *Proc. Trans. Br. Ent. Nat. Hist. Soc.* **2**: 120–124.

Mr R. A. JONES showed two examples of extreme size variation in beetles. A specimen of the weevil *Liophloeus tessulatus* (Müller, O. F.), from Nunhead Cemetery, 2.vi.91 was 12.5 mm long compared to its 'standard' size of 7–11 mm. Three huge females of the click beetle *Melanotus erythropus* (Gmelin) from Chailey Common, 24.ii.91, were 18, 19 and 20 mm respectively, at the top end of the wide size range of 11–20 mm for this species.

Also shown were two local insects taken recently, these were *Ptinus sexpunctatus* Panz. (Coleoptera: Ptinidae) from his house in Nunhead, 28.v.91 and *Eurydema oleracea* (L.) (Hemiptera: Pentatomidae), from Nunhead Cemetery, 8.v.91.

Lastly, he showed a specimen of *Hylecoetus dermestoides* (L.) (Coleoptera: Lymexylidae), on behalf of Mr C. W. Plant, into whose car it flew whilst he was visiting Pont-y-pant, North Wales, 28.v.90.

The names of Alan Hubbard and Gianfranco Liberti were read for the second time and these persons were duly elected members.

The lecture, 'Scorpions' was given by Dr A. LOCKETT, visiting the United Kingdom from Australia. Most people know what a scorpion looks like: it has eight legs, two chelicerae, two claws, a sting, and on the underside of its abdomen two pectins and book lungs. Scorpions are ancient creatures, dating (in the fossil record) at least as far back as the Silurian age 430–400 million years ago. The fossil record is incomplete, but current opinion holds that precursors were probably marine, as they had no lungs.

In Britain there are no indigenous scorpions, but *Euscorpius flavicaudis*, a European species, has become established in the Sheerness docks and on Ongar tube station. This colonization indicates that Britain *is* suitable for their survival, and that their absence may be due to the last ice-age. The idea that scorpions only live in warm climates is erroneous, and many species live in cold montane conditions. Dr Lockett had studied scorpions from various continents, but living in Australia had brought him into close contact with them and it was with specific reference to this fauna that he illustrated his talk.

Scorpions have an evil reputation, but only a very few species across the globe are at all dangerous. These include some of the larger buthids, which are characterized by their relatively small claws but large stings. The scorpionids are, by contrast, often very reluctant to use their diminutive stings, preferring to attack with their larger claws.

An easy way to look for scorpions was with a 'black' light, since scorpions fluoresce under this ultra-violet light. Having found them, they are easy to keep, requiring little food and even less water. They are long-lived and there are reports of them being kept for up to 11 years. Several are sexually dimorphic, including a particularly striking Australian example which lives in cracks in rocks. The male has huge semi-circular claws, forming an impenetrable barrier when hidden in a crevice. The female however is short and dumpy with only small claws.

Dr Lockett was particularly struck by a peculiar species which he found under logs and other flotsam stranded on the sun-baked surface of dried up lakes in the centre of Australia. It proved to be a species and a genus new to science which he was able to name *Australobuthus xerolimniorum*.

Structural abnormalities of scorpions are known, such as individuals possessing two tails, and recently he discovered two specimens of a common gregarious species which appeared to lack pigment. Dissection and examination of the eyes, which normally contain light-sensitive pigments in special cells, proved the individuals to be true albinos, the first such record for scorpions.

SHORT COMMUNICATIONS

***Oedalea ringdahli* Chvála (Diptera: Hybotidae) new to Britain.**—On 13.vi.1984 near Altnabreae, Loch Achilty, East Ross (O.S. grid ref. NH 427569) I swept a single male *Oedalea* which I immediately recognized as being different from the seven previously recorded British species of this genus on account of the almost uniformly black legs. The fly was caught beside a shaded stream under predominantly birch woodland. Despite intensive searching of the area in the vicinity of this capture, no more examples of this distinctive species could be found. Consulting the excellent volume in the *Fauna Entomologica Scandinavica* series by Chvála (1983) that evening soon established the identity of the addition to our fauna as *Oedalea ringdahli* Chvála. This species was described as new by Chvála (1983) from the holotype male collected by Ringdahl at Umfors, Lycksele Lappmark, Sweden on 20.vi.1937. This was the only specimen which had been seen by Chvála at the time he described the species.

Chvála (1983, p. 179) mentions the existence of two dark-legged specimens of *Oedalea holmgreni* Zett., referred to by Collin (1961, p. 293), and suggests that these may in fact be *O. ringdahli*. Through the kind assistance of Mr Adrian Pont (formerly of the Diptera section, British Museum (Natural History)) I have been able to examine the male from Cusop Dingle, Herefordshire, 16.vi.1914 (*leg.* J. H. Wood) which is housed in the Natural History Museum (NHM) British Diptera collection. The specimen bears a label in Collin's handwriting "Oe. holmgreni *var.*" which confirms that he examined this specimen. Careful comparison of the male from Cusop Dingle with the male from Altnabreae indicates that they are conspecific. The antennae are identical, both individuals have the anterior part of the notopleural depression polished (this is grey-dusted in *O. holmgreni*) and the pattern of leg coloration is the same, though the dark areas on the legs of the older specimen have apparently faded slightly. The male from Altnabreae is side-pinned and the characteristic pair of strong prescutellar dorsocentral (dc) bristles are readily visible in consequence (though the right dc is longer and stronger than the left). The male from Cusop Dingle is pinned vertically in the traditional British manner and as a result the area of the thorax in front of the scutellum is obscured and the dc cannot be seen.

I have not been able to trace the second male mentioned by Collin (1961, p. 293) from Harpenden, Hertfordshire, 22.vi.1950 (*leg.* B. R. Laurence) which is apparently not present in the NHM collections.—I. F. G. McLean, Nature Conservancy Council, Northminster House, Peterborough PE1 1UA.

References

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A further record of *Oedalea ringdahli* Chvála (Diptera: Hybotidae) in Britain.—Whilst identifying Diptera collected by malaise trap which had been operated in the Black Wood of Rannoch, Perth and Kinross District, Tayside Region, Scotland, (grid ref. NN5655) I came across a single male *Oedalea* which was markedly darker than usual. It differed from all the other *Oedalea* species with which I was familiar in having all the femora and tibiae extensively darkened. The specimen keyed out in Chvála (1983) to *O. ringdahli* Chvála. Chvála states that at that time *O. ringdahli* was only

known from the holotype which was taken in the mountains about 10 Km north of Tarna in northern Sweden. He concludes that it is a northern, rather mountainous species. As this appeared to be a rare and little known species in Europe I sent the specimen to Dr Chvála who kindly confirmed the identification. He also informed me that *O. ringdahli* has also been found at Vastmanland in southern Sweden by A. C. Pont and in Norway by T. Jonassen. *O. ringdahli* has previously been regarded mainly as a Scandinavian species so its appearance in the Scottish Highlands is perhaps not too surprising as there are other woodland empid species such as *Tachypeza truncorum* (Fall.) which show a similar distribution (MacGowan, 1986).

The malaise trap in the Black Wood of Rannoch was situated at an altitude of 250 m on a gently north facing slope. The trap was sited within the native Caledonian pinewood, the canopy being dominated by large, mature Scots pine (*Pinus sylvestris* L.) with occasional birch (*Betula sp.*). The ground flora was almost entirely dominated by *Calluna vulgaris* L. The trap was emptied on the last day of each month, the *O. ringdahli* specimen being taken in the July sample. Other members of the same genus taken in the Rannoch trap included *O. stigmatella* Zett., (two females) and *O. zetterstedti* Collin, (two males, five females). I have taken both of these species previously in malaise traps operated in native pinewoods with *O. zetterstedti* being the most widely distributed. Both species tend to be more common in the drier and eastern pinewoods rather than in the west. Perhaps the most important factor influencing the capture of all the *Oedalea* species was the presence some 10 m from the trap of a large dead, fallen Scots pine. Several authors have reported rearing the larvae of *Oedalea* from dead wood in the past (Collin, 1961).

In Norway *O. ringdahli* would appear to be not uncommon on the west coast. Specimens have been taken in the lower branches of a large Norway spruce (*Picea abies* L.), in clearings in deciduous forests, in a garden and at the edge of a swampy forest. The only factor which these sites had in common was the presence of rotting wood. Its apparent rarity may well be due to the fact that this species has a short flight period (T. Jonassen, pers. comm.).

Chvála (1983) makes a note in his description of *O. ringdahli* that the two dark specimens of *O. holmgreni* referred to by Collin (1961) from England may in fact refer to specimens of *O. ringdahli*. One of these specimens was taken by J. H. Wood at Cusop Dingle in Hertfordshire on 16.vi.1914 (see McLean, 1991) with another similar specimen being taken by B. R. Laurence at Rothamsted also in Hertfordshire on 22.v.1950. I have contacted Dr Laurence regarding his specimen but the individual may have been preserved in alcohol with many other specimens and cannot be traced at this time. The specimen was taken resting on a leaf in a hedgerow. The confirmation by McLean (1991) that the Cusop Dingle specimen is indeed *O. ringdahli* must greatly increase the probability that the Rothamsted specimen also belonged to the same species.

I thank M. Chvála, B. R. Laurence, T. Jonassen and I. F. G. McLean for their assistance in the preparation of this note.—Iain MacGowan, Nature Conservancy Council, 9 Culduthel Road, Inverness IV2 4AG.

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***Oedalea ringdahli* Chvála (Diptera: Hybotidae) in Britain.**—On 28.v.1989 at Cwm Sere, a north-facing valley at 320 m above sea level on the northern slope of the Brecon Beacons, Brecknockshire (grid ref. SO 0323) I swept a very dark-legged female *Oedalea* sp. from under *Alnus/Betula/Quercus* woodland. The specimen was tentatively determined as *O. ringdahli* using Chvála (1983) but as the female is undescribed it was not until I collected examples of both sexes from the same locality on 17.vi.1990 that I was able to confirm the determination by examination of the male genitalia.

The female differs from the male primarily in that the upper facets of the eye are not enlarged, the third antennal segment is slightly broader basally and the halteres are pale. The legs are slightly paler (considerably so in the 1989 specimen which is rather teneral) and the whitish dorsal hairs on the posterior femora are much shorter. The "ovipositor" is shining black but paler and lightly dusted dorsally.

O. ringdhali is generally considered as a Scandinavian species but recent records from Scotland (McLean, 1991; MacGowan, 1991) and confirmation that the dark-legged specimen from Cusop Dingle, Herefordshire referred to *O. holmgreni* Zett. by Collin (1961) is in fact *O. ringdahli* (McLean, 1991) indicate that the distribution extends to include the north and west of Britain. The empidoid fauna of the Brecon Beacons and the Black Mountains (Cusop Dingle is a woodland valley on the northern periphery of the Black Mountains, 25 km north east of Cwm Sere) is rich in species having a northern and western distribution in Britain. These include *Chelifera pectinicauda* Collin, *Hilara media* Collin, *H. canescens* Zett. and *H. germanica* Engel which outside Scandinavia is previously known only from Scotland. Other species of *Oedalea* have been reared from rotting wood and it is probable that *O. ringdahli* will be found in association with fallen timber in other upland woodlands in the north and west of Britain.—Adrian R. Plant, 41B Llanfair Road, Pontcanna, Cardiff CF1 9QA.

References

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OFFICERS' REPORTS FOR 1990

Council's Report

The Society's membership again showed a net increase, with 48 new members being elected during the year. Against this 15 members were struck-off for non-payment of subscriptions and 16 members resigned. Four deaths were reported to the Society during 1990. At the end of the year Messrs R. M. Payne and H. R. Last completed 50 years' continuous membership of the Society and were elected special life members.

The council met eight times during 1990 and, on average, 13 members attended each meeting. The greater part of the Council's time during 1990 was spent considering new accommodation for the Society. It became apparent early in the year that our hope of finding accommodation in Central London was becoming increasingly unlikely. At about the same time, and following an approach by our member Mr W. Parker, the Society received the offer of a site at Dinton Pastures Country Park near Reading where we could erect a building to house the library and collections. The site is owned by Wokingham District Council, who made the offer providing we included within our building a separate exhibition area for the country park. A series of discussions were held with the country park management and a feasibility study was commissioned from an architect. As a result the BEHNS Council felt that a move to Dinton Pastures was feasible and, in the circumstances, desirable. However the Council also felt that, on an issue as important as this, the membership should be consulted, and a letter from the President, listing the options open to the Society, was circulated to all members asking for their opinion. 271 replies were received, representing 35% of the membership, and of these 251 (94%) were in favour of a move to the Dinton Pastures site. The Council therefore decided to proceed further, an estimate of the building costs has been obtained and the district council has been asked to draw up the terms of a lease. Subject to satisfactory negotiations concerning the lease, the approval of the Society's trustees and the granting of planning permission, the Council hopes that building will commence during 1991. Mr Peter Chandler has played the leading part in the discussions and negotiations concerning this scheme, and the Council is very grateful to him for all the time and effort he has put in on the Society's behalf.

The President, on behalf of the Society, wrote to ministers and various other individuals and organizations, expressing the Society's concern at the proposed changes in organization at the British Museum (Natural History) and, in particular, at the reduction in taxonomic work in entomology; unfortunately no convincing replies were received.

After 12 years as Treasurer, Col. D. H. Sterling resigned at the end of the year. The Society is very grateful to him for his careful stewardship of the Society's finances during this time; he will become one of the Society's auditors. The Society's new Treasurer will be Mr Tony Pickles who was co-opted onto the Council during 1990 to assist with the changeover. One other change in the Society's officials is that Mr Roger Hawkins took over the post of Sales Secretary at the beginning of the year.

Eighteen indoor meetings were held in 1990, ably organized by Michael Simmons. The meetings covered Lepidoptera (3), spiders and mites (3), Coleoptera (2), Odonata (2), Diptera (2), Hymenoptera (1), Hemiptera (1) plants (1) and general entomology and slide evenings (3). After an encouraging start, attendance at the meetings, which are now held in the meeting room of the Royal Entomological Society, has been very disappointing. On average only 18 members attended each meeting, and one attracted an audience of only seven. Considering the location of the meetings, with good access

to public transport, parking outside the door, the proximity of the Natural History Museum and the introduction of tea before the meeting, these low attendances are causing the Council some concern. It may soon be difficult to justify the continuation of these meetings which attract such a small percentage of the Society's members. Roger Key arranged 23 field meetings for 1990 and again introduced some new venues. However those meetings held outside the south–east were very poorly attended. Mr Key resigned as Field Meetings Secretary during the year, and his place has been taken by Mervyn Brown.

Dr Basil MacNulty once more guided the Annual Dinner to a successful conclusion and the 56 members and guests attending had an enjoyable meal. The number of members who signed the attendance book at the Annual Exhibition was 185, which was very similar to the number signing in 1989, but the number of visitors was lower at 54. The exhibition was masterminded by Andrew Halstead, who announced his intention of resigning as Exhibition Secretary on becoming President in 1991; he will be succeeded by Michael Simmons.

Treasurer's report

As you will know I have audited our Society's accounts for some 10 or 11 years before being asked to be Treasurer. I might be considered to have some insight into these accounts therefore, but I must say that it is only in the last 2 months that I have had any real appreciation of the work of my predecessor Col. Sterling and of the Assistant Treasurer, Geoff Burton who continues to wrestle with the subscriptions.

Financially, this has been a good year for the Society and I have taken over as Treasurer assets worth some £284 000 at 31 December. We have benefited from the high level of interest imposed by the Chancellor as others have suffered, and included in the various funds of the Society is over £34 000 of interest and other investment income earned in the last year.

On the down side, the Stock Exchange collapse last autumn has seen the market value of the investments held on the exchange fall from £64 000 in 1989 to £57 000; although this is still well in excess of the cost of £33 747 included in the balance sheet and in the figure of £284 000. Recent trends, since the start of the Gulf war, have seen an improvement on this position.

Turning to the Income and Expenditure Account, this showed an excess income over expenditure of £3768, but this was only after the receipt into this account of £6975 of investment income. In other words it cost £3207 more to run the Society than was raised from the members and activities. As it is the Council's intention that eventually the Society should be self financing in this respect and should not rely on investment income, an increase in subscriptions as previously circulated was approved. It must be pointed out that the costings used to arrive at the new level of subscription are somewhat uncertain, as is the future home of the Society.

It may be that in a year's time we will have both a permanent home and as a consequence a much slimmer balance sheet. If the hope of a permanent home is achieved, it will be in no small measure the result of the sound, financial management our Society has enjoyed under Col. Sterling who has left the finances in such a strong position. I would like to add a word of personal thanks for the assistance he has given me in taking over as Treasurer and the easy ride I have enjoyed as Auditor.

A. J. Pickles

Balance sheet as at 31st December 1990

1989 £				1990 £	
26744		*General fund*	—Opening balance	29779	
3035	29779		Excess of income over expenditure	3768	
			Gain of redemption	125	33672
	2308	*Housing fund*	—Balance		2308
22066		*Special*	—Opening balance	23859	
1793	23859	*publications*	Surplus from sales	1868	25727
48535		*Hammond, Crow*	—Opening balance	185586	
10582		*& Pelham-*	Income	26814	
27500		*Clinton*	Crow bequest	6547	
100000		*Bequest funds*	Pelham-Clinton bequest 89,	470	
186617			Redemption gain 90.	219417	
1031	185586		Expenditure	1392	218025
3494		*Hering*	—Opening balance	4296	
1000		*memorial*	Donation	1000	
		Fund	Gain on redemption	31	
525			Income	619	
5019				5946	
723	4296		Expenditure	1400	4546
	245828		*Total funds*		284278
			These funds are represented by:-		
			Investments at cost (details appended)		
39658			General and bequest investments	33748	
3340	42998		Hering Memorial Fund investments	3540	37288
			Stock		
7262			Special publications at cost	6192	
241	7503		Christmas cards	221	6413
			(The value of the library, collections, ties, back numbers of *Proceedings* and *Journal* and the computer system is not included in the accounts)		
			Liquid assets		
46078			N.S. investment account	51836	
1367			Debtors and advance payments	1699	
135000			Cash on sterling money market account	169000	
8763			Cash on business reserve account	19051	
5675			Cash on current account	3664	
196883				245250	
1556	195327		Less subscriptions in advance, amounts owed and	4673	240577
	245828		provisions		284278

There is a contingent liability for £1500 architect's fees if the Dinton Pastures building project does not proceed.

Income and expenditure account for 1990

1989 £		1990 £	1989 £		1990 £
4062	Publications account	3411	5700	Subscriptions	5226
1806	Rent and insurance	2750	6229	Interest and dividends	6975
1224	Stationery and general expenses	1338	152	Donations	377
729	Indoor meetings & exhibition	945	16	Surplus on Christmas cards	23
	Library	173	412	Surplus on cabinets & collections	
129	Subs/donations other societies	128	184	Surplus on library	
1777	Move from Alpine Club	88	69	Surplus on dinners 1988 & 1989	
3035	Excess income over expenditure	3768			
12762		12601	12762		12601

Publications account 1990
(Publications free to members)

4701	Production of *Journal*	5269	808	Sales	1280
930	Distribution costs	814	761	Bequest funds grant for plates	1392
			4062	Net cost to income & expenditure	3411
5631		6083	5631		6083

Special publications account for 1990
(Publications for sale)

8499	Opening stock	7262	3053	Sales	3514
	Larvae	205	400	Excess 1988 provision	
423	Distribution & general costs	371	7262	Closing stock	6192
1793	Surplus to Spl. Publications fund	1868			
10715		9706	10715		9706

Schedule of investments as at 31st Dec. 1990

		Book value at cost: General & bequests £	Book value at cost: Hering memorial £	Assessed current market value	£
1230	Shell T&T 25p Ord.	477.79	771.83	@ 458	5633
750	Unilever 5p Ord.	248.45		@ 683	5123
6272	M&G Charifund Units	19091.17	1147.24	@ 486.9	30538
£2450.90	Treas. 9½% 1999	771.22	1621.21	@ 92 17/32	2268
£3863.71	Treas. 8¾% 1997	3687.94		@ 89 9/16	3460
£3882.90	Treas. 9% 1994	3759.57		@ 93 13/32	3636
£4098.06	Treas. 13¾% 1993	4041.44		@ 105 26/32	4336
£2138.90	Funding 5¾ 1991	1670.00		@ 98¼	2101
		33747.58	3540.28		57095

Auditors' report

In our opinion the annexed balance sheet gives a true and fair view of the Society's affairs as at 31st December 1990 and the income and expenditure accounts give a true and fair view of the Society's results for the year.

A. J. PICKLES FCA
R. A. BELL

Professor Hering Memorial Research Fund

Three grants have been made for 1991, the sums awarded totalling £1400. This amount, which is unusually high for the Hering Fund, has become available largely through the generosity of the anonymous donor who supported us also last year. The Committee is extremely grateful for this gift.

The Committee was particularly pleased to be able to support Dr Wolfram Mey, from the Museum für Naturkunde der Humboldt-Universität, Berlin, for a visit to the Natural History Museum, London. Dr Mey holds a position at the very institute at which Professor Hering worked, so the grant is highly appropriate. Dr Mey visited London in February 1991 to work primarily on microlepidopterans and also on Trichoptera. The Committee agreed to award him the sum of £850.

Dr Jane Memmott of the Natural History Museum, London, was awarded £500 to support her fieldwork on tropical leaf miner communities in Costa Rica. Dr Memmott is examining the effect of parasitoids and predators on the biology of leaf miners.

Mr William Booth, a PhD student from The University of Wales at Cardiff, has been awarded £50 towards the cost of an expedition to study the foodplant range of the spittlebug *Philaenus spumarius* (L.). Whereas in New Zealand this insect appears to feed exclusively on grasses, elsewhere it feeds on a wide range of plants but rarely on grasses.

May I take this opportunity to thank the editors of the several journals who advertise details of the fund.

M. J. Scoble

Librarian's report

Despite not having a library to oversee, the year seems to have been a busy one. Efforts continued throughout most of the year to try to perform an exercise of damage limitation with regard to the theft of some of the Society's books. Many of the organizations that deal with this type of offence have now been alerted to the possibility that more of the Society's books may be offered for sale elsewhere.

Connected with the Society's endeavours to rehouse itself a number of enquiries were made from commercial suppliers of library shelving systems in an effort to give a true price of what it would cost to house the library in the future.

A considerable amount of time has been spent this year in informing the many British and international organizations with which we exchange journals, of our address change. This rather mundane job has been made worse by the fact that many organizations do not appear to make the necessary corrections to their address lists straight away.

Performing this task has been made considerably easier by the use of my own personal computer and it has become evident to me that the Society ought to consider the many benefits it would have from having its own modest system in the library. Certainly if structured correctly such a system would considerably help members self-select books. It would also help the management of the library in the purchase of new books and in overseeing the loan system. Equally however there could be a number of problems the Society would have to overcome, for example in the adaptation of appropriate software. A particularly urgent requirement, when the Society is eventually rehoused will be the production of multiple lists of the library holdings, to use when we re-install the books from storage. With these requirements in mind I asked Council for permission to form a small subcommittee specially to look into this subject. I hope the members of this subcommittee will shortly convene for the first meeting.

One exchange has been arranged during the year for the Society to receive the French journal *Alexanor (Revue des Lepidopteristes Français)*, which we formerly received by the graciousness of the late Mr S. N. A. Jacobs.

Thanks are due to Mrs A. W. Gould for donating a number of books to the Society in memory of her husband. I would also like to thank all of the members who have continued to help and support me and the library during a difficult year and I particularly thank the President, Colin Plant, for his invaluable help and suggestions in dealing with the thefts from the library.

S. R. MILES

CURATOR'S REPORT

As might be expected from the situation resulting from the vacation of the Alpine Club at the end of 1989, curation has been at a low ebb during the past year and the search for a new location for the collections and library has been a more pressing priority.

The bulk of our collections have now been in store at Fulham for more than a year and even if our present plans about premises come to fruition, are likely to remain so for most of 1991.

As I stated last year the cabinets are arranged to permit access for curation and I have continued to make visits at irregular intervals to ensure that preservative levels are topped up and to check for the presence of any *Anthrenus* beetles. Altogether five visits have been made and I can say that storage has been of a satisfactory although not ideal standard. A single *Anthrenus* beetle was detected on the December visit and the situation will continue to be watched closely. The possibility that humidity may be a problem in the winter months is recognized and this will be monitored.

The Torstenius collection will remain in the care of Mr Ashby to whom I am grateful for his contribution. The bees are still with Mike Edwards and I understand from him that records for the Aculeate Recording Scheme have been extracted by George Else. Progress in other areas has not been practicable, the future plans previously outlined having to await the relocation in new premises.

During 1990, the Society received a request for information on the size, content and associated documentation of our collections from Mr J. Bateman of the Natural Science Collections South Eastern Research Unit. Information is being collected for the preparation of a register of natural science collections for this region. Similar registers have already been published for other regions. Both institutions and private collectors have been contacted and the intention is to make the information available to researchers. Outline information has been provided to Mr Bateman with the indication that more detailed information can be provided when required, but stressing that the collections will not be available for examination by researchers while they are in store.

I consider that any future publicity about the existence and content of our collections can only be beneficial to the Society. I have noted that many authors of revisions list several museum collections they have consulted but only rarely have the Society's collections been taken into account. When we do relocate, preparation of an account of the scope, content and principal collectors involved, to make the importance of the collections more widely known, will be given attention in addition to completion of the cataloguing already begun.

I am grateful to all those who have given assistance or support during the year, and hope that a more encouraging report can be made in a year's time.

P. J. CHANDLER

EDITOR'S REPORT

The usual style of the Editor's report is to drily state that in whatever year we find ourselves, the Society's journal published however many pages, with however many colour plates and about whatever subjects. But, as with any journal, the prime aim is to get into as steady a routine as possible, to guarantee a continuous supply of quality material for its readers.

Luckily, I have found myself in a period of relative calm, amidst the Society's uncertain future. Material drops through my letterbox with remarkable regularity, and my answering machine is constantly recording messages of intent from potential authors.

So instead of reporting on the number of pages published (anyone can look on their library shelves to discover this figure), it might be interesting to briefly examine the content and style of the journal over the last few years.

A precise study of the members' interests could be painstakingly calculated from the last membership list, but a reasonable estimate can be made from the reports of the annual exhibitions, for which exhibit numbers and their relative proportions are moderately consistent over the last 4 years. We can then compare these interests with the amount of material actually published in the journal (Table 1).

Table 1. Comparison of BENHS members' interests and articles published in the journal. Categories follow those of the annual exhibitions.

Order	Interests (%)	Material published (%)
British butterflies	13.7	14.4
British macros	29.5	10.8
British micros	18.3	7.8
Foreign Lepidoptera	10.1	10.5
Lepidoptera total	71.6	43.5
Diptera	8.5	21.6
Coleoptera	9.8	22.1
Hemiptera	2.7	2.1
Hymenoptera	4.5	6.0
Other orders	2.9	4.7
Total	100.0	100.0

Interests are calculated from exhibit numbers at the 1985, 1986, 1987 and 1988 BENHS annual exhibitions.

Material published is calculated from the number of articles in *Br. J. Ent. Nat. Hist.* volumes 1–3, 1988–1989, and does not include meetings reports (except the annual exhibitions), announcements, book reviews, obituaries, or articles of wide general interest.

Despite the fact that lepidopterists constitute over 70% of the membership, Lepidoptera papers make up only 43.5% of the journal. This is less than the amount of space given over to Coleoptera and Diptera (43.7%) although coleopterists and dipterists represent less than 20% of the members. Of course, these figures are only very approximate, but I think it does prove that it is the coleopterists and dipterists who are especially forward in publishing their articles.

I should point out that the amount of material published reflects almost exactly what is submitted, and despite my own interests in Diptera and Coleoptera, I promise that I am not exercising any improper selection procedure. I suspect the selection is made by members, when they submit their articles to other journals.

In spite of this apparent disloyalty, I continue to receive much enthusiasm and support from lepidopterists and non-lepidoperists alike, and I hope that they still find the journal as enjoyable and satisfying as I do.

RICHARD A. JONES

BENHS FIELD MEETING

Hoe Stream at Mayford near Woking, Surrey, 20 May 1990

Leader: **A. J. Halstead**. Three members joined the leader on a warm sunny day. The site consists of the banks of the Hoe Stream with a flower-rich wet meadow and *Equisetum* swamp. There is a piece of scrubby deciduous woodland and some over-mature trees along the banks of the stream. Several local flies were recorded, including *Hilara discoidalis* Lundbeck (Empididae), *Psacadina verbekei* Rozkosny (Sciomyzidae), *Gimnomera tarsea* (Fall.) (Scathophagidae), *Parhelophilus versicolor* (F.) and *Epistrophe nitidicollis* (Meig.) (both Syrphidae). Amongst the more interesting sawflies were *Hartigia xanthostoma* (Evers.) (Cephidae), *Tenthredo distinguenda* (Stein) and *Pseudodineura fuscula* (Klug) (both Tenthredinidae).

BOOK REVIEWS

Butterflies in south-east Cornwall by M. P. Frost and S. C. Madge, Caradon Field & Natural History Club. A5 booklet (available from A. Aston, Briar Cottage, Downderry, Torpoint, Cornwall), 1991, 69 pages, 35 maps, £3.95 plus P&P 50p.—This excellent and well produced booklet of the butterflies which occur or have been recorded from this area of Cornwall between the rivers Tamar and Fowey, is a welcome addition to the mounting number of local lists available to the lepidopterist though this publication is far more than just a list. It consists of an introduction, a map of the area with a one-kilometre-square grid based on the usual 10-kilometre grid, details of the survey and the coverage problems involved, acknowledgements and a list of observers. The main body of the text deals with the individual species recorded and the endemics each have a map indicating the occurrence within the one-kilometre squares. Then follow the remarks and observations on coverage, status, habitat, flight period and food-plants. Finally there is a gazetteer for the places and their relevant squares within the areas, a page of references, and an exhaustive index giving both common and scientific names. The shiny plastic cover has an enlarged photograph of the small copper, *Lycaena phlaeas*, at rest superimposed on its distribution map and on the back cover is another, this time of a male silver-washed fritillary, *Argynnis paphia*, feeding on bramble. The reviewer has no hesitation in recommending this booklet as it is a 'must' for anyone interested in our native butterfly fauna. No doubt that now it has been published it will encourage more observations to be made in this area thus enabling more 'blanks on the map' to be filled in.

T. G. HOWARTH

Field guide to butterflies and moths of Britain and Europe by Dr Helgard Reichholf-Reim, Consultant Editors: Dr Jeremy Thomas (Butterflies) and Barry Goater (Moths), Crowood Press Ltd, 1991, 287 pages with 579 colour photographs and many line illustrations. Paperback, £8.99.—The contents consist of a short

preface, a key to the symbols used throughout the text and the colour-coded symbols for the families, an introduction giving general remarks on Lepidoptera, their numbers, distribution and structure as well as how to search for them. The main portion of the book consists of the text and plates with the text on the left page and the plates on the right hand side. The text is arranged so as to correspond to the arrangement of the photographs opposite them. This consists of a brief description of the adult, habitat type, distribution, abundance, flight period, life-cycle, larval food-plants and any general remarks. There follows short chapters on classification, metamorphosis, conservation, information on legislation and codes of conduct concerning entomologists, societies and national journals, photographic acknowledgements, a brief bibliography and indices for the English and scientific names. After the short section on metamorphosis there are 12 plates illustrating life-histories of four species followed by four plates of larvae in their natural surroundings and then two of pupae.

As soon as one examines this book it is immediately apparent the strict limitations that have had to be set by the author in his choice of the species included and therein lies one of the main criticisms that may be made concerning this guide. It is felt that the user would stand only a fair chance of identifying his or her specimens as only very few representatives of many genera are dealt with. Those species that are included are extremely beautifully illustrated with the adults either shown at rest or set. Many of their larvae are also figured either as colour photographs or as text figures.

Most of the species illustrated are enlarged so that it would have been helpful to the reader if a scale had been included, perhaps on the inside of the front or back covers. It would appear that the amount of text allotted to a species governs the amount of enlargement of its portrait, i.e. if six species are dealt with on a page of text then the six photographs of the adults are so enlarged that they all appear about the same size.

The colour coding of the symbols is placed in the top right-hand corner of the plates and unfortunately some ten of these cut into the right fore wing of the imago there figured. The identification of some of the butterflies by the user is made more difficult if not impossible when only one surface is illustrated. The nomenclature used follows that of P. Leraut (1980) though this does not agree necessarily with modern usage here—*Vanessa* instead of *Cynthia* for *cardui* etc. One spelling error has been noticed, i.e. p. 38 *Nymphalus* for *Nymphalis*. There is also one misidentification on pl. 274 where the larva figured as that of the pale clouded yellow belongs to that of Berger's clouded yellow, *Colias australis*. On p. 126 the text of the two species—the oleander hawkmoth and the broad-bordered bee hawkmoth—has been transposed and the figure of the larva is wrongly attributed. There seems little point for the figures of the adults on this page and the preceeding five pages. The scientific index is arranged alphabetically according to genera not species which makes it very difficult if the user is unfamiliar with the genus concerned. In spite of these few criticisms the book itself is well printed and the beautiful plates are particularly interesting.

T. G. HOWARTH

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