The Bulletin of the Amateur Entomologists' Society

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Note: (B) = Botanical name

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The Bulletin

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The Amateur Entomologists' Society

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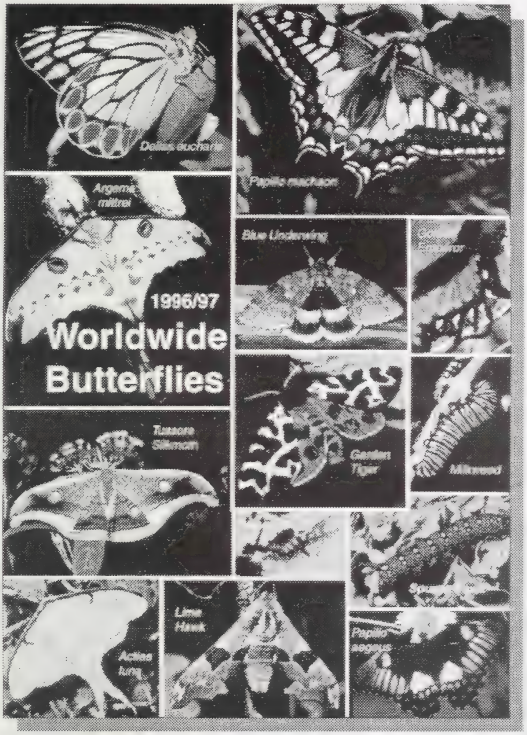

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There will be talks and a bug hunt aimed at all levels of interest.

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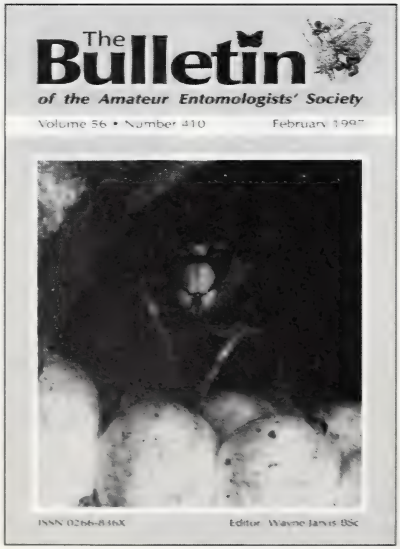

The cover of this issue of the *Bulletin* features the Social wasp (*Dolichovespula media*).

Photo: Nick Holford

The Bulletin
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Editorial

The AES Bug Club is now up and running, and the first issue of the *AES Bug Club News* has been included with this *Bulletin*. Numbers of our Junior membership have already increased and we are looking forward to the events over the next twelve months. We are still looking for volunteers to help run junior events around the country. If you are interested, please contact us as soon as possible.

The Society's Annual General Meeting and Member's Day takes place on Saturday 26th April 1997 at the rooms of the Royal Entomological Society of London. The day begins at 11am and involves a variety of talks and events aimed at all levels. The Society welcomes nominations of people who are interested in joining Council. These should be sent to the Secretary at the usual address. We are also looking for a person to step into the shoes of our current Advertising Secretary, Rob Dyke. Rob would like to stand down from this post at the Annual General Meeting and we therefore need someone to take over. Please contact the Secretary if you are interested to find out what the job entails.

Finally, thank you to those who responded to the opportunity to air their views with regard to the policy on insect trade. These letters will be considered by the AES Council at the March Council meeting.

1997
Member's Day and AGM

at the

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Saturday 26th April 1997.

Doors open 10.30am

Insects in Aberdeen

by E. Pickard (3928)

105 Kirkhill Road, Aberdeen AB11 8FT.

A hedge of birch, hawthorn and beech encloses part of my garden and during the thirty years or so of its existence it has often been able to provide something of entomological interest.

"Regulars" include the Brimstone moth (*Opisthograptis luteolata*) and the Grey dagger (*Acronicta psi*) whose distinctive larvae are to be found on the hawthorn every year (Plate 97A, Fig. 1). This year, however, they extended their range to a nearby rose bush where I found and photographed some well grown caterpillars.

This autumn provided a good number of Painted ladies (*Cynthia cardui*) (Plate 97A, Fig. 2) in the Aberdeen district, a species which I have not noticed in numbers for the past few years. Two specimens were noticed on *Buddleia* (*davidii*) on 6th August 1996 and from then until 10th October 1996, Painted ladies were met with during every day when the sun shone. Although mostly on *Buddleia*, where they outnumbered Red admirals (*Vanessa atalanta*) and Small tortoiseshells (*Aglais urticae*), I also found them on Ragwort (*Senecio jacobaea*) and later Orpine (*Sedum telephium*) which came into bloom after *Buddleia*.

At the beginning of August there was also a huge eruption of SIlver Y moths (*Autographa gamma*) when the insects seemed to be everywhere both day and night for about three weeks.

Insects of Glasgow

by Frank McCann (6291)

3 Langbar Path, Easterhouse, Glasgow G33 4HY.

Whilst walking in Alexandra Park in Glasgow, around 11am, on 18th August 1996 I saw two interesting butterflies. One was a Small copper and the other a Painted lady. They were at the edge of a wood and both were flying over cut grass. There were some Hawkweed plants growing there, along with docks and dandelions.

I also saw a number of medium-sized grasshoppers – green in colour. I have seen and heard the same species at various other places in Glasgow recently. I have also noticed a species of black ant in places in and around Glasgow.

Solitary bees in my garden

by Neil Robinson (10002)

3 Abbey Drive, Natland, Kendal, Cumbria LA9 7QN.

In 1993, in preparation for resuming my boyhood interest in Solitary bees and wasps on my retirement in 1995, I began by taking a look at the bees which were visiting my garden in Natland about two miles south of Kendal, Cumbria.

There are about 200 species of Solitary bees in Britain, far more than the social Bumble-bees (*Bombus,* 19 spp. of which only six are really common) and their parasites the Cuckoo bees *Psithyrus* (six spp.). Solitary bees have no workers and the cells are constructed and provisioned with honey and pollen by individual females. Exceptions are a few species which have a simple social structure – and a larger number that are cleptoparasites which do not build cells at all but lay their eggs in the cells of other bees. The cells are most commonly constructed in tunnels in the ground excavated by the bees themselves but some species use holes in wood or hollow stems. The cells are closed after egg-laying so there is no tending of the young. The females have stings which cannot penetrate human skin – though they can prick! They are generally rather inconspicuous little insects but a few are quite brightly coloured.

I was intrigued to find that, in addition to the six common species of Bumble-bee (*Bombus terrestris, B. lucorum, B. lapidarius, B. pratorum, B. pascuorum* and *B. hortorum*) and one Cuckoo-bee *Psithyrus bohemicus,* my garden was being visited by thirteen species of Solitary bees (one of which was distinctly uncommon) – twice the number of social species. I suppose the garden would be described as "small suburban" because, although Natland is a village surrounded by farmland (permanent pasture), our house is about 20 years old on a modern estate. The garden has a typical suburban layout consisting of lawns, borders with perennials and flowering shrubs, and a few trees, extending around three sides of the house and totalling about 420 square metres (0.1 acre). I cannot claim much credit for the contents as most were established by previous owners, but fortunately they include flowering shrubs such as *Cotoneaster, Escallonia* and *Pyracantha* which have shallow open flowers that are much loved by the short-tongued Mining bees. *Cotoneaster* in particular must produce a lot of nectar because it is always crowded with hive and solitary bees. Our patch is not in any way designed as a "wildlife garden", which usually involves

creating a pond (not practical in our garden for various reasons) and planting flowers to attract butterflies, but I was fascinated to discover the range of Solitary bees which were visiting what might be termed "ordinary" garden plants.

In spring some of the beds are over-run by self-seeding forget-me-nots (*Myosotis* sp.) which are very popular with the Mining bees, especially small species such as *Lasioglossum calceatum* (Scopoli), *L. villosulum* (Kirby) and *Andrena subopaca* Nylander. At this time the garden is also visited by *Osmia rufa* (Linnaeus), the commonest of the Mason bees, whose thorax and abdomen are brightly covered with red-brown hairs. The female has two distinctive horns on the face which are used for fashioning its clay cells. It nests in holes in walls and wood and is notorious for entering the keyholes of old-fashioned door-locks and filling up the mechanism with its cells made from mud pellets.

In June the *Cotoneaster* comes into flower and attracts, in addition to lots of hive and bumble-bees, some of the larger mining bees:

Andrena scotica (Perkins). Very common in spring, easily overlooked because it closely resembles the dark strain of hive bee, but has a flat abdomen whereas the other is cylindrical and, although it has hairy legs for pollen collecting, it lacks the neat pollen baskets. It is often found on the inside of windows because its questing behaviour causes it to fly in through transoms (which hive bees do not do). Take a closer look at bees which you find on your windows in the spring – they are very likely to be this species. It is misnamed in older books *A. trimmerana* (Kirby), which is now known to be a rare southern species.

A. haemorrhoa (Fabricius). Another common spring bee. The females have rusty-red hair on the thorax (hence the name) and a shiny black abdomen with a red tip.

A. fulva (Muller in Allioni). The "tawny mining bee": about the size of a hive bee, conspicuous by the velvety orange-brown hair on the female's thorax and abdomen. Also known as the "Lawn bee" from its habit of throwing up mini-volcanoes of sand around its holes in lawns in the spring.

A. chrysosceles (Kirby). Also common, golden legged as its name suggests, with white bands across its abdomen.

A. helvola (Linnaeus). A rather nondescript brown bee which was a real surprise because it is rare in the north of England and scarce in

the south, where it seems to be associated with woodland rides and the woodland spurge, *Euphorbia amygdaloides* L. (George Else, Natural History Museum, London, *pers. comm.*). I took it at the *Cotoneaster* in June 1993 and 1994. In June 1995, when the *Cotoneaster* was not in flower because the spring was so cold and late, it came to the *Pyracantha*.

Also to be found in the garden at this time are two Nomad bees: *Nomada marshamella* (Kirby) and *N. ruficornis* (Linnaeus) which are the cleptoparasites of *Andrena scotica* and *A. haemorrhoa* respectively. These look more like wasps than bees, being black or orange with yellow stripes, more or less devoid of hair. They sneak into the nest-holes of their hosts, which have no workers to guard them, and lay an egg in the cell wall, from which the larva emerges to eat the host's egg and then its food supplies.

Another wasp-like bee is the tiny *Hylaeus hyalinatus* Smith which is shiny black with some yellow markings and no hair at all. It is believed to swallow pollen and carry it with nectar in its crop, to its cells which are usually made in hollow plant stems. It is often to be found crawling round the stamens in the centre of Geranium flowers and is also very fond of goat's beard (*Aruncus*) which produces masses of dusty pollen – and gives me hay fever if I stand too close.

Most of these bees have finished their cell provisioning by July and are not seen again until the following year, but at this time *Megachile centuncularis* (Linnaeus), the common Leaf-cutting bee, is still active. It has a short pointed abdomen with white bands above and a dense orange pollen brush on the underside. It makes its cells in tunnels in wood from pieces cut out of rose leaves: oblong for the sides and round for the ends. For some reason it does not fancy my roses for nest construction, evidently it prefers someone else's, but it does like the large golden heads of *Centaurea macrocephala* with its long projecting stamens. On this its behaviour is very distinctive, as it hurries about with its abdomen flexed into the vertical, transferring pollen from the long anthers to the brush on its underside with its hind legs.

As far as I have been able to discover, only the *Osmia,* and probably the *Hylaeus,* are actually nesting in the garden. I have put up some bundles of hollow twigs and canes to see whether I can attract some "aerial nesters", but I have to admit that this is more for my benefit than the bees, which are obviously managing for themselves somewhere else. The attraction of the garden is clearly as a pollen and nectar source. In this respect Natland stands out as an island of floristic

diversity in a uniformly green landscape of improved grassland, thin hedges and stone walls. The only other place of any value for Solitary bees which I have been able to discover in the vicinity are a few stretches of roadside verge and some slopes beside the river which are too steep for the farmer to improve. It looks as though the gardens at Natland are supporting the Solitary bee population, at least as far as pollen and nectar sources are concerned, in much the same way as suburban areas support populations of some species of birds. I suspect that this is true also for a wide range of invertebrate groups (a friend has identified over 70 species of spider from her house and, admittedly large, garden), if we did but look – but our attention does tend to be grabbed by butterflies and moths!

Some butterflies and moths of Glasgow

by Frank McCann (6291)

3 Langbar Path, Easterhouse, Glasgow G33 4HY.

Recently, around the beginning of September 1996, I found a Peacock butterfly at Easterhouse. I found it dead on the roadside at Wellhouse, it had probably been struck by a passing vehicle. It was quite a large specimen and I put it into a jar with pieces of damp paper to relax its wings and a few days later I set it.

This is the first Peacock I have seen in Scotland. Recently I have seen some Red admirals and Small tortoiseshells in my travels around Glasgow. Also as I mentioned in my last note, Painted ladies and Small coppers.

I have noticed various micro-moth species especially just after dark at Riddrie, Glasgow as well as seeing other moths such as the Silver-Y, various species of the Wave family – but I have not noticed many Carpets which I usually see resting on stone walls around this time of year.

On the 29th September 1996 also in Riddrie, Glasgow, I was looking at the leaves of a bindweed plant, when I found a batch of small moth-eggs, fifteen in number. They were laid in three rows of about five to a row, on the underside of a small convolvulus leaf (which I think is the Greater bindweed) near the base of the plant. I think the eggs are those of the White plume moth, which I discovered last year in the area (a female which laid a few eggs).

The butterflies of Northern Greece (Greek Macedonia, Pindos Mountains and Mount Olympus)

by Matthew Rowlings (9108)

87 School Road, Stretford, Manchester M32 8DL.

At the age of 23 I consider myself very fortunate to have realised one of my earliest ambitions – hunting butterflies in Greece. I've been looking at the distribution maps of Higgins and Riley since the age of twelve and have always been amazed by the variety in the butterfly fauna of south-east Europe. At the end of May 1995 my father and I enjoyed this variety at first hand. Our experiences are recorded in this article.

Having decided roughly which area we wanted to travel to, the next question we asked was: "What do we want to see there?" Our previous trips to the continent had always been in high summer to fit in with school and university terms, so for a change we thought we would like to see some of the spring butterflies (Pierids and Papilionids in particular) at the expense of the greater variety found in summer. Our decision was based on information in several readily available field guides to European butterflies. A crude analysis of distribution maps (themselves a crude but invaluable guide to a species' range), descriptions of flight times (also of variable accuracy when considering a particular area) and habitat all pointed to May as the most productive time and northern Greece seemed to offer most variety. The unusual and endemic species found in southern Greece and the Peloponnesus will have to wait for another trip.

In the absence of specific site information we maximised our chances of seeing what we were looking for by working out a provisional route by overlaying distributions onto road/relief maps. The maps we used were Michelin's 1:700,000 covering all Greece in acceptable detail and the 1:300,000 Euro-Map for Greece and the Islands which gives more detail but doesn't cover the far east of northern Greece. Unfortunately neither map has a reference grid, so I'll have to use road numbers and place names for descriptions of localities.

On 29th May we flew from Luton to Halkidiki airport at Greece's second city Thessalonika. In the baking heat outside the small airport we took delivery of our 1.2 Corsa and were sucked into the busy traffic

at about 2.30pm. Within 30 minutes we had left the town and its busy roads behind and hit the typically good and very quiet roads of rural Greece.

Heading east (along route-16 towards Arnea) across the low plains towards the promising dry hills of Halkidiki we stopped to find our first butterflies on a small patch of roadside land rising up from the farmed valley floor at Galatista. It was a very tense ten minutes before we saw anything on the open flowery meadow-land – and that was a Small copper (*Lycaena phlaeas*). With relief, it wasn't much longer before our concern about the area was way-laid by the disturbance of Oriental meadow browns (*Hyponephele lupina*) and a Balkan marbled white (*Melanargia larissa*) from low scrub. We later noticed that low bushes or shrubs were common places for (mainly) Satyrids to shelter from the blazing sun. Also in this small scrubby patch were a couple of "yellow-flowered-trees" that provided a feast for ten or so Ilex hairstreaks (*Nordmannia ilicis*), Brown arguses (*Aricia agestis*) and several Oriental meadow browns (*Hyponephale lupina*). Two beautiful Little tiger blues (*Tarucus balkanicus*) were resting on a nearby lump of waste concrete. For some reason I was prompted to say "This could be the only place we see these blues." Little did I know how true my prophecy would be.

We moved on and climbed up into the wild almost uninhabited hills. The extremely dry slopes were covered in dried-up grass and scrub and looked like rich hunting ground. We weren't mistaken, even at 5.00pm. Ilex hairstreaks abounded – hundreds were put up from the stunted oak scrub. Several Fritillaries, particularly the Lesser spotted fritillary (*Melitaea trivia*), were present along with the Black-veined whites (*Aporia crataegi*) and Baton and Chapman's blues (*Pseudophilotes baton* and *Agrodiaetus thersites*). Painted ladies (*Cynthia cardui*) were common. A slightly green patch of grass yielded one Dappled white (*Euchloe simplona*) – (this is a genus where little consistency is found in English names between the field guides). Time was late for butterflies so we decided to find accommodation – not as easy as we expected in this land famed for tourism, even taking into account our rural location. So we pushed on and got into the greener, higher hills of eastern Halkidiki (up to 850m) and stopped in a large but deserted, and thankfully cool, hotel in the small town of Paleohori. Here we sampled our first Greek style greasy food – substantial, functional food it is too, but not objectionable.

Day 1 – 30th May 1995

We rose early with a strong appetite for butterflies but not for the plain bread and ham that greeted us for breakfast. The day's plan was to follow the coast and move up to the southern foothills of the Balkan mountains in the evening. Our first few stops were in the uplands (5000-5800 m) amongst green well-treed hills. Butterfly numbers were surprisingly low but there were a few highlights. Notably the Cardinal (*Pandoriana pandora*) was showing well on thistles, Purple shot coppers (*Heodes alciphron*) were also feeding. A few Scarce swallowtails (*Iphiclides podalirius*) were swooping from higher slopes and the holiday's only Sloe hairstreak (*Nordmannia acaciae*) was found in the vicinity of some of the abundant (only along road verges) flowering broom. The close inspection of a tortoise led to a scare as Peter's spectacles fell from his shirt pocket un-noticed; later a little detective work was needed to lead us back to the unharmed glasses. One open meadow overlooked the beautiful Aegean Sea and the jagged coast-line including some of the well-known Athos peninsula famed for its monasteries and the exclusion of women and female animals. Here we found some of the large Amanda's blues (*Agrogiaetus amanda*) that were enjoying nectar from large bushy vetches. These were joined by Bath whites (*Pontia daplidice*) that do occasionally rest/refuel during their rapid flight schedule.

We dropped down to the coast at Stratoni and travelled north. A deserted white sandy beach with a wooded hinterland looked interesting. Southern white admirals (*Limenitis reducta*) were feeding on the "yellow-flowered-tree" but again there were few butterflies on the wing. A fresh water patch in a small glade was being used by a few butterflies for liquids. A single Two-tailed pasha (*Charaxes jasius*) flew from the muddy edge never to be seen again. In a neighbouring little glade was another butterfly that we saw only once – a wonderful fresh male Grecian copper (*Heodes ottomanus*) that was supposed to be between broods.

After some lunch in a cool, shaded and deserted café (part of a deserted but obviously very popular night-club and bar area) we pushed north, still somewhat disappointed with the low number of butterflies being found. Even though the quality was equal to any previous holiday, we hoped the change of area would lead us to better things. Before leaving the coast we stopped on a windy hillside near Nea Kerdilia just before entering the devastated agricultural lowlands of the Strimonas and Xiropotamos rivers. Large ant-lions were fairly

common; four inches from head to tip of the hindwing, these transparent lime-green and black insects were a common feature for the rest of the holiday. Peter found an exciting local Greek speciality sitting deep inside a bush – the Latticed brown (*Kirinia roxelana*). Its large rounded hindwings give the butterfly an unusual proportion and the spotted/mottled hindwings and deep veining of the upper forewings make this insect very interesting to the eye.

We put-our-foot-down for an hour an a half to get inland to Drama, a regional capital city. Typically for Greece, most of the out-of-town journeying was a solo affair on nearly empty roads, only in the larger towns did traffic cease to flow and sign posts become non-existent. Drama was no exception. After not-just-a-little cursing and double-backing on ourselves, we found the right road out of the city. Going north towards Livadero and up into the foothills of the Balkan Mountains proper, we went into greener land. An open grassy/scrubby hillside was our first stop at 3.00pm and, to our mild disappointment, yielded similar butterfly numbers to the coast. However, two very exciting Yellow banded skippers (*Pyrgus sidae*) turned up – quite large and with a lot of white on their upperwings, their flight is slower than their "Grizzled" cousins. The yellow-on-white underside hindwings are as dramatic and unexpected as the field guide illustrations lead the imagination to suggest.

At a narrow stream in a small village further up the valley, a meadow was the first site where we found the Green underside and Mazarine blues (*Glaucopsyche alaxis* and *Cyaniris semiargus*). The former was personally significant as it was the only butterfly we found on the holiday that was new to me but not to my father! Incidentally, not being familiar with the Green underside blue or the Pontic blue (*Agrodiaetus coelestinus*, which I don't believe we saw) how could I be sure I hadn't found the latter in the field? – some of our Green underside blues had deep blue uppers and dark underwings.

Further on, the road went up a much narrower valley. The habitat varied from dry to damp and from meadows to forests. We stopped at a small bridge in a forested area with artificially created meadows and regrowth beside the bridge. The only vehicles on the road were large logging lorries (one coming down the valley every ten minutes) and our little Corsa. At 4.30pm the sun was disappearing behind a haze and was sinking out of the valley. At last butterflies were common and could be seen all around. And my, oh my! What we found! In 45 minutes we had doubled the day's species count and added some

striking records to the holiday list. A Southern comma (*Polygonia egea*) was absorbing the late afternoon heat off a west-facing cliff, a Chequered blue (*Scoliantides orion*) was flying over short road-side turf, a Blue argus (*Aricia anteros*) and Southern small whites (*Artogeia mannii*) were passing through and the best of all was a Common glider (*Neptis sappho*). The name "Common" suggests "plain" and is a real misnomer for this aptly named "Glider" – a better common name would be regal glider, as it soars slowly past with hardly a wing beat, allowing one to admire its inherent black and white beauty in slow motion. While I know how unsettling name changes can be to a naturalist (specifically changes to scientific names) if ever there was a case for breaking the rule, a change from the established "Common glider" to something more expressive would surely be justified!

The sun gave up and we decided to return to Drama to look for some food and a bed. Suffice to say we were very excited by our afternoon successes and were looking forward to returning in the morning.

Day 2 – 31st May 1995

We could not leave the hotel soon enough. Good humour was not on the menu after a particularly bad night – hapless insects were being explosively vapourised by the biggest butchers' actinic tube bug killer I have ever seen (located just below our window), road noise was bad all night (heavy trucks accelerating up a hill from traffic lights), the temperature and humidity were very high, our neighbour played music loud enough to bounce us off our beds between two and four in the morning . . .

Back at the bridge at 8.45am the sun had already woken everything up. The "Regal" gliders (*Neptis sappho*) were flying slowly past, four feet above the ground and were feeding photogenically on Euphorbias. In addition, Large tortoiseshells (*Nymphalis polychloros*) were probing for salts on rocks in the morning light and Eastern short-tailed blues (*Everes decoloratus*) came out of the grass. Both the Wood white and the Eastern wood white (*Leptidea sinapis* and *L. duponcheli*) were present but we were unsuccessful in finding the Fenton's wood white (*L. morsei*) that shares the same foodplant as the glider. We saw our first very tattered and faded Brimstones (*Gonepteryx rhamni*), that were to pop up unexpectedly throughout the rest of the holiday, and always caused excitement in our quest for the Powdered brimstone (*G. farinosa*). Sadly that quest was fruitless. The only other addition for this site was the Mountain small white (*Artogeia ergani*) – a dainty butterfly readily distinguished from the other Small whites by the almost completely unmarked underside forewing.

Our photography done we tore ourselves away and drove on deeper into the hills. The twisting switchback of a road climbed through almost completely undisturbed open woodland. Unfortunately, as far as any photography was concerned, we were in a no-photo zone. We were in (militarily vulnerable?) border country with Greece's volatile neighbours (Bulgaria and the former Yugoslavia) and photography was forbidden. All military installations (and these are numerous all over the north) are protected in this way. This is a shame because the military have provided so many lovely roads into otherwise inaccessible or remote mountains. The Greeks lock people up for months for taking photos of aeroplanes *etc.*, so we abided by this constraint, even though there was absolutely nobody around to catch us. It was so quiet that we didn't see another vehicle until the early afternoon!

There were so many nice spots that we had to be very choosy when selecting places to get out and walk. Everywhere (literally) we stopped we found something new. One slightly marshy patch produced our only Twin spot fritillaries (*Brenthis hecate*) – five or six butterflies gliding above the tiny area. We stopped when we saw our first *Erebia* species: the Woodland ringlet (*Erebia medusa*). This became quite common at 300 to 400 metres above sea level. Also at this spot we found one of our target Papilionids – the Southern festoon (*Zerythis polyxena*). Distinguished from other white butterflies at quite a distance by its gliding flight with wings flat (nymphalid style), a short sprint up the road saw it in the net and being admired by its captors. Quite an exotic, the zigzag markings give the impression of deeply scalloped wings.

One corner in the road was flatter than most and more open. Orange tips (*Anthocharis cardamines*) first caught our attention in our hunt for the Gruner's and Eastern orange tips (*A. gruneri* and *A. damone*) – two target pierid species. We were not in luck today but we did find our only Marbled and our first Pearl-bordered fritillaries (*Brenthis daphne* and *Clossiana euphrosyne*) of the holiday. We were walking opposite ways around a large rock, about 15 metres high and about 100 metres round, when I heard Peter yell, in excitement, for a second opinion on a large butterfly slowly descending our rock. Without question it was the Eastern festoon (*Zerynthia cerisyi*). This was a sight for already happy eyes. This is a butterfly enthusiast's butterfly: large, exotic (south-east European special), and with a beautiful three-colour pattern; subtle black markings on a creamy-yellow ground colour with just a suggestion of red spots. A definite personal favourite of the European fauna. Unfortunately this was the only one we have ever seen.

We pushed on through wonderful unspoilt countryside of deep wooded valleys whose remoteness should protect them from development for the near future. Other stops produced the Duke of Burgundy fritillary (*Hamearis lucina*), Clouded apollo (*Parnassius mnemosyne*) and Southern small white (*Artogeia mannii*). It was 2.30pm when to our complete bemusement we came upon a huge and obviously vastly expensive road development. There was a small army of workers constructing two huge concrete bridges across two valleys to improve access. Access from where and to where we could not possibly imagine – at least 30 miles of tortuous narrow lane from the nearest main road and going nowhere! The only explanation we came up with was a military one. Unfortunately it is possible that such developments may hasten any opening up of this wilderness area with a potential loss of some of its wildlife.

After a beer in a bar (guaranteed never to have hosted tourists before) we turned around and headed west into heavy thunderstorms towards our next destination – 200km to the eastern foothills of the Pindos mountains. Unable to find accommodation in the city of Gianitsa we diverted to the attractive city of Edessa where we found the quiet room and nice beds required for a refreshing sleep.

Day 3 – 1st June 1995

The storms had passed and a little more travelling across another over-farmed plain found us at the base of a 500 metre escarpment. A road climbed this and we got an incredible view of the plains disappearing in the haze several tens of miles to the south. The only grassy areas on an otherwise rocky cliff were heavily grazed. However, some butterflies were found here, including two species we only found in the Pindos – the Russian heath (*Coenonympha leander*) and Tufted marbled skipper (*Carcharodus flocciferus*), and two Niobe fritillaries (*Fabriciana niobe*) found nowhere else on the holiday.

The small village of Nimfeo welcomed us at the top. We stopped for a drink and were joined by an elderly but able gentleman who spoke very good English. As a native of the "original" Macedonia (dating back 2300 years to Alexander the Great and beyond) he made it quite clear why Greece is objecting to the new state from former Yugoslavia calling itself Macedonia. Despite the obvious pride for his homeland he had seen tremendous declines in the local populations because of migration of the young to the cities.

We left with the directions we needed for neighbouring Pericopi but had no warnings of what we were about to experience. The maps suggested we would find a road – the dirt began 100 metres from Nimfeo. Immediately we almost hit disaster. With two wheels on a muddy verge, we took a run at a long puddle that filled the road, only to feel ourselves helplessly sliding sideways down into it. We got through but we were trapped as we didn't dare turn round to go back – anyway it was only five miles to Pericopi. It took a long two hours travelling on rough dirt tracks through unproductive Beech woodland at over 100 metres above sea level. The butterfly count was low and we didn't find anything different. The butterflies seen were mainly Heath fritillaries (*Mellicta athalia*), Small heaths (*Coenonympha pamphilus*) and Meadow browns (*Maniola jurtina*) with the occasional Small white (*Artogeia rapae*), Orange tip (*Anthocharis cardamines*) and Clouded apollo (*Parnassius mnemosyne*). It was a sorry loss of valuable holiday time spending so long wandering around on dirt tracks with a misleading map. We came out of the woodland and onto open grassland. A pack of large upset dogs chased us for half a mile and made any walking impractical. Luckily there didn't seem to be anything flying over the fields anyway.

Eventual arrival at Pericopi revealed a completely uninhabited village. Not long deserted, it was only accessible by dirt tracks, so we were destined for more slow, bumpy journeying. Eventually we got back to civilisation and took a smooth road towards the nearest town for afternoon refreshments near Florina. From there we swept round the tortuous, never ending E86 through some dramatic unspoilt mountain districts which were apparently and most surprisingly, dead to butterflies and other insects. We were unable to find any different habitat for the rest of the day and had to settle for the lowest daily species count of the holiday – still, not bad at 44. We dropped off the high ground to the pretty lakeside city of Kastoria and found another empty hotel to rest our bodies weary from too much travelling.

Day 4 – 2nd June 1995

The next morning saw us travelling west again and into the northern Pindos Mountains. There was plenty of evidence of the limestone base rock in the form of striated cliffs but the surface soil was fairly rich and low plants were more rank than is usually food for a variety of butterflies. However, very early on in the day Peter caught a very fresh specimen of the Freyer's fritillary (*Melitaea ardiunna*). A cross between the Glanville and Knapweed fritillaries (*M. cinxia* and *M. phoebe*) (both also present), it

was instantly recognised by the outward curving borders of the submarginal band on the underside hindwing.

We had three hours of travelling to do during the day, so we had to keep moving to take in as much of the area as we could. The E90 road took us through a remote wilderness area along the border with Albania. The same unproductive beech woodland abounded, particularly at higher elevations. Lower down at the valley bottom shrubs of various descriptions were dominant, but there were few butterflies anywhere.

However, our day list increased steadily with a final total of 45 including nine blues, eight fritillaries and seven whites. We found the Tufted marbled skipper (*Carharodus flocciferus*) again suggesting it is widespread in north-western Greece. Several Osiris blues (*Cupido osiris*) were found during the day. Our route took us to the unusual countryside around Eptahori. The whole area looked like the mountains and soils were made of unmixed cement. The weird grey soil did not produce much of a change in fauna despite a switch from the beeches to pines. However, we slammed on the brakes when we saw our first yellow "*Papilio*" swallowtail (*i.e.* not the Scarce swallowtail (*Iphiclides podalirius*)). We were far enough west to be on the edge of the range of the Southern swallowtail (*Papilio alexanor*) but the unidentified swallowtail sped off never to be seen again. However, just nearby was an unusual bush covered in large seed pods, and around this bush a huge blue was flying. It was flying extremely fast and erratically and it took patience waiting the right moment to lunge at it with the net to secure its capture. It was the Iolas blue (*Iolana iolas*) – a first for the holiday. The bush was presumably the foodplant bladder senna.

It wasn't far beyond a small road junction guarded by police in an armoured personnel carrier and signposted "Albania 6km" that we began dropping off the elevated land and the beeches gave way to more interesting vegetation. It was 4.00pm when we stopped at a small sheltered sunny valley near Konitsa. There were several blues taking salts at a stream. The Turquoise blue (*Agrodiaetus dorylas*) was showing well with its striking blue uppers and distinctive white bordered underside forewing. Escher's and Chapman's blues (*A. escheri* and *A. thersites*) were also taking liquids. The Tufted marbled skipper (*Carcharoudus flocciferus*) was present. These repeated sightings illustrate just what care should be taken when using field guide maps – Higgins and Riley do not have this butterfly in the region whereas Higgins and Hargreaves do. There is a case here for consolidating knowledge on the distribution of European butterflies (and moths) and publishing updated distribution maps at regular intervals (rather than waiting to tag the new information in the next new field guide).

As we dropped rapidly down towards a heavily farmed plain, we stopped for a drink from the back of the car. The scrub oak behind the lay-by looked like it warranted a walk. The holiday's only Camberwell beauty (*Nymphalis antiopa*) was flying down the dry valley. It was an extremely worn and faded specimen. A dead oak tree beside us had met a mysterious fate: its trunk and main branches were partially engulfed by a smooth ginger-brown bark belonging to some unwanted (and, to us, unknown) plant. Further on we thought we saw another Swallowtail so we stopped to look for it. We were on an extremely dry cliff face with only scarred bare rock nearby. It was very, very hot and not at all a nice place to be. We were surprised to find any butterflies here. In fact we only found one but it was the Mediterranean skipper (*Gegenes nostrodamus*) – The only place I've ever seen one. It was basking on red-hot rocks, a habit the species is known to enjoy – rather it than me!

Having done too much travelling (again) on a hot day it was nice to put our feet up in a cool hotel in Ioninia that evening.

Day 5 – 3rd June 1995

Our destination for the day was Meteora, near Kalambaka in central Greece. Our route was to take us over the Afhin Kataras pass on the E92 – the highest pass in the Pindos Mountains at 1705 metres. After a good start at lower levels, butterfly numbers dropped as we climbed. We encountered the same problem as further north – the soils were too rich to support the variety of plants needed for a wide range of butterflies. There were, however, some very nice meadows and one of these bordered a stream in a narrow mountain valley near Mikra Peristeri. It had a healthy number of insects flying in it. Adonis and Escher's blues (*Lysandra bellargus* and *Agrodiaetus escheri*) were plentiful but the highlight of the day came as we were leaving. The shout "There's a yellow Orange tip down here!" got me hurtling down the narrow valley. A tremendous sweep of the net made sure we were to get a good look at our one and only Grüner's Orange tip (*Anthocharis gruneri*). It's a miniature, dainty orange tip with a lime lemon ground colour.

As we got higher we had the distinct feeling that we were too early in the season to see much in the picturesque meadows. Clouded apollos (*Parnassius mnemosyne*), Blue arguses (*Aricia anteros*) and Black-veined whites (*Aporia crataegi*) were widespread but nothing else was common. The Blue argus was a puzzle as once again we found some with and some without a spot in the underside forewing cell – what's going on? Can

anybody help? They were almost certainly not *Polyommatus eros* or *P. erioides* – neither of which we found. Anyway, we decided we'd be better off down at warmer elevations.

Back down at plain level we identified our first Swallowtails (*Papilio machaon*). These appeared to exist in small localised colonies as we only saw them three or four at a time, opposite to previous experiences in western Europe in which they have tended to appear anywhere in ones or twos. We arrived at the town of Meteora at 3pm. This was the first place we visited that lies on the tourist trail – there were several bus loads of people there with ample facilities to cope with a lot more. The attractions are the 15 or so monasteries that are built on top of high pinnacles of sandstone – used as the set for one of the James Bond movies. Our main interest was lower down amongst the verges of rural roads just off the bottom of the plain. Latticed browns (*Kirinia roxelana*) were easy to find by tapping the bushes in which they were resting. Our only two Marbled whites (*Melanargia galathea* f. *prodica*) were found here flying alongside the Balkan marbled white (*M. larissa*). They are very different to our version of the Marbled white having much bolder black markings and a creamier ground colour – altogether a contrasting black and deep yellowy-cream striped butterfly. Green and Ilex hairstreaks (*Callophrys rubi* and *Nordmannia ilicis*) were feeding on bramble with Southern white admirals (*Limenitis reducta*) and Common blues (*Polyommatus icarus*).

We had planned to travel the hour and a half to Mount Olympus that evening so we drove up to Meteora at 4.30pm to pay our homage to the tourist attractions. Driving through the town we spotted a "yellow-flowered-tree" covered with an amazing spectacle of more than 50 Nettle tree butterflies (*Libythea celtis*). In fact the whole area was teeming with them. The road took us up and above the monasteries, so we could look down on them. Two Swallowtails were courting so we jumped out of the car to check for the Southern swallowtail (*Papilio alexanor*) only to find they had completely vanished. Shortly after this another Swallowtail flew nearby. The steep slopes prohibited any chases but I was convinced we had the Southern swallowtail. We waited in vain in the failing light for the chance to catch one and confirm my suspicions. The Yellow-banded skipper (*Pyrus sidae*), Queen of Spain fritillary (*Issoria lathonia*), Large tortoiseshell (*Nymphalis polychloros*) and Clouded yellows (*Colias croceus*) were the only things we caught for the rest of the evening but we decided to stop at Meteora for the night and clear up any doubts about the Swallowtails in the morning. The proprietress of the entirely empty hotel gave us an

explantation for the quietness of the hotels – the weather in the north can be cold and wet (everything's relative!) even to the end of May. I guess we'd been lucky with this season.

Day 6 – 4th June 1995

Our last full day in Greece started with a brilliant sunrise through the sandstone spikes of Meteora. We went straight back to find the Swallowtails. We split up and walked separately along the road. I was ahead when I heard a giant call from far behind me. On looking round Peter was walking rapidly up the hill some 300 metres behind with his net folded over and looking very smug. A fabulous Southern swallowtail (*Papilio alexanor*) was trying to get out. The previous night's hunch had paid off and we could relax then with that question answered. It is a bigger butterfly than the Swallowtail (*P. machaon*) but its black stripes make it look sleeker and the reflective sky-blue scales in the outer black stripes on the upperwings accentuate elegance. Despite what several authors comment on the butterfly's affinity for thistles, all thistles we staked out drew blanks.

Also nearby were our only small golden skippers – the Essex and Small skippers (*Thymelicus lineola* and *T. flavus*). Nettle tree butterflies (*Libythea celtis*) were as common as the previous evening and Latticed browns (*Kirinia roxelana*) were actively dodging between hiding places in bushes. One patch of bramble amongst deciduous woodland assembled a selection of Ilex and White-letter hairstreaks (*Nordmannia ilicis* and *Strymonidia w-album*), Common and Holly blues (*Polyommatus icarus* and *Celastrina argiolus*), Peacocks (*Inachis io*) and Southern white admirals (*Limenitis reducta*). Our second Iolus blue (*Iolana iolas*) was flying around an isolated bladder senna with exactly the same vivacity as our first. Unfortunately, the tourist levels built up too high to be much fun so we moved to a hillside on the opposite side of the valley.

A dirt-track led up to a large monastery (called Vitouma, near Megarhi) well above the plains. It was very dry and soils were dark. Beyond the monastery however the dirt-track continued upwards and into the limestone heights. The change to limestone was gradual but distinct with streaks of white stone becoming more frequent as we went higher – finally we had left all dark soil behind. There was no obvious change in numbers of butterflies flying but the variety had increased noticeably, as we expected (and hoped) it would. As I had just finished off my handful of food a White-banded grayling (*Pseudochazara anthelea*) dropped in over

Fig. 1. Larva of the Grey dagger (*Acronicta psi*).
(E. Pickard – Insects in Aberdeen)

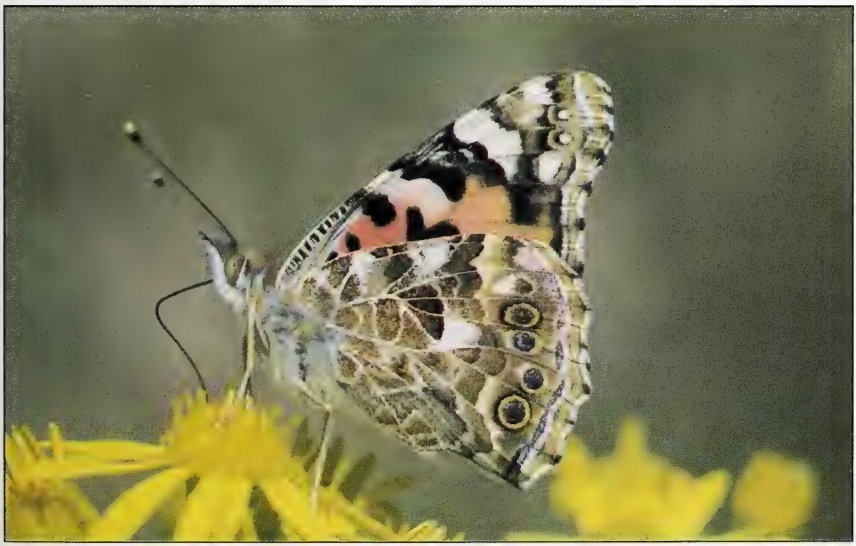

Fig. 2. The Painted lady (*Cynthia cardui*).
(E. Pickard – Insects in Aberdeen)

Fig. 3. *Ascalaphus italicus*.
(M.J. Dawson – Italy 1996)

Fig. 4. *Ascalaphus ottomanus* (♂).
(M.J. Dawson – Italy 1996)

Fig. 5. Red admirals feeding on oak tree sap slick.
(M. Majerus & T. Majerus – Feeding of Lepidoptera on oak tree sap)

Fig. 6. Large yellow underwing sucking oak sap.
The proboscis is clearly visible.
(M. Majerus & T. Majerus – Feeding of Lepidoptera on oak tree sap)

Fig. 7. A female Large yellow underwing with highly distended abdomen feeding on oak sap.
(M. Majerus & T. Majerus – Feeding of Lepidoptera on oak tree sap)

Fig. 8. After feeding, Copper underwings moved up the oak trunk to rest.
(M. Majerus & T. Majerus – Feeding of Lepidoptera on oak tree sap)

the car. This is the only Grayling I have seen that I would call beautiful rather than handsome. It had large black eyespots on the upper forewing in a lovely white and orange-red band.

Further on our little Corsa finally failed us – it simply did not have he traction of four-wheel drive necessary to carry us up the slope, so we parked it and walked on. This was one of the best moves of the holiday. Five hundred metres further on, the otherwise steepish rocky slope opened into a shallower grassy slope. As soon as we entered this grassy area I caught a Mazarine blue (*Cyaniris semiargus*). It had orange submarginal lunules on the hindwing similar to those typical of the Greek mazarine blue (*C. helena*). However, its size was that of the Mazarine blue and without dissection I consider it to be the subspecies of the Mazarine blue (*C. s. parnassia*) found only in central Greece. Mazarine blues lacking the orange lunules were found nearby. Purple shot coppers (*Heodes alciphron*) and Adonis blues (*Lysandra bellargus*) were frequently encountered. The Oriental marbled skipper (*Carcharodus orientalis*) rather that the Tufted marble skipper (*C. flocciferus*) appeared. Although not an exciting skipper it is at the extreme western end of its range in Greece which made it worth seeing. Within minutes we found the much more interesting Tessellated skipper (*Syrichtus tesselum*). It is very heavily spotted with white on the upperwings which makes it look almost striped. Three were seen in dryer more sparsely-grassed areas. A perfect Southern swallowtail (*Papilio alexanor*) flew through. Unfortunately, time had caught up with us and we had to leave and begin heading back east towards the airport for the morrow's departure. The very last butterfly we caught on the way back to the car was a white – unbelievably it was a male Kreuper's small white (*Artogeia kreuperi*) with predominantly green underside hindwings. It tied up an excellent day's butterflying.

The hour and a half journey across arid barren lowlands to Mount Olympus took us two hours with traffic delays in the ancient town of Larissa. Our hotel room had a dramatic panoramic view of the Aegean Sea, the plains up to Thessalonika and the peak of Mount Olympus – the cloud-covered home of the gods.

Day 7 – 5th June 1995

The day of our departure had suddenly arrived. Our plan was to spend three hours around the massif of Mount Olympus then travel straight to the airport an hour and a half away. We took the road to the top but we soon saw a sign indicating, without any ambiguity, that the netting of butterflies

was strictly forbidden. One hundred metres further on the road was closed due to resurfacing work, so (thankfully?) we were spared the ordeal of butterflying without the net. We decided to try the advertised walking trail up to the top but it too had signs shouting "No butterfly nets!". In fact, the country was almost devoid of butterflies despite its wilderness. Only the Chequered blue (*Scoliantides orion*) was found in any numbers. So we left the area early to go hunting near the airport.

The countryside around Thessalonika had dried perceptively since our arrival a week earlier. We found a bank of flowering thistles near Panorama that was attracting numerous Cardinals (*Pandoriana pandora*) and fresh, mostly female Cleopatras (*Gonepteryx cleopatra*). Unfortunately, no new fritillaries were found, nor were there any Powdered brimstones (*G. farinosa*). Higher up on a hillside we found another Tessellated skipper (*Syruchtus tessellum*), but clouds developed and our butterflying was effectively ended. A delay at the airport saw us watching military aircraft operations for two hours – but strictly no photographs of their movements.

Day 8 – 6th June 1995 – UK

Thoroughly exhausted but most satisfied we lay-in contemplating everything we had seen. A total of exactly 100 species were found in our single week's hunting (more details – sites, general information – can be provided to anyone interested). Our only regret was travelling so far and not taking a little time to see some of the remnants of the ancient Greek civilisations. One particular hint for any visitor to Greece is that the valleys/plains of the north are completely devastated by agriculture and almost certainly of limited interest, whereas the mountainous regions are less damaged. A return visit is inevitable for us, perhaps at a different time of the year, and the area must be heartily recommended to any butterfly/natural history enthusiast.

Nomenclature follows Higgins and Riley (1980).

References

Higgins, L.G. and Riley, N.D. (1980). *The Butterflies of Britain and Europe*. 4th Edition. Collins.

Higgins, L.G. and Hargreaves, B. (1983). *The Butterflies of Britain and Europe*. Collins.

Whalley, P. (1990). *Mitchell Beazley Pocket Guide to Butterflies*. Mitchell Beazley.

– , (1993). *Butterflies: Mitchell Beazley Nature Handbook*. Mitchell Beazley.

Italy 1996

by M.J. Dawson FLS, AES (9130)

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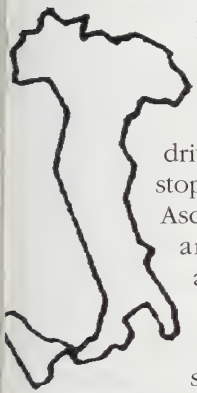

Having obtained permission to capture insects (including Ascalaphids) from the Agricultural Entomology Institute (Faculty of Agriculture), John Hemmings and I travelled to Italy, together with an expert lady driver. Having a driver is most essential, as it meant that the car could be stopped immediately and we could tumble out as soon as an Ascalaphid was seen. Two years ago we went to Greece; if anyone can handle the Athens traffic, they can drive anywhere. Our sincere thanks to Tessa for her expertise in missing all the cars.

There are six species of Ascalaphid in Italy/Sicily. We saw many of each except *Deleproctophylla australis*. An old olive orchard in Sicily near Novara (north coast) produced a few specimens, one of which was retained for photographic purposes.

Of the other species, *Ascalaphus longicornis* was found up to around 1500 metres (Torres Orsaia, Italy). *A. coccajus* was plentiful in grassy meadows. The most common species was *A. italicus* (Plate 97B, Fig. 3), found on open grassland in large numbers. None was seen in Sicily. The indigenous race in Sicily is *A. ictericus siculus* and was widespread. In a suitable spot, a hundred or so could be seen.

A. ottomanus (Plate 97B, Fig. 4) was not common but found all over Italy. It was found in some numbers on mountains on the Adriatic coast near Trebisacci (Albidona). In the latter area, *A. italicus* was flying on a suitable field next to the sea (Marina di Amendolara).

In my article on Spain 1995, *Bulletin* **405,** April 1996, photograph number three states the Ascalaphid as *A. variegata*. This should have been *A. australis*.

To show the worldwide popularity of the AES, four persons contacted me after the above article appeared, one from Spain. Also, a parcel arrived from life member Mr Kinoshita of Osaka, Japan, with eight magnificent specimens of Ascalaphids and four other Neuroptera. They arrived in super condition. They were exhibited at the AES Exhibition at Kempton Park in October 1996. Should any members wish to contact Mr Kinoshita, perhaps they would like to get in touch with me in the first instance. His main interest is in Bombycoidea and Noctuidae.

In praise of Candytuft: an excellent nectar plant

by Don MacNamara (5537)

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First of all there are two kinds of Candytuft, a perennial, which is no good for butterflies, looks nice though, and the annual one to which I refer in my article, *Bulletin* **55**, October 1996, p. 231. The annual comes mainly in pinky-purplish or white, the colours are not that stable, but any colour seems to attract the butterflies. All the species of butterflies that come into the garden end up on the Candytuft. On a warm July night the moth activity around them is quite considerable. Bees are quite keen too.

I refer to the planting of seeds. I sprinkle them in October and November and this lot will be blooming in May onwards – sometimes, if a mild winter occurs, earlier. I've had them flowering all the year round. I then put some more in about the end of February. If you plant patches every six weeks throughout the year you will get perpetual displays of flowers. They grow to a height of six inches to about 12 inches (15 to 31cm).

They are very hardy, frost-resistant and although they do not like too much competition in the early stages (keep broad-leaved "weeds" away) they will come up in any soil. They survive occasional slug and snail attack.

The ones that are planted in the autumn will sprout quickly (again depending on the weather) and form sturdy plants for the spring and summer season. When they bloom off, wait until the seed heads are a golden or straw colour – pick them and use the seeds for the next planting.

You can pull up the whole plant and bottle it to stand in a butterfly cage or grow them with the foodplants. I do this but if bottled lightly spray the blooms with water once a day to keep the nectar "topped-up".

As they continually produce new flowers over a long period they are an ideal nectar source. I am surprised that the butterfly garden books don't appreciate its value.

The seeds can be stored for as long as you like, keep them dry though.

Feeding of Lepidoptera on oak tree sap

by Michael E.N. Majerus and Tamsin M.O. Majerus

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Four years ago we reported some brief observations of Red admiral butterflies (*Vanessa atalanta*) and hornets (*Vespa crabro*), amongst other insects, feeding on sap oozing from a wound in a mature oak tree trunk on the Dartington Estate, near Totnes, Devon (Majerus, 1993). Visiting the estate again this year from 17th-22nd August, we were able to make rather more detailed observations.

Immediately on arrival at Dartington, Mrs Judith Horam reported to us that she had seen large flocks of butterflies around one of the oak trees along the drive that runs through the estate. At the earliest opportunity, we visited the sessile oak (*Quercus petraea*) (tree 1) where we had observed Red admirals four years previously. As we approached, over a dozen Red admirals could be counted flying up from the trunk and settling back down on it (Plate 97C, Fig. 5). Examination of the trunk revealed that the wound that had been issuing sap four years previously was still doing so, and that a second wound on the other side of the tree had also formed a sap slick. The slicks were attended by a variety of insects. In addition to the Red admirals, both male and worker Common wasps (*Vespula vulgaris*) were seen feeding on the sap together with many species of fly. On that first visit, the Red admirals were feeding in numbers. The second, more recent, slick was better attended that the first by about a 5:1 ratio. Most of the butterflies, which were frequently disturbed by passing cars, alighted close to one of the slicks and walked the few inches to the sap, usually with wings closed, but intermittently flicking their wings open and closed again. We passed this tree a number of times each day over the six days, and only on 22nd August, a much cooler and more overcast day than those preceding, were no Red admirals seen. Otherwise, anything from two to 18 butterflies were seen on this tree during the main part of the day. The first butterflies arrived at or shortly after 9.00am, and the last disappeared a little after 6pm.

During the stay, two oak trees were found to be attended by Red admirals. One of these (also *Q. petraea*) (tree 2) was also on the main drive through the estate. The sap slick on this tree was much smaller and it was rarely attended by more than a couple of butterflies at any one time. The third tree was a large, mature Turkey oak (*Q. cerris*) (tree 3), on the main lawn outside the Great Hall. A single large sap slick on

this tree was attended by up to ten Red admirals at a time, along with two or three Hornets, several Common wasps, and many flies. Unlike four years ago, no antagonistic interactions between the hornets or wasps and the butterflies were seen at any of these sites.

It is worth noting that although Red admirals were the most common butterflies on the estate during this period, several other species were also common. In particular, Painted ladies (*Cynthia cardui*) and Peacock butterflies (*Inachis io*) were abundant on *Buddleia,* while Large whites (*Pieris brassicae*), Small whites (*P. rapae*), Green-veined whites (*P. napi*), Meadow browns (*Maniola jurtina*) and Gatekeepers (*Pyronia tithonus*) were common. However, during our observations this year, no other butterflies were seen feeding on oak sap on the estate. Previously, Commas (*Polygonia c-album*) and Speckled woods (*Parage aegeria*) have been observed feeding at such slicks at Dartington (Majerus, 1993). That they were not observed doing so this year is not significant as the former was not seen during the visit, and the only three Speckled woods seen were very worn and were on the other side of the estate. In fact, one Speckled wood was seen feeding on a sap slick, together with two Red admirals, on a visit to the beautiful gardens at "The Garden House" neat Tavistock, where a sap slick was found on a Turkey oak in "the Dell".

The lack of many of the other species of common butterflies at the slicks suggests that the feeding behaviour observed is practiced by only particular species, the Red admiral being the most prevalent. We find this surprising. If the sap of oaks is nutritious, it might be expected that other species that overwinter as adults in Britain (or attempt to), such as Painted ladies and Peacocks, would also use this food source to build up reserves.

The observations of butterflies and other insects feeding on oak sap in the day, prompted us to visit the trees on the nights of 20th/21st and 21st/22nd August, to see whether nocturnally active insects ever visited the slicks.

In four visits on the two nights, some ten species of moth were observed feeding at the slicks (Plate 97C, Fig. 6). Details of these are given in Table 1. In addition, many wood lice, a small number of earwigs, and on tree 3, a very large number of small ants, were seen feeding on sap. On the night of 20th/21st, three Lesser stag beetles (*Dorcus parallelopipedus*) were also seen on tree 1. These beetles were not seen feeding on sap, and it is suspected that they were using the

Table 1.

Details of moths visiting sap slicks on three oak trees over two nights in August 1996.

Species	20th 10.00pm	21st 1.00am	21st 4.00am	22nd 1.00am
Tree 1				
Large yellow underwing (*Noctua pronuba*)	27	35	14	17
Copper underwing*	4	7	7	15
Dark arches (*Apamea monoglypha*)	1	2	2	
Shuttle-shaped dart (*Agrotis puta*)	1			
Mouse (*Amphipyra tragopoginis*)	1	1	1	
Dark sword-grass (*Agrotis ipsilon*)	1	1		
Knot grass (*Acronicta rumicis*)		1	1	
Common rustic** (*Mesapamea secalis*)		1	2	1
Square-spot rustic (*Xestia xanthographa*)			1	
Angleshades (*Phlogophora meticulosa*)				1
Tree 2				
Large yellow underwing	1	2	1	1
Copper underwing	1	3	1	
Tree 3				
Large yellow underwing	6	13	9	8
Copper underwing	4	6	3	5
Square-spot rustic		1		

* Includes both the Copper underwing (*Amphipyra pyramidea*) and Svensson's copper underwing (*A. berbera svenssoni*). Collection of six individuals revealed both species to be present, but assessment of the exact numbers of each in the field at night was not possible.

** No determination of whether *Mesapamea secalella* was present among these moths was made.

sites as a convenient feeding ground attacking insects visiting the sap. The finding of several Large yellow underwing (*Noctua pronuba*) wings at the foot of this tree is certainly suggestive of this explanation.

The moths that came to these trees to feed tended to alight, like the Red admirals, a few inches from the slicks and then scuttle to the edge of the slick to feed. Duration of feeding was not stringently monitored, but one female Large yellow underwing that was found feeding at 1.00am on 22nd August, and already appeared bloated at the time, with a considerably distended abdomen (Plate 97D, Fig. 7), continued to feed for a further 48 minutes. Most of the moths moved a short distance away from the slicks once they had finished feeding, and appeared to rest for some time before flying off. The Copper underwings (*Amphopyra pyramidea* and *A. berbera*) were the exception to this, for they typically walked some distance up the trunk before stopping to rest after their meal (Plate 97D, Fig. 8).

It is notable that all the moths seen at the slicks were noctuids. The abundance of Large yellow underwings at the sap slicks is probably simply a reflection of their extraordinary abundance on the estate this year. We ran a mercury vapour moth trap each night during our stay, and this moth was the commonest species by an order of magnitude each night. Conversely, the large number of Copper underwings that were seen on the oak trunks was less expected, for this species was not very common in the moth trap, only one or two being taken each night. This moth is well known for its attraction to "sugaring" strips, and these slicks are certainly a natural alternative to artificial "sugars", at least for some species.

Reference

Majerus, M.E.N. (1993) Red admirals and Hornets. *Bull. amat. Ent. Soc.*, **52**: 23.

Mapping European Butterflies: Project Outline

by Dr Otakar Kudrna

Gesellschaft für Schmetterlingsschutz e.V., Karl-Straub-Str. 21, D-97616 Bad Neustadt.

The butterflies – the best-known group of insects – are sensitive to environmental changes and serve as most valuable bioindicators providing indispensable information on the state and evolution of the European environment under the impact of changing land use practices and other anthropogenic pressures. Numerous butterfly species are considered threatened and many have been given legal protection on local, regional, European or even a worldwide scale. In spite of this, there is no data bank, no distribution atlas, no scientific assessment of the degree of threat and no conservation concept for indigenous butterfly species on a European scale.

Against this background, the Gesellschaft für Schmetterlingsschutz e.V. (GfS) and the Naturschutzbund Deutschland e.V. (NABU) – the latter represented by the "BFA Entomologie" and "BFA Internationales" – have resolved to start the project Mapping European Butterflies (MEB). The main objectives of the project are:

- to set up a data bank on the distribution of indigenous European wild butterflies and
- to publish an annotated distribution atlas of European butterflies.

The atlas will contain dot maps (about 14x18cm each) for all European butterfly species; the maps will be based upon geographical co-ordinates of reference localities. The Reference Locality System (RLS) has been especially devised for this project. Further aims of the project are:

- to assess the conservation status of indigenous European butterfly species,
- to identify all important butterfly areas of European significance and
- to determine priorities in the conservation of European butterflies and their habitats.

All these aims are from a European point of view, based chiefly upon the evaluation of their present distribution patterns. The project should be completed within four years, resulting in the publication of the distribution atlas in the autumn of 1999 or the spring of 2000.

The great significance of a distribution atlas for taxonomic, biogeographic and ecological research but above all as a scientific base

for effective conservation of nature is generally acknowledged. Scientifically based butterfly conservation deserves an exceptionally high priority. The natural and seminatural habitats of about 180 German indigenous butterfly species are co-inhabited by ten to twelve thousand insect species (Kudrna 1986). The significance of butterfly habitats for the maintenance of biodiversity on a European scale is much higher.

The earlier availability and utilisation of a distribution atlas could have prevented the grave errors in the selection of butterfly species listed in the annexes of the "Fauna Flora Habitat" (FFH) Council Directive 92/43/EC (Kudrna & Kühling 1995), thus making this important act really work.

The Gesellschaft für Schmetterlingsschutz is a member of the IUCN – the World Conservation Union.

Wanted: Information on the Large heath

by Harry T. Eales

11 Ennerdale Terrace, Low Westwood, Derwentside, Co. Durham NE17 7PN.

I am carrying out a study on the decline of the Large heath butterfly, *C. tullia* Müller, in England. Its present status is far from certain, but it is known that many sites have been lost to agriculture, afforestation, draining and peat extraction, during the last decade alone.

I am seeking data regarding sites, no matter how well known, number of specimens seen, site area, site altitude and any threat either direct or indirect which may affect any colony. Information from data labels in collections, photographic or notebook records, in fact any data from any date period whatsoever, would be most welcome.

I intend to contact museums holding collections of this species, to extract any data which may be available. This will give me historical records, but current information is in very short supply. All information will be treated in confidence where this is requested.

At the present time I would estimate that Northumberland has 75% of all the colonies in England. I have just completed a second year of a five-year study of this species in this county, and I have located it on 116 separate sites. I anticipate that there are at least another 100 colonies awaiting detection. The rest of England is less fortunate, and it may not be long before many of the more southern sites lose their resident populations.

Some butterflies of Albarracin and Abejar, Spain

by Graham Stevens (10417)

Urb. Pla. de Les Clotxes II, 46450 Benifayo, Valencia, Spain.

Every year my wife and I travel to England from our home in Valencia, Spain, via Santander in northern Spain and the ferry to England. This year I persuaded my wife that it would make a pleasant change to take an alternative route and travel via Teruel and Abejar and visit the areas made famous by Allcard and Manley in their book *The Butterflies and Burnets of Spain,* and attempt to follow in their footsteps, especially as we had two days to spare before we caught the ferry. Albarracin is situated 125 kilometres north of Valencia and 35 kilometres west of Teruel.

We set off early on the 1st August 1996 and arrived at Albarracin at 11am. The weather was hot, with temperatures around 88°F and a bright blue cloudless sky. I found a large layby bordered on one side by a lightly-wooded area with a small river running through the centre and on the other side by a stony meadow on a hillside.

I started my search along the meadow and was immediately struck by the vast number of different species that were in this one area. We spent three hours in this area slowly moving up river to the town of Albarracin.

The next day saw us above the village of Abejar which is situated 250 kilometres north of Teruel and 30 kilometres west of Soria on the N234. The area is mountainous and covered in lush green fields. We spent a further three hours in this area before moving on to Santander.

I visited the area of Albarracin again on 20th October 1996 and covered exactly the same area as before. Once again it was a sunny hot day with temperatures in the high 70s. Below I list the specimens that I saw in those two visits together with their locations.

1st August 1996

Clouded yellow	*Colias croceus* Geoffroy	Both areas	In abundance
Berger's clouded yellow	*C. australis* Geoffroy	Albarracin	23
Ripart's anomalous blue	*Agrodiaetus ripartii* Freyer	Albarracin	3
Oberthur's anomalous blue	*A. fabressei* Oberthur	Albarracin	1
	Lysandra arragonensis Gerhard	Albarracin	33
	L. coridon caelestissima Verity	Albarracin	12
Adonis blue	*L. bellargus* Rottemburg	Both	6
Long-tailed blue	*Lampides boeticis* Linne	Both	18
Common blue	*Polyommatus icarus* Rottemburg	Both	In abundance
Green-underside blue	*Glaucopsyche alexis* Poda	Albarracin	2
Mazarine blue	*Cyaniris semiargus* Rottemburg	Albarracin	2
Mountain argus	*Aricia montensis* Verity (f. montanabella)	Both	8
Painted lady	*Cynthia cardui* Linne	Both	In abundance
Swallowtail	*Papilio machaon* Linne	Both	7
Red admiral	*Vanessa atalanta* Linne	Both	12
Small tortoiseshell	*Aglais urticae* Linne	Both	5
Great banded grayling	*Brintensia circe* Fabricius	Both	3
Small copper	*Lycaena phlaeas* Linne	Both	8
Meadow fritillary	*Mellicta parthenoides* Keferstein	Both	4
	Melanargia lachesis	Albarracin	3
Marbled white	*M. galathea* Linne	Both	17
Esper's marbled white	*M. russiae* Esper	Both	6
Bath white	*Pontia daplidice* Linne	Both	In abundance
Cleopatra	*Gonepteryx cleopatra* Linne	Albarracin	8
Spotted fritillary	*Melitaea didyma* Esper	Albarracin	1
Queen of Spain fritillary	*Issoria lathonia* Linne	Both	9 (worn)
High brown fritillary	*Fabriciana adippe* Denis	Both	13 (worn)
Silver-washed fritillary	*Argynnis paphia* Linne	Both	6 (worn)
	Lysandra austuriensis de Sagarra	Abejar	3
Dusky large blue	*Maculinea nausithous* Bergstrasser	Abejar	1 (worn)
Rock grayling	*Hipparchia alcyone* Denis	Abejar	4
Dark green fritillary	*Mesoacidalia aglaja* Linne	Abejar	4 (worn)
Violet fritillary	*Clossiana dia* Linne	Abejar	1

20th October 1996. In the area of Albarracin.

Painted lady	*Cynthia cardui* Linne	6 (worn)
Common blue	*Polyommatus icarus* Rottemburg	numerous
Clouded yellow	*Colias croceus* Geoffroy	18
Clouded yellow	ssp. f. *helicina*	3
Berger's clouded yellow	*C. australis* Geoffroy	24
Bath white	*Pontia daplidice* Linne ssp. f. *raphani*	In abundance
Cleopatra	*Gonepteryx cleopatra* Linne	8
Meadow brown	*Maniola jurtina* Linne	1
Wall brown	*Lasiommata megera* Linne	In abundance
Long-tailed blue	*Lampides boeticus* Linne	In abundance
Adonis blue (females dusted in blue scales)	*Lysandra bellargus* Rottemburg	4
	Aricia cramera Eschscholtz	In abundance

Book Reviews

Mariposas Diurnas De La Provincia De Granada

by Miguel G. Muñoz Sariot, 1995, hardback, 22cm x 30.5cm, 165pp, 209 colour photos (large size), text in Spanish. Price is 7500 pesetas (plus 400 pesetas P&P). Available direct from the author: Miguel Gines Muñoz Sariot, Cuesta de San Antonio n°29, 1°izda, 18011-Granada, Spain. (Payment by Postal Order). ISBN 48-605-4288-2.

If you have an interest in European butterflies, this is an excellent volume, the result of many years study by the author, who has bred most of the Iberian species. Covering around 104 species, the book has the most impressive collection of photographs that I have seen in recent years. Many photos of the larvae are hitherto unpublished: *Agriades zullichi, Lysandra sagratrox, Pylaon hespericus, L. golgus, Aricia morronensis, Cupido lorquini, Iolana iolas, Pseudochazara hippolyte williamsi, Eurodryas desfontainii, etc. . .*

Even if you don't understand Spanish, this is not a problem, as species names and foodplant names are in latin and I find that I can follow the text quite easily. At around £40, the book is not cheap, but the quality is superb. The photos feature some superb action. Swallowtails in copulation, a freshly emerged *Charaxes jasius* hanging from the chrysalis case, a pair of Apollo in flight. Black-veined whites, Dingy skipper and *Anthocharis euphenoides* in flight, a pair of *Colotis evagore* in pre-mating posture, and many, many other brilliant shots of larvae, chrysalids, foodplants and copulation, as well as a number of habitat photos.

With many lepidopterists holidaying in Spain these days, you just cannot afford to be without this excellent publication, if you are planning a trip, and if you're just an armchair lepidopterist – it's worth every penny. You won't find a better book on the butterflies of southern Spain.

Paul W. Batty (8926)

Animals under logs and stones

by C. Philip Wheater and Helen J. Read. A5, pp. 90; 4 colour and 2 monochrome plates; numerous diagrams. Naturalists' Handbooks No. 22. Richmond Publishing Co. Ltd. 1996. Price: hardback £15.00, paperback £8.95.

One of my greatest childhood pleasures was turning over logs and stones, not to mention other debris, such as rusty corrugated iron, old sacks *etc* in order to see the teeming activity as the creatures underneath flee for safety. It was easy enough to recognise the difference between slugs, snails, beetles, mice, woodlice, worms and centipedes, although with few exceptions not to species, nor even to family. Pill millipedes are often confused with Pill woodlice for instance.

With all the concern over conservation and declining numbers, even the extinction of a few species, I still find that turning over a stone or log still produces a hive of activity from the inhabitants and this makes me wonder just how common or rare they may be. Now here at last is a book from which they can be studied and recorded without having to consult some dozen or so volumes on the various orders. The book commences with the environment to be encountered under logs and stones and this is followed by a brief account of the various orders to be found there and this quotes books for further reading. The bulk of the book is taken up with keys to the many species that are to be found and this includes, on plate 6, an illustrated "guessing guide" which should enable one to jump straight to the correct Order. All the keys are appropriately illustrated with line diagrams where necessary. The keys are followed by a section on techniques; how to collect, keep, preserve, study and then write up about the animals. There is a very extensive bibliography and, as is now adopted by these publishers, this is headed by useful information as to how to obtain and/or consult the books and journals quoted. The index looks to be very thorough. A page is devoted to useful addresses and I am pleased to say that the AES is included.

This is a book that deals entirely with invertebrates, but it does briefly mention that a number of vertebrates such as toads, slowworms, mice *etc* may also be occasionally found. The colour plates illustrate the commoner species of all Orders and we understand that a wall chart of these with keys to the Orders is available separately.

The various volumes of *Naturalists' Handbooks*, which have been under the *aegis* of the Company of Biologists for the past three years

have been going from strength to strength. Written by experts in their various fields they are now of a high standard of production and are an important and unsurpassed introduction to the subject in hand, particularly for the amateur and the student starting on his or her biological studies. One slight criticism of this one is the duplication of several diagrams; Figures 3 and 37 as well as Figures 4 and 36 are identical. This does not detract from a book on a subject where invertebrates are almost invariably still to be found and without too much trouble at that. One just has to be very quick in order to catch most of them and with this volume to hand the means of identification is now readily available.

Brian Gardiner

Grasshopper country: the abundant orthopteroid insects of Australia

by David S.F. Rentz. Hardback. pp. 284, 425 colour photos, numerous black and white photos and figures. ISBN 0 86840 063 7. University of New South Wales Press, Sydney, 1996. (in UK available from Pemberley Books, 34 Melrose Close, Hayes, Middlesex UB4 0AZ. Tel./Fax: 0181-561 5494 – Price £42).

This beautifully illustrated and well-designed volume, with an attractive dust jacket, covers all Australian orthopteroid insects *i.e.* the Orthoptera (grasshoppers, katydids, crickets and relatives), Blattodea (cockroaches), Mantodea (mantids) and Phasmatodea (stick and leaf insects). In addition to a very informative text from a world-renowned expert, there are 425 colour and 150 black and white photographs, nearly all taken by the author in the field and in the laboratory. A range of good quality figures is also included.

Part 1 (pp. 1-45) of this book deals with several introductory sections, basic characteristics, taxonomy, conservation, "singing" orthopteroids, mating and courtship, collecting, rearing, killing and preserving the colourful Australian fauna. The last section also includes useful notes on dissection of genitalia. Within the text, the enthusiast will discover useful practical hints, such as using a mini bat detector.

Part 2 (pp. 46-208) covers the Orthoptera: grasshoppers, katydids and crickets, which are spilt into respective groups. Keys to subfamilies, tribes and/or genera are provided, along with sketches showing key anatomical characters. The text includes useful notes on culture methods, classification and preservation, along with remarks on representative species within families, taking into account any relevant research, behaviour, distribution and foodplants.

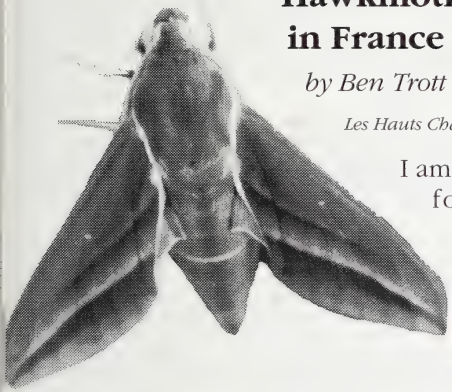
Part 3 (pp. 209-257) covers the remaining orthopteroid orders *i.e.* the cockroaches, mantids and stick and leaf insects in exactly the same comprehensive manner as described above.

Pages 258-284 includes sections dealing with References, photography, special interest groups, formulas and recipes, a brief glossary and an index.

What more can the orthopterist want than this highly accurate, colourful volume?; David Rentz has included invaluable observations from his collecting trips across Australia and the outstanding plates show numerous species, including their behaviour, mating, moulting and camouflage. This attractively-priced book will also cater for readers interested in nature or general entomology. I can do no better than sum up with an accurate statement from the dust jacket "Grasshopper Country is one of the most comprehensive and best illustrated books on orthopteroid insects anywhere in the world, and a milestone in Australian entomology."

It is understood that CSIRO, Australia are promoting the book with an accompanying CD, which it may be possible for interested parties to purchase separately. Alternatively, order both the book and the audio CD direct from CSIRO Publishing, PO Box 1139, Collingwood, 3066 Victoria, Australia – Australian $79.95 (for customers outside Australia or New Zealand US $79.95 – payment by credit card possible). More than 130 species are included on the CD.

Paul D. Brock (4792)



Hawkmoth sightings in France 1996

by Ben Trott (9354)

Les Hauts Champs Moiteaux, 35270 Combourg, France.

I am reporting my Hawkmoth sightings for 1996. I have been using a fluorescent light trap, and have been collecting larvae:

Moths

11 Elephant hawkmoths – light trap

5 Poplar hawkmoths – light trap

4 Privet hawkmoths – light trap

1 Pine hawkmoth – light trap

1 Small elephant hawkmoth – light trap

1 Narrow-bordered bee hawkmoth on a Privet bush

1 Broad-bordered bee hawkmoth on Balsam

17 Hummingbird hawkmoths

Larvae

88 Willowherb hawk larvae

22 Elephant hawk larvae

2 Small elephant hawk larvae

1 Hummingbird hawk larva

This makes a total of 154 sightings. It has been a remarkable year for me, in a normal year I would find a few Elephant hawk larvae and see a small number of Hummingbird hawkmoths. Being a junior member some years ago in 1991, I was encouraged to rejoin by the sheer abundance of sighting this summer.

Diary Dates

To make the diary effective contributions are needed from members. Any relevant items should be sent to the *Bulletin* Editor. No charge is made for entries. Please allow three months advance notice.

APRIL

26th ***AES AGM & Member's Day***

At the Royal Entomological Society of London, 41 Queen's Gate, SW7. There will be talks and a bug hunt aimed at all levels of interest. Doors open at 10.30am, start 11.00am. For further details see inside back cover of this *Bulletin*.

I: Wayne Jarvis 0976 828142.

MAY

17th ***Emperor moth expedition and bug hunt.***

2-5pm at Snelsmore Common Country Park, Berkshire (SU463710). Meet at main park entrance just off the B4494 Donington to Wantage Road.

Children welcome for this bug-hunt at which we hope to attract the spectacular day-flying emperor moth, and will also be finding what other mini-beasts inhabit the woods and heathland of Snelsmore. Please bring a bug-box. Children should be accompanied by an adult. Joint with Butterfly Conservation and the AES Bug Club.

I: Martin Harvey (01491) 671889).

Spring moth-watch at Snelsmore Common.

8pm until late, at Snelsmore Common Country Park, Berkshire (SU463 710). Meet at main park entrance just off the B4494 Donington to Wantage Road.

Please bring a torch and warm clothes (and a Thermos flask to ward off the British spring!).

Please contact leader in advance to find out about access details (the car park is locked after dusk).

I: Martin Harvey (01491) 671889).

Published 25th February 1997 by the Amateur Entomogists' Society (Registered Charity No. 267430), from PO Box 8774, London SW7 5ZG.

AES MEMBERS' DAY AND ANNUAL GENERAL MEETING

Saturday 26th April 1997

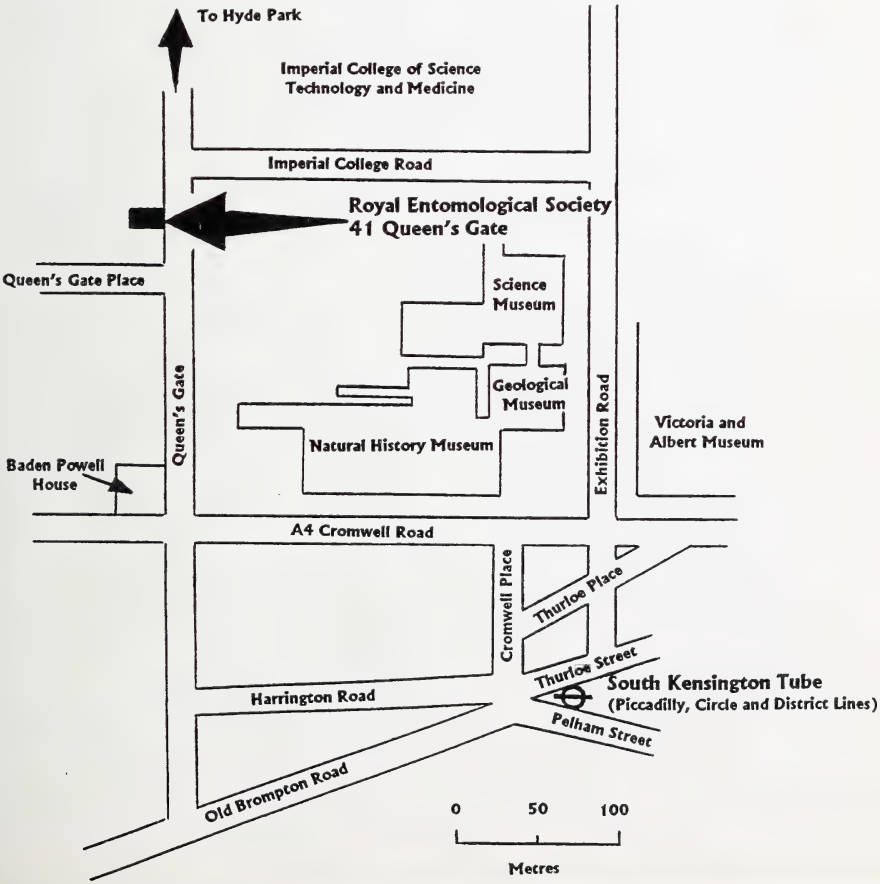
ıt the Royal Entomological Society of London, 41 Queen's Gate, SW7

HOW TO GET THERE

ıere is no car parking facility at the R.E.S. and it is therefore strongly advised that public ınsport is used.

y Train: The nearest mainline station is London Victoria from which the underground or bus systems should be used.

y Underground: South Kensington Station is served by Piccadilly, Circle and District Line trains.
Gloucester Road Station is served by Circle and District Line trains.



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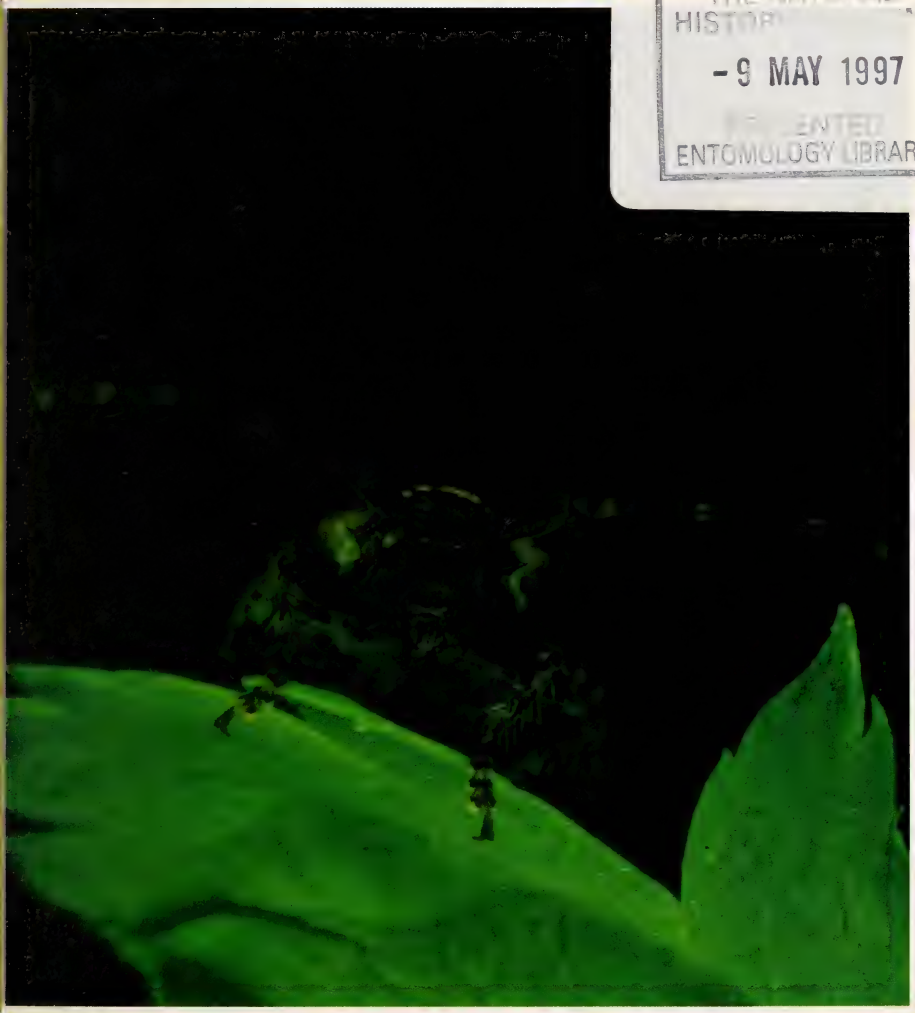

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The Amateur Entomologists' Society

Founded in 1935

Where to write

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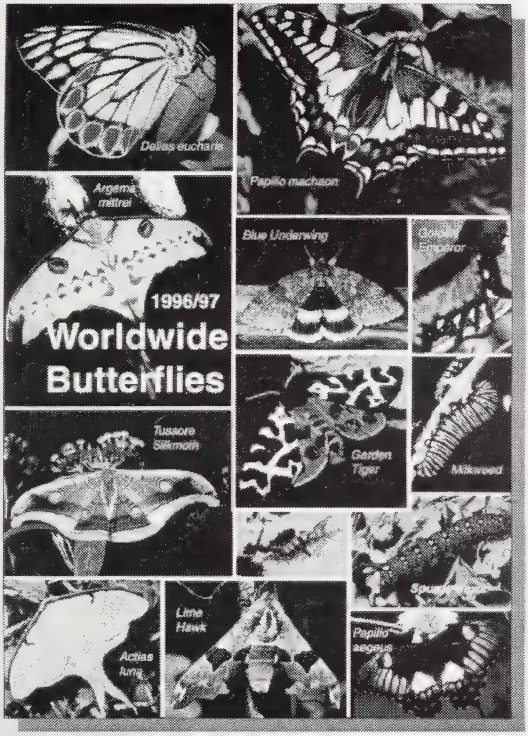
Advertising Rate: The following charges apply to adverts in the body of the *Bulletin*. Full page £60, Half page £40, Quarter page £25. Insert charges available on request to Advertising Secretary, address as above.

Worldwide Butterflies

Sherborne, Dorset, DT9 4QN. *Tel 01935 74608 Fax 29937*



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THE 3rd E.L.G. SPRING ENTOMOLOGICAL FAIR

SUNDAY 18th MAY 1997

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* MAIN LIVESTOCK DEALERS ATTENDING *
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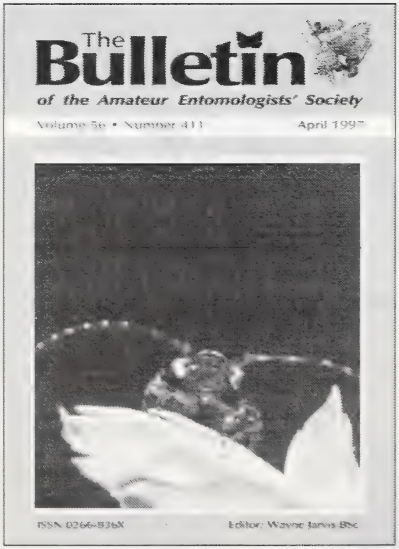

The cover of this issue of the *Bulletin* features the Longhorn beetle (*Pogonochoerus hisidulus*).

Photo: Nick Holford

The Bulletin
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Editorial

The AES has recently been formulating a new trading policy for use at the Society's annual exhibition and in its publications. We asked for our members' opinions on the subject in an earlier *Bulletin,* and received 35 replies, for which we are thankful. The policy which we drew up hastily last year, resulted in a list of "unwelcome" species of butterflies and moths, *Lepidoptera non grata,* if you will. It was based on four established lists of specifically rare and threatened species, but it was clearly not sensible, as we realised when the full extent of the list was seen. We rescinded this list for the 1996 exhibition as a result of this realisation, despite reports to the contrary in some other publications which had suggested that pressure from dealers and the lobbying of other groups had effected the change – it had not. The exhibition was, as we have come to expect, a success, with a slight increase in attendance for traders and visitors.

The letters that we received before the 31st January 1997 deadline have all been read and points taken from them. Views ranged from those who wanted the exhibition to remain as it has done for years, to those who wanted to see a restriction in the trade of endangered specimens of deadstock and livestock and those who wanted to see the sale of ALL specimens to be banned. Council met in early March and formulated a new policy on the trade of specimens, and this will be implemented for the 1997 exhibition and all advertisements in any Society publication.

The policy is an attempt to show those who would ban specimen sales that entomologists are not the zoological equivalent of stamp collectors. Amateurs provided much of the entomological knowledge we have today, and they continue to contribute to it. A valuable part of this knowledge has come about through the exchange and sale of live and dead specimens, and this material should continue to increase our knowledge and enhance our understanding.

Some people have actively criticised the previous AES policy, but they have done this in other publications, rather than approach the Council direct. And despite a questionnaire being distributed to members of another entomological society, these vociferous outbursts have still not been backed up by any formal approach or level

argument addressed to the Society. This is not an appropriate way to further anyone's points of view.

Behind both the previous *Lepidoptera non grata* list and the current policy is the recognition that entomologists must face disapproval from certain quarters. This disquiet is felt by some non-collectors who view rows of set specimens for sale and see nothing more than collecting for collecting's sake. There is general agreement that collecting is not a threat to the survival of species, when compared to the huge loss to the habitats in which these creatures live, indeed, without collections there would be no records for most insect species, no knowledge of their habits and habitats, no appreciation of their ecological needs and no chance to encourage or protect them. The availability of specimens for sale (both live and dead) further enhances entomology, because it means that reference collections can be more easily assembled, old data are not lost or destroyed, newcomers and youngsters are easily encouraged and breeding skills and interests are developed.

But to some people, these specimens for sale smack of a Victorian exploitation of the environment and an anoraked nerd's need to "get the complete set". This view belittles entomology and we should do all we can to counter it, by actively pointing out the importance and necessary part that exchange and sale play in the study of insects. The policy, which follows this editorial, aims to set the sale of live- and deadstock in its rightful context, as part of an overall aim to further, and encourage the study of entomology.

On a lighter note, the Society Treasurer, Andrew Locke has announced that he will be leaving the post as of 31st May. We are, therefore, looking for a replacement to fill this important position within the Society. Any one interested in doing so, or filling the post of Advertising Secretary, should contact me at the PO Box address or on 0976 828142.

The Annual General Meeting is also looming, taking place on Saturday 26th April at the Royal Entomological Society of London. We have organised talks and demonstrations, and also a Bug Hunt in the nearly Natural History Museum gardens. Specimens may also be brought along for identification and as always, the Society's publications will be available for sale, including our two new volumes, *A guide to moth traps and their uses* by Paul Waring and Reg Fry (Price £5) and *Rearing Parasitic Hymenoptera* by Mark Shaw (Price £4.50). They can of course also be ordered by sending a cheque to AES Publications, The Hawthorns, Frating Road, Great Bromley, Colchester, Essex CO7 7JN.

Also at the Members' Day and Annual General Meeting , the AES Bug Club will be running activities for our Bug Club members, showing how best to handle insects and during the afternoon we will (weather permitting) be demonstrating field techniques as we look around the Natural History Museum's Conservation Garden on our Bug Hunt. This will also be helping the museum document those species that have colonised the area.

The *AES Bug Club Newsletter* received a very warm welcome with its first issue (sent to all AES members) in February. We would be grateful if those of you that have "finished" with your copies could pass it on to your local school or a friend to have a look at and maybe increase our membership! The costs of producing both the *Bulletin* and the *AES Bug Club Newsletter* are still not covered by the cost of subscription, and we need to obtain as many new members as we possibly can to try and change this situation, or inevitably, we shall have to increase the cost of membership!

Finally, before I fill the pages of this *Bulletin* totally with ramblings, a quick note regarding the submission of articles. It helps us a great deal if the articles are sent double-spaced (hand-written articles are acceptable if they are legible!) following the same format as *Bulletin* articles, particularly with the references. Please include your name, membership number and address at the top of each article and on any illustrations or slides/photographs on the reverse side. Latin names should be included wherever possible but they should not be underlined. We always require articles, both for the *Bulletin* and the *Bug Club Newsletter* and will always attempt to publish them. If you are not sure about submitting an article, please drop me a line or phone 0976 828142 and I will attempt to persuade you to do so!

Enough of me for now! the Society's trading policy follows . . .

Wayne

Amateur Entomologists' Society

Policy on providing facilities for trade in biological specimens

The Society provides facilities through its *Wants and Exchanges List* and its annual exhibition. It does so to help fulfil its overall aim of furthering the study of insects, which can only be pursued effectively through the observation of dead and living specimens, with the aid of books and equipment.

The Society does not believe that trade in invertebrates is generally detrimental to populations in the wild, but recognises that such harm is harm is possible where species are already in serious decline for other reasons (such as habitat loss), or where they are being over-exploited. The Society further believes that it is preferable for traders to obtain their specimens through captive breeding or *bone fide* ranching systems rather through capture from the wild, as an assurance that natural populations and their habitats are not being harmed.

In accordance with this policy, the Society's rules for trade at its annual exhibition and through its *Wants and Exchange List* are as follows:

1. Species that are protected under all the provisions of Schedule 5 of the Wildlife and Countryside Act (1981), or for which there is a total ban on international trade under CITES, may not be offered for sale.

2. Species that are listed in Schedule 5 of the above Act as protected from trading, except by licence, may not be offered for sale unless the licence number is provided by prior application to the appropriate officer of the Society; *i.e.* the Exhibitions and Meetings Secretary or the Wants and Exchange Editor. At the annual exhibition, the licence must also be available for inspection, and the licence number must be prominently displayed on the trader's stand.

3. There is no restriction on trade in species not included in categories (1) and (2) above. Traders are, however, requested to provide their customers with information on the origins of all live or dead specimens on sale. The Society suggests that this information should be based on the following categories:
   a) Captive bred, from self-sustaining stock.
   b) Reared from wild-caught immature stages, including gravid females.
   c) Wild-caught (in whatever stage is offered for sale).
   d) Bred from a *bone fide* ranching system.
   e) Specimens from old collections.

Traders must note that, although information is requested, rather than required, further details must be provided if the specimens are stated to be derived from categories (d) or (e). These details are as follows:

Category (d) – the address of the ranch or ranching agency.

Category (e) – the origin of the collection and the year in which the specimen was collected.

A search for the Reddish buff moth *Acosmetia caliginosa* (Hübner) in Spain and France, May 1995, with records of other Lepidoptera seen.

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Introduction

In mid-May 1995, we undertook an expedition with the principal objective of visiting the two known sites in western Europe, where the Reddish buff moth has been reported in the last decade. One of these is on the north coast of Spain and the other is just across the border in France. The aim was to document the condition of the habitat at each site, for comparison with the single locality to which the moth is now confined in the UK and with reintroduction and possible reintroduction sites in the UK. The former consists of heathland on the Isle of Wight, where PW is working with the English Nature Species Recovery Programme to ensure that the habitat remains suitable for breeding and that additional areas of former heathland are returned to optimum condition. The moth breeds in open heathy areas dominated by ling heather *Calluna vulgaris,* amongst which other low plants grow, including saw-wort *Serratula tinctoria,* which is the sole larval foodplant of the Reddish buff.

The Species Recovery Programme is also concerned to identify other potentially suitable sites within the former range of the Reddish buff in England, into which the moth might be established, to restore the number of British colonies to former levels. At the end of the nineteenth century the moth was known from several sites within the New Forest in Hampshire (Tutt, 1901-1905 and data labels from preserved specimens). In the 1930s an additional colony was discovered in a wood outside the New Forest, near Fareham in eastern Hampshire (Cardew, 1931). It had also been recorded from the Isle of Wight, where it is now known to have occurred on at least four sites (Waring, 1992a). The current plan is to return the moth to the mainland and to improve its status on the Isle of Wight. Hampshire County Council (HCC), by whom PMP is employed, are actively assisting with the former at one of their sites.

Recent study of the moth and its requirements in Britain has had to be based largely on its one remaining site. As a result of Hampshire

County Council's European initiatives programme PMP was offered the opportunity of a study tour to visit continental sites and develop contacts, hence this joint expedition was planned (with PW participating at his own time and expense).

Additional aims of the expedition were to record and report the other species of moths encountered while searching for the Reddish buff, to develop contacts with the Spanish authorities who issue the permits now necessary for collecting voucher specimens of insects, and to accept an offer extended to PMP of a guided tour around the Biosphere reserve and regional park of Urdaibai, near Bilbao. The offer was extended by Basoinsa, a Spanish environmental consultancy based in Bilbao, which has been involved in the Urdaibao project and which had previously visited a similar HCC site (Titchfield Haven National Nature Reserve). Basoinsa have subsequently provided us with detailed vegetation maps which will assist further work on the Reddish buff in Spain.

Background information about the Reddish buff in Europe

Within Europe the Reddish buff has been recorded from Spain, France, Italy, Germany, Switzerland, Austria, Poland, Czechia, Sweden, Norway and the former USSR. It is locally quite common in the Czech Republic and Sweden (M. Fibiger, *pers. comm.*). Within Spain the moth seems only to have been reported form two localities as far as we are aware. Jose Yela (*pers. comm.*) has seen two specimens collected by T. Seebold and reported by Seebold in 1879 (*Anales de la Sociedad Espanola de Historia Natural* **8**: 104-107). These are in Seebold's collection at the Museo Nacional de Ciencias Naturales, Madrid, and are labelled Bilbao. They are the only Spanish records in the literature. In 1987 Norman Hall was light-trapping along the north coast of Spain and collected four specimens of a moth unknown to him and subsequently identified by Barry Goater as the Reddish buff. These were found at Torimbia, some 160km west of Bilbao. Later, in 1994, Norman Hall discovered similar-looking moths near Osse-en-Aspe, close to Accous, at the western end of the French Pyrennees. Jacques L'Honore (*pers. comm.*) has searched some of the French literature and reports that the moth has also been recorded from Jarnca, Charente, in the past.

The sites we visited:

We light-trapped all night at Torimbia (16-17/5), the Urdaibai reserve (17-18/5) and above Osse-en-Aspe (18-19/5) and recorded 106 species of macro-moth.

During our expedition we also visited Jarnac, near Angouleme, Charente. We failed to find any heathland or any other likely looking habitat for saw-wort in this area, in spite of an extensive tour round the main roads and some minor ones in the vicinity. A large proportion of the ground around Jarnac is planted with vineyards and it is possible that these have been established on former Reddish buff habitat. Former sites in the UK may also have been lost to agricultural development. Jarnac is sited on the former floodplain of the Charente River and land which is not used for buildings or agriculture has been planted extensively with trees, especially poplars *Populus* spp. in the damper low-lying areas. In view of what we saw, it seems unlikely that the Reddish buff is still to be found in or near Jarnac.

Torimbia, near Llanes, Asturias, Spain 16/17 May

(Plate 97E, Fig. 1)

Playa Torimbia is a sandy beach which is reached via the village of Niembro. Above the beach is a steep-sided headland covered in heathy vegetation and it is on these slopes, below a telephone repeater station, that the Reddish buff moth was discovered by Norman Hall in 1987. He collected four specimens between the 9th and 13th August.

The narrow track up from the village leads to a place that has recently been bulldozed to create a car-parking area large enough for about ten cars. The westward side of the heathland, which faces Torimbia bay and the prevailing wind, consists of a heather dominated sward well-populated with saw-wort. The saw-wort grows as scattered small rosettes, so densely that one or more rosettes are present in every pace. In terms of plant structure, the sward looked very like breeding grounds of the Reddish buff on the Isle of Wight, though amongst the ling heather and saw-wort were plant species not present in the UK breeding ground. These included: St. Dabeoc's heath *Daboecia cantabrica,* common butterwort *Pinguicula vulgaris,* white asphodel *Asphodelis albus* and spring squill *Scilla verna,* all of which were common and in flower. Other low plants growing with the saw-wort included: purple moorgrass *Molinia caerulea,* common gorse *Ulex europaeus,* dwarf gorse *U. minor,* tormentil *Potentilla erecta* and wood sage *Teucrium scorodonia.* A small rock sample was collected and was later identified as quarzite, which can lead to a neutral to mildly acidic soil which agrees well with the heathy habitat described above.

The saw-wort rich sward covered several large slopes by the sea and comprised perhaps 50-100 acres (20-40 hectares) in total. Within this

there was considerable variation in sward height, though the sward length within each slope was much more consistent. There were obvious signs that some parts of the slopes had been burnt, including one area within the last year. A fire was observed in progress on a small patch of heathland (4-5 acres or 2 hectares) on a heathland immediately to the east during our visit. The fire was obviously deliberate and was attended by people, but the timing was not the best from the point of view of wildlife. Sheep dung was found in places and a flock of about twenty Soay-type sheep was seen at the base of the heathland. Both fires and grazing combined with the sea-winds, are probably responsible for maintaining even sward heights. Several of the more sheltered slopes were more rank than the Reddish buff would breed in on the Isle of Wight, with saw-wort becoming swamped by grasses and other vegetation. Such places produced Boorman drop-disc height measurements in excess of 30cm (see Waring, 1992). Clearly, without continued management these swards could become too rank for the moth.

There were few trees or bushes anywhere on the site, but those noted included patches of blackthorn *Prunus spinosa*, bramble *Rubus fruticosus*, alder buckthorn *Frangula alnus* and grey willow *Salix cinerea*. There was no hawthorn *Crataegus monogyna* or birch *Betula* sp. which are present on the breeding site in the UK. Two Scots pines *Pinus sylvestris* were present on one of the upper slopes, but it was not clear if these had been planted. Also royal ferns *Osmunda regalis* were noted growing on the banks and in the gullies.

Because of a stiff sea breeze which was sweeping the westward-facing slope with the shortest and most promising looking sward for the Reddish buff (Table 1), we chose a more sheltered slope for the light-trapping. One Robinson trap was operated on the slope, amongst saw-wort, and another was operated on a narrow track through the sward, in the lee of a bramble patch, 100m distant from the first trap and by saw-wort. Additionally, an actinic trap was operated at the base of the neighbouring slope, about 200m away. It was a dry, mild and cloudy night with no moon, with the temperature at dusk 15°C dropping to a minimum of 10°C. A total of 35 species of macro-moths was recorded (see Appendix 1). The catch included one female Reddish buff (in slightly worn condition), in the Robinson trap on the slope, and several species normally associated with heathland, including the Emperor moth, the Heath rustic and the True lover's knot. The mean sward height where the Reddish buff was trapped was 22.5cm (see Table 1). By contrast, the most recently burned slope, upon which small rosettes

of saw-wort were already regenerating, produced a mean sward height of 6.3cm (see Table 1).

Table 1. Sward height measurements using the Boorman drop-disc technique on three slopes at Torimbia (see Appendix 2 for measurements)

Slope	Mean sward height (cms)	Sward height range (cms)	Sample size
A	17.3	13-24	20
B	22.5	15.5-38.5	29
C	6.3	3-11	22

Butterflies seen included Speckled wood *Pararge aegeria,* Common blue *Polyommatus icarus,* Holly blue *Celastrina argiolus* and an egg of a Brimstone *Gonepteryx rhamni* on an alder buckthorn leaf. The Small tortoiseshell *Aglais urticae,* Painted lady *Cynthia cardui* and Large white *Pieris brassicae* were noted though these may have been only passing through the site.

Interesting bird species seen on the heathland included: common buzzard *Buteo buteo,* peregrine falcon *Falco peregrinus,* nightjar *Caprimulgus eurpaeus* churring on the slopes, singing tree pipit *Anthus pratensis,* stonechat *Saxicola torquata,* singing grasshopper warbler *Locustella naevia* and melodious warblers *Hippolais polyglotta,* a pair of chough *Pyrrhocorax pyrrhocorax,* raven *Corvus corax* and singing corn bunting *Emberiza calandra.*

Col de Houratate, Osse-en-Aspe near Accous, Atlantique, France 18/19 May (Plate 97E, Fig. 2)

This site was found without difficulty, using precise notes and a sketch map from Norman Hall. It is completely different from Torimbia and consists of a grassy hillside with relatively small patches of ericaceous plants and much bracken *Pteridium aquilinum* and common gorse, much of which had been cleared in the last year and may be kept in check annually. The site is high up in the Pyrennes (at about 1110m above sea level) and 2.6 miles (4kms) up the road running north from Osse-en-Aspe (as measured on the car mileometer). The soil is most probably calcarious with the underlying rock identified as dolomite; this agrees well with flora noted.

We recorded as many of the plant species as we could to give a good indication of the type of habitat. The list includes many species associated with base-rich ground and the more acid-loving species, including the ling heather, were mainly confined to slippages and overhangs on the slope. The sward on the open slopes included dwarf gorse, tormentil, bilberry *Vaccinium myrtillus*, ling heather, betony *Betonica officinalis*, and woodsage, but large parts of sites had prominent populations of salad burnet *Poterium sanguisorba*, marjoram *Origanum vulgare* and bird's-foot trefoil *Lotus corniculatus*. The following species were also recorded in abundance: creeping and meadow buttercup *Ranunculus repens* and *R. acris*, herb-robert *Geranium robertianum*, red clover *Trifolium pratense*, white clover *T. repens*, creeping cinquefoil *Potentilla reptans*, wood-spurge *Euphorbia amygdaloides*, docks and sorrel *Rumex* spp., thyme-leaved speedwell *Veronica serpyllifolia*, bugle *Ajuga reptans*, ribwort plantain *Plantago lanceolata*, cross-wort *Galium cruciata* and yarrow *Achillea millefolium*. Grasses included: tor grass *Brachypodium pinnatum*, yorkshire fog *Holcus lanatus*, cocksfoot *Dactylis glomerata*, common fox-tail *Alopecurus pratensis* and sweet vernal-grass *Anthoxanthum odoratum* and purple moorgrass. The last-named was mainly in a recently burned area with gorse. Other plants included: stinking hellebore *Helleborus foetidus*, shepherd's-purse *Teesdalia nudicaulis*, milkwort *Polygala* spp., perforate St. John's-wort *Hypericum perforatum*, violets *Viola* spp., red campion *Silene dioica*, greater stitchwort *Stellaria holostea*, spring pea *Lathyrus vernus*, wild strawberry *Gragaria vesca*, great mullein *Verbascum thapsus*, germander speedwell *Veronica chamaedrys*, honeysuckle *Lonicera periclymenum*, hedge bedstraw *Galium mollugo*, oxeye daisy *Chrysanthemum leucanthemum*, daisy *Bellis perennis*, hemp-agrimony *Eupatorium cannabimum*, dandelion *Taraxacum officinale*, hawksbit *Leontoden* spp. and a spotted leafed orchid *Orchidaceae* which was not in flower and some ferns. Importantly, we could find no saw-wort at the site or in the adjacent land. The sward height was very variable and patchy, but as short as 2-3cm on the steepest slopes and burnt areas.

The open sward was bounded by a hedgerow dominated by mature trees with woodland nearby. The woody perennials included: wild cherry *Prunus avium*, beech *Fagus sylvatica*, oak *Quercus* spp., hazel *Corylus avellana*, alder *Alnus glutinosa*, ash *Fraxinus excelsior*, some birch *Betula* spp. and spruce *Picea* spp.

We operated one Robinson trap exactly where Norman Hall had placed his on the open bracken-covered bank, a second Robinson trap about 75 metres away on a large patch of bilberry.

It was a cloudy night with occasional rain, the dusk temperature was 11°C which dropped to a minimum of 7°C during the night. We had a very good catch with 66 species of macro-moth recorded. No Reddish buff was seen. Among the more interesting species were the Lace border (two individuals), Silver cloud (five), Horse chestnut (two) and a single Black-veined moth. The full catch is listed in Appendix 1.

No butterflies were seen at this site, but as there was intermittent rain when we arrived late in the evening and it was overcast the following morning, conditions were far from ideal. However, we did see a male Emperor moth and a Common heath moth on the wing as we left.

On the way up to this site from Osse-en-Aspe, in similar habitat, we saw two red-backed shrikes *Lanius collurio* by the roadside. We also had excellent views an of Egyptian vulture *Neophron percnopterus* and booted eagle *Hieraaetus pennatus* at the trap site.

Urdaibai Biosphere Reserve, near Bilbao, Pais Vasco/Euskadi, Spain 17/18 May (Plate 97F, Fig. 3)

The Urdaibai reserve consists of an estuary and its surroundings; it includes a range of habitats from intertidal mud-flats to woodland rich in the evergreen oak *Quercus ilex*. It was not possible to operate our light traps in the estuarine marsh at this site, or to examine this habitat in detail during our guided tour around the reserve, but we were able to set up a light trap on a farm overlooking the marsh. The trap was set up in the grounds of a farmhouse owned by Ma. Belen Ozamiz Aberasturi, at "Ozolo", Ozollo Zelaietas, five kilometres west of Gautegiz Arteaga, on the east bank of the estuary. The trap was about 500 metres from the marsh, in the corner of a cultivated field and small orchard. On the hills to the east was an area of woodland, including conifer plantations, but no birch was present.

It is unknown whether any moths have been previously recorded within the reserve – we were simply interested to find out what was flying and to make a contribution to the biological data for the site. Some 43 spp. of macro-moths were recorded (Appendix 1), the most notable of which were the Oblique carpet and the Pinion-streaked snout, both of which are likely to be dependent on the marsh. Other species which we were particularly interested to see were the Fox moth, Orange moth, Tawny prominent and the Orache moth, though all of these are probably common and widespread in this area. Few birds were seen of note with a nightjar calling at dusk and singing firecrest *Regulas ignicapillus* perhaps being the most notable.

Miscellaneous sites and records:

Much of our time on this expedition was spent driving between sites, but some interesting records of Lepidoptera were collected en-route. We saw three Black-veined white butterflies *Aporia crataegi* on the wing during a brief comfort stop on the banks of the Embalse de Yeas by the Monasterio de Leyre, about 50km east of Pamplona, in arid scrub habitat on 18th May. The stop also produced some good birdwatching with black kites *Milvus migrams,* Egyptian vulture, some 50 griffon vultures *Gyps fulvus,* goshawk *Accipiter gentilis* and five crag martins *Ptyonoprogne rupestris.*

We operated a Robinson trap for an hour after dark on the south bank of the river close to Jarnac, on the cold clear night of 19/20th May. The following moths came to the light: Clouded border *Lomaspilis marginata,* Elephant hawk-moth, Setaceous hebrew character, Angle shades and Burnished brass *Diachrysia orichalcea.* The trap was set up on the edge of the camp site on recently mown grass and close to a plantation of Lombardy poplars *Populus nigra.* At least six singing nightingales *Luscinia megarhynchos* could be heard from the trap site. Also a singing golden oriole *Oriolus oriolus* and a pair of cirl buntings *Emberiza ciclus* were recorded here. Small tortoiseshell and Common blue were seen at the camp site.

On the drive north through France to meet our return ferry back across the Channel to the UK we stayed overnight on 20/21st May at the municipal campsite at Menil off the D28 road, near Chateau-Gontier south of Laval, Mayenne (Plate 97F, Fig. 4). This was again on a river bank, opposite a large chateau and a substantial block of broad-leaved woodland. The campsite itself consisted of neatly laid-out hedges of hazel and grey willow to divide up the grassy plots. There were some riverside willows *Salix* spp. and we placed a Robinson trap under a mature walnut *Fuglands regia.* We experienced another dry, cold and clear starlit night, with the temperature just 8°C at dusk and dropping fast! The trap was operated until 23.40 hours but only three moths came to the light – an Orange footman *Eilema sororcula,* a White ermine and a Flame shoulder. An actinic trap operated all night at the other end of the plot caught only two moths – a Poplar hawkmoth and a Muslin moth. A larva of the Gipsy moth *Lymantria dispar* was found on a leaf of crack willow *Salix fragilis* on this site. A Red admiral *Vanessa atalanta* was seen the following morning. During the night a barn owl *Tyto alba* screeched and flew around from the adjacent church yard.

Discussion and conclusions from the work on the Reddish buff moth *Acosmetia caliginosa*

(i) Bivoltine life-cycle in Spain?

The Reddish buff moth is univoltine on the Isle of Wight and in captivity in Peterborough and it normally flies from mid or late May through to late June, with occasional adults in July. Norman Hall's records of the moth from Torimbia and Osse-en-Aspe are of fresh adults in early August. From the latter dates we suspected the moth might be bivoltine in parts of southern Europe and decided to visit Spain in mid-May, just before they were due to fly in England, to allow for the more advanced season further south. Our finding of a slightly worn specimen at Torimbia on 16th May indicates that there are either two generations or an even more protracted emergence period than in the UK.

(ii) Breeding requirements

The habitat at Torimbia is similar in many ways to that at the Isle of Wight colony and this suggests that our knowledge of the moth derived from studies on the Isle of Wight may be applied more generally to other sites. The conditions at these two sites provide an objective to aim for in bringing other sites into suitable condition for establishment trials.

(iii) Larval foodplant

The reported occurrence of the moth at Osse-en-Aspe, in the apparent absence of saw-wort *S. tinctoria,* suggests there may be at least one alternative foodplant. In the nineteenth century it was reported that the larva also fed on salad burnet *P. sanguisorba* and this observation is often repeated in later literature. This plant happens to be common at the Osse-en-Apse site but PW questions its suitability as a foodplant, at least in the British context. During a captive rearing project for the Species Recovery Programme, many larvae originating from the Isle of Wight stock have been successfully reared on saw-wort, but salad burnet has been consistently ignored by larvae, even when growing adjacent to saw-wort and even when hungry larvae were offered nothing else. It would be interesting to establish whether races from other parts of Europe are different in this respect.

(iv) The status of the moth at Torimbia and elsewhere on the north coast of Spain

Although only one Reddish buff was seen on our visit, the extent and condition of the available habitat suggests that a large colony is likely to

be present. Saw-wort is considered an uncommon and localised plant in Spain (T. Cascan *pers. comm.*), so Torimbia could be one of only a few sites for the moth in Spain. It is the only Spanish site currently known for the moth and its protection and conservation is recommended, for the Reddish buff and all the other wildlife it supports. This paper is being sent to the Spanish authorities to highlight the importance of the site and to find out what protection, if any, the site has currently.

The adjacent headlands on both sides of Torimbia are lower in altitude and have been extensively cultivated. However, there may be other similar heathy headlands along the 160km of coastline east to Bilbao where the moth was previously recorded, and perhaps elsewhere on the coast. Driving back towards Santander at Treceno 4km west of Cabezon de la Sal, we noticed a hillside covered in heathy habitat with gorse, partly planted with *Eucalyptus* spp. The distribution of the moth in this area needs investigation. Colleagues from Basoinsa have kindly supplied us with vegetation maps which show that there are extensive areas dominated by ling heather *C. vulgaris* west of Bilbao and they hope also to be able to identify for us areas where saw-wort *S. tinctoria* has been recorded, to assist future survey work.

(v) Management of the Serratula *heathland at Torimbia*

From our observations at Torimbia it appears that the *Serratula*-rich heathland would deteriorate in the absence of management, perhaps in just a few years. The current state seems to be the result of light sheep-grazing, fire and the stunting effect of sea winds. We were surprised to see heathland being burned in May, rather than at the end of the growing season, which is better for nesting birds and other wildlife, and wonder if this is a long-established tradition in the area. We were pleased to see that the fires were attended and are apparently restricted to a small part of the heathland in any one year. This will allow the Reddish buff and other wildlife to survive in the unburned areas, from which burned areas can be recolonised when the vegetation regenerates.

(vi) Current status of the moth in France

The records of the moth in France should be collected together and scrutinised to see how many colonies currently survive. Our experience at Jarnac leads us to suspect that some localities with past records have changed greatly and that colonies have been lost.

A note on obtaining permits from the Spanish authorities

Veijo (*in press*) has outlined the current position regarding Spanish legislation which affects the collection and study of insects and explains that it is apparently necessary to obtain a permit to light-trap moths. The contact to write to for permission for Asturias is the Regional Director of nature reserves at the Principado de Asturias at Oviedao. We were able to obtain a permit from them once we had explained our objectivess in a letter. We had to collect the permit from their local office at Arriondas. We shall be supplying a copy of this paper to the authority concerned.

Acknowledgements

We would like to thank Countryside & Community Department of Hampshire County Council for their support and financial assistance to PMP in the planning and execution of this expedition. Without Hampshire County Council's foresight this trip would not have been possible. We would also like to thank Christine Bond (Information Manager Countryside & Community Departmentof HCC) for all her help with the advance preparations, for her interpretative skills and logistical support. We also thank our European contacts for all their help with information, including Michael Fibiger, Jacques L'Honore, Victor Sarto, Jose Viejo and Jose Yela of Societas Europaea Lepidopterologica and Miriam Gonzales, Teresa Cascan and Gotzon Cuesta of Basionsa. We thank Jorge Marquinez Garcia, the Regional Director of nature reserves for the province of Asturias for permission to work on the Reddish buff at Torimbia. Lastly, we thank Norman Hall for his pioneering work in locating the moth in Spain and France and for providing us with detailed directions to find the localities. Without his detailed information this expedition could not have achieved its results so effectively.

References

Cardew, P.A. (1931). *Acosmetia calignosa* in Hampshire. *Entomologist* **64**: 188.

Tutt, J.W. (1901-05). *Practical hints for the field lepidopterist*. Facsimile reprint 1994. *Amateur Entomologists' Society* **23**. (Nb. Tutt's note may be drawn largely from Ramsey and Cox 1869. *Entomologist* **4**: 369).

Viejo Montesinos, J.L. and Cumlido, C.S., *in press*. Butterfly protection rules in Spain: reality or fiction? *Proceedings of the 9th Congress of European Lepidopterology Societas Europaea Lepidopterologica*.

Waring, P. (1992a). Reddish buff moth, *Acosmetia caliginosa* Hubner 1813 – recent history, ecology and conservation in Britain. Species Recovery Report 1992. 170pp. Confidential report to English Nature, Peterborough.

– , (1992b). Slipping a disc in the grass. *Butterfly Conservation News* **50**: 51-53.

Appendix 1. List of moths trapped on a trip to northern Spain and France May 1995. Log numbers taken from Bradley & Fletcher.

Night and site of catch	16/17th May Torimbia	16/17th May Torimbia	16/17th May Torimbia	17/18th May Urdaibai	18/19th May Osse-en-Aspe	18/19th May Osse-en-Aspe	18/19th May Osse-en-Aspe
Trap type	mv	mv	actinic	mv	actinic	mv	mv
0017 Common Swift *Hepialus lupulinus*							1
0018 Map-winged swift *H. fusconebulosa*	3						
0464 Diamond-back moth *Plutella xylostella*	present						
1336 *Eudonia pallida**				1			
1356 Garden pebble *Evergestris forficalis*	1						
1395 *Udea ferrugalis*				1			
1398 Rush veneer *Nomophilia noctuella*				1	1	3	3
1428 Bee moth *Aphomia sociella*				1			
1638 Fox moth *Macrothylacia rubi*	1F			1M			
1643 Emperor *Pavonia pavonia*		1M				1 - day	
1652 Peach blossom *Thyatira batis*		1		3		1	
1653 Buff arches *Habrosyne pyritoides*		1		1			
1680 Maidens blush *Cyclophora punctaria*							1
1687 Lace border *Scopula ornata*					1	1	
1714 Portland riband wave *Idaea degeneraria*				2			
1719 Oblique carpet *Orthonama vittata*				1			
1734 July belle *Scotopteryx luridata plumbaria*			1				
1738 Common carpet *Epirrhoe alternata*				1			
1762 Dark marbled carpet *Chloroclysta citrata*	1						
1769 Spruce carpet *Thera britannica*						2	
1776 Green carpet *Colostygia pectinataria*	1				2		
1817 Foxglove pug *Eupithecia pulchellata*	3						
1846 Narrow-winged pug *E. nanata*	2						
Eupithecia oxycedrata					3	3	7
1858 V-pug *Chloroclystis v-ata*	1			2			
1862 Double-striped pug *Gymnoscelis rufifasciata*		2		1			
1867 Treble-bar *Aplocera plagiata plagiata*					1		
1894 Latticed heath *Semiothisa clathrata clathrata*						4	3
1902 Brown silver-lines *Petrophora chlorosata*			3	1	6	12	8
1903 Barred Umber *Plagodis pulveraria*							1
1905 Horse chestnut *Pachycnemia hippocastanaria*		1	2		1		1
1904 Scorched wing *Plagodis dolabraria*						1	
1906 Brimstone moth *Opisthograptis luteolata*				1	1		1
1918 Lunar thorn *Selenia lunularia*						2	
1924 Orange moth *Angerona prunaria*				1			
1931 Peppered moth *Biston betularia***						2	5
1937 Willow beauty *Peribatodes rhomoidaria*			2	2			

Night and site of catch	16/17th May Torimbia	16/17th May Torimbia	16/17th May Torimbia	17/18th May Urdaibai	18/19th May Osse-en-Aspe	18/19th May Osse-en-Aspe	18/19th May Osse-en-Aspe
Trap type	mv	mv	actinic	mv	actinic	mv	mv
1939 Ringed carpet *Cleora cinctaria cinctaria*					1	4	2
1941 Mottled beauty *Alcis repandata repandata*		1					
1944 Pale oak beauty *Serraca punctinalis*						1	1
1952 Common heath *Ematurga atomaria*						1 - day	
1954 Bordered white *Bupalus piniaria*				1			
1956 Common wave *Cabera exanthemata*				1			
1962 Barred red *Hylaea fasciaria*				1			
1966 Black-veined moth *Siona lineata*							1
1970 Grass wave *Perconia strigillaria*					1		
1976 Privet hawkmoth *Sphinx ligustri*						1	
1980 Eyed hawkmoth *Smerinthus ocellata*				1			
1981 Poplar hawkmoth *Laothoe populi*				1			
1990 Striped hawkmoth *Hyles lineata livornica*						1	
1991 Elephant hawkmoth *Deilephila elpenor*				1			
1994 Buff-tip *Phalera bucephala*				3		4	1
1995 Puss moth *Cerura vinula*				1			
1999 Lobster moth *Stauropus fagi*						4	1
2003 Pebble prominent *Eligmodonta ziczac*		2					
2004 Tawny prominent *Harpyia milhauseri*				3			1
2005 Great prominent *Peridea anceps*				1	1	1	1
2007 Swallow prominent *Pheosia tremula*							1
2008 Coxcomb prominent *Ptilodon capucina*					1	2	
2011 Pale prominent *Pterostoma palpina*					1		1
2028 Pale tussock *Calliteara pudibunda*						2	
2038 Muslin moth *Nudaria mundana*	2M			4M			
2060 White ermine *Spilosoma lubricipeda*				4			
2061 Buff ermine *S. luteum*	1	1		2			
2064 Ruby tiger *Phragmatobia fulignosa fulignosa*	1						
2078 Least black arches *Nola confusalis*						1	
2087 Turnip moth *Agrotis segetum*							1
2089 Heart & Dart *A. exclamationis*				4			
2091 Dark sword-grass *A. ipsilon*	1			2		2	8
2098 Flame *Axylia putris*	1						
2102 Flame shoulder *Ochropleura plecta*	1	2		14		2	
2107 Large yellow underwing *Noctua pronuba*	9	4			5	7	20
2118 True lover's knot *Lycophotia prophyrea*	1						
2119 Pearly underwing *Peridroma saucia*	2			4		2	5
2126 Setaceous hebrew character *Xestia c-nigram*	1			6	2	3	3
Euxoa vitta sub. rondoui		1				1	

Night and site of catch	16/17th May Torimbia	16/17th May Torimbia	16/17th May Torimbia	17/18th May Urdaibai	18/19th May Osse-en-Aspe	18/19th May Osse-en-Aspe	18/19th May Osse-en-Aspe
Trap type	mv	mv	actinic	mv	actinic	mv	mv
2139 Red chestnut *Cerastis rubricosa*		1	1		1		2
2158 Pale-shouldered brocade *Lacanobia thalassina*					1		
2160 Bright-line brown-eye *L. oleracea*		1	1	1			
2166 Campion *Hadena rivularis*							1
2181 Silver cloud *Egira conspicillaris*						3	2
2187 Common quaker *Orthosia cerasi*		1				1	2
2188 Clouded drab *O. incerta*							1
2190 Hebrew character *O. gothica*						2	
2194 White-point *Mythimna albipuncta*		1			1	4	3
2195 Delicate *M. vitellina*	7	3	2	3	1	3	12
2203 White speck *M. unipuncta*	1			7			
2216 Shark *Cucullia umbratica*							1
2221 Mullein *C. verbasci*					1		
2243 Early grey *Xylocampa areola*					1		1
2250 Dark brocade *Mniotype adusta*						2	
2289 Knot grass *Acronicta rumicis*				1	1		
2291 Coronet *Craniophora ligustri*						1	
2304 Orache moth *Trachea atriplicis*				1			
2305 Small angle shades *Euplexia lucipara*	1					1	1
2306 Angle shades *Phlogophora meticulosa*						2	5
2326 Clouded-bordered brindle *Apamea crenata*							1
2334 Rustic shoulder-knot *A. sordens*					2	4	3
2339 Tawny marbled minor *Oligia latruncula*				2			
2342 Rosy minor *Mesoligia literosa*				5	(1)	(2)	
2343 Common rustic *Mesapamea secalis*					1		
2380 Treble lines *Charanyca trigrammica*						1	
2384 Vine's rustic *Hoplodrinia ambigua*				1		2	
2393 Reddish buff *Acosmetica caliginosa*		1F					
2403 Bordered straw *Heliothis peltigera*					1		
2410 Marbled white spot *Protodeltote pygarga*				7			
2425 Nut tree tussock *Colocasia coryli*							1
2441 Silver-Y *Autographa gamma*					1		
2469 Herald *Scoliopteryx libatrix*				1			
2474 Straw dot *Rivula sericealis*				15			
2477 Snout *Hypena proboscidalis*				1			
2484 Pinion-streaked snout *Schrankia costaestrigalis*				2			

* Note that not all pyralids caught were fully identified, hence the list is incomplete.

** All were typical specimens.

Appendix 2. Sward height measurements taken using the Boorman drop-disc technique taken at Torimbia, Asturias, northern Spain.

Slope									
A	14.5	16.0	16.5	22.5	17.5	13.5	16.5	19.5	15.5
	19.5	13.0	21.0	18.0	24.0	16.0	17.5	18.5	13.0
	18.0	15.0							
B	28.0	23.5	38.5	31.0	20.5	24.0	20.0	22.0	22.0
	24.5	15.5	26.5	23.0	18.0	26.0	21.0	20.5	18.0
	22.5	20.0	18.0	22.5	24.5	19.5	19.5	26.0	18.5
	19.5	18.0							
C	6.5	6.0	10.0	7.0	7.0	5.0	5.0	5.5	6.5
	7.5	11.0	4.0	5.0	5.5	3.0	3.0	4.5	7.0
	7.5	9.0	6.5	7.0					

1997 Member's Day and AGM

to be held at the

Royal Entomological Society,
41 Queen's Gate, London SW7.
on Saturday 26th April 1997.

Doors open at 10.30am
and the day begins at 11.00am.

There will be talks and a bug hunt aimed at all levels of interest.

For details of how to get there
see the map on the inside back cover of this *Bulletin*.

Moths of Glasgow

by Frank McCann (6291)

3 Langbar Path, Easterhouse, Glasgow G33 4HY.

Recently in the Blackhill and Riddrie areas of Glasgow I collected two interesting moths. I could not identify them properly but they were both the same species. The first I found was a female and the second a male. The female was caught whilst it was resting on a rose leaf above the M8 motorway, the male was collected from a privet hedge about one mile away.

The female laid eggs on the rose leaves I provided – around 100 eggs in all. I released both moths, the female into my garden and the male near to where I found it.

I think the species is the Lunar thorn or the Early thorn but I couldn't study it properly. The larvae which hatched out are of the Geometer type and just out of the egg they are quite slender with a large head and some hairs on the body. They are greenish in colour and the head is darker. I supplied them various plants – a young growth of birch, rose and cotoneaster as well as a few leaves of plantain, dandelion and dock from my garden.

Whilst searching for larvae in my garden I found three different species. The first was a Geometer type of larva which looked about half-grown – deep-green in colour on garden mint, which has spread around the garden a great deal. The second caterpillar I found was on the underside of a large prickly thistle leaf – the larvae was bright-green with a yellow stripe below the spiracular area. The third larva I found on the underside of a plantain leaf growing next to the white campion plants which I had grown from seed. This larvae was very interesting – it was in the shape of a woodlouse and was pinkish grey with markings along its back, I am puzzled to what type of insect it is. I released the three species back into the garden – each onto the plants on which they were found.

There is a lot of ivy growing in front of my window and upwards to the verandas above (I planted it around 1979 and it has spread very much since then). Some of the ivy was coming through into the living room via the window. I cut the ivy growth which had entered the house and noticed on the underside of one of the ivy leaves a batch of moth eggs which had obviously been laid from inside the house. The eggs in question are in a closely compacted batch and are hemispherical, very beautiful with ribs and markings.

Ringlet (*Erebia*) butterflies in Greece: Additions and Corrections

by Andrew Wakeham-Dawson (9379)

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Thanks to kind contributions of information from a number of AES members (David and Sheila Howell and Andrew Hinett in particular) and a more extensive review of literature (aided by Gaskin's 1996 review of butterfly research in Greece), I can make a number of additions and corrections to my review of Greek *Erebia* (Wakeham-Dawson, 1996).

Erebia ottomana bulgarica Drenowski 1932.

Fresh males of this species were flying on rocky, sub-alpine slopes above 1500m on Mount Tymphristos (Veluchi) on 11th July 1995 (Wakeham-Dawson, *in press*). The larval foodplants are grasses (species not named) and the pre-adult stages are shown in Tolman (1995).

Proterebia phegea pyramus Louker & Dils 1987 was first found near Kozani (north Greece) in 1984 (Louker & Dils, 1987). *Phegea* has features which made it poorly placed in the genus *Erebia* (Higgins & Riley, 1980). It was placed in a new genus *Proterebia* in 1980 (Louker, 1984).

E. epiphron roosi Arnscheid & Sterba 1987. This species has been recorded from the Vernon mountains (Florina, north-west Greece), where it was flying on 14th July 1984 with *E. ottomana* at 2000m (van der Poorten, 1985). Sheila and David Howell also found the species near Florina in 1987 (*pers. comm.*).

E. rhodopensis Nicholl, 1990. This species was found between 1800m and 2300m on the top of Mount Grammos (north-west Greece) in 1984 and 1993 (Koutroubas, 1994).

References

Gaskin, D.E. (1996). Research on Grecian Butterflies: A Bibliography. *Ent. Rec. J. Var.* **108**: 49-61.

Higgins, L.G. & Riley, N.D. (1980). *A Field Guide to the Butterflies of Britain and Europe.* Collins.

Koutroubas, A.G. (1994). *Erebia rhodopensis* (Nicholl, 1900) espece nouvelle pour la Grece (Lepidoptera, Nymphalidae, Satyrinae). *Phegea* **22**: 9-13.

Louker, S. & C. De (1984). Onderzoek naar *Proterebia phegea dalmata* Godart (Lepidoptera, Satyridae). *Phegea* **12**: 67-75.

Louker, S. De & Dils, J. (1987). The occurrence of *Proterebia phegea* Borkhausen in Greece with descriptions of a new subspecies (Lepidoptera, Nymphalidae, Satyrinae). *Phegea* **15**: 157-160.

Tolman, T. (1985). Sexual dimorphism in the pre-imaginal stadia of *Erebia ottomana* Herrich-Schaffer, 1848 in Greece (Lepidoptera, Nymphalidae, Satyrinae). *Linneana Belgica* **15**: 6-8.

van der Poorten, D. (1985). *Erebia epiphron* Knoch, een nieuwe soort voor de Griekse fauna (Lepidoptera, Satyridae). *Phegea* **13**: 3.

Wakeham-Dawson, A. (1996). Ringlet (*Erebia*) butterflies in Greece. *Bull. Amat. Ent. Soc.* **55**: 33-36.

– (*in press*). Some notable butterfly records from Greece in 1992 and 1995. *Ent. Rec. J. Var.*

Butterflies for the New Millennium

The *Butterflies for the New Millennium* project is based on a concern for butterflies and their habitats and the need to provide up-to-date information on all species as many species continue to decline.

This major project – launched in 1995 by Butterfly Conservation and the Biological Records Centre is the largest and most comprehensive survey of butterflies ever undertaken in the UK.

Butterflies for the New Millennium is undertaking a detailed audit of the populations and distribution of butterfly species in Britain and Ireland. This will culminate in the production of a comprehensive atlas for the year 2000.

This intensive five-year survey is covering the period 1995-1999, although recording will continue beyond the year 2000 to keep information up-to-date.

The resulting database will be a vital tool for the conservation of endangered butterflies as we enter the new millenium and a means of reviewing conservation priorities. It will underpin future recovery plans for butterfly species identified as being at risk of serious loss or extinction.

The project is now starting its third year. If you are not already contributing butterfly records to the project but would like to, please write, sending a large (A4 – approx. 9" x 12") stamped addressed envelope (31p) to Butterfly Conservation (Head Office), PO Box 222, Dedham, Colchester, Essex CO7 6DE. You will be sent a free information pack which includes recording instructions, recording forms and details of your local co-ordinator from whom more forms can be obtained.

The Orange tip in Pembrokeshire

by Gordon Knight (10332)

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Identification

Without the lovely Brimstone to announce spring's arrival, Pembrokeshire has to be content with the Orange tip (*Anthocharis cardamines*) as the Pieridae's contribution. The males of course, are unmistakable, but at a distance many of the females are written off as just "Cabbage whites". Near to, even without the orange tip of the male, the females are distinct from other whites because of the parsley-sauce pattern on the under-surface of their hindwings.

Foodplants

Without doubt the Cuckoo flower (*Cardamine pratensis*) is its principal foodplant in Pembrokeshire, mainly perhaps because despite intensive farming there still remain many damp sites where this popular member of the Cruciferae flourishes. Garlic mustard (*Alliaria petiolata*) is an alternative foodplant, but it is not common along the hedgerows in Pembrokeshire as it is elsewhere in Britain. I also once saw a female lay eggs on Dame's violet (*Hesperis matronalis*) in a garden. I do wonder about Oil-seed rape (*Brassica napus* ssp. *oleifera*) in Pembrokeshire but have no information on it.

Cannibalism

One obvious advantage of using Cuckoo flower as a foodplant is its abundance in Pembrokeshire, but there are two quite serious disadvantages. Not being a robust species it provides only sufficient food for one caterpillar, although one must not of course exaggerate its frail appearance compared with other marshland species: it is a perennial, having a knobbly rhizome not unlike a miniature version of that of the Primrose, and it does grow in April and May, thus avoiding serious competition. A further potential danger is that another cruciferous-loving White (Pieridae) might lay eggs on it, particularly the Green-veined white, which is on the wing at the same season and was frequent about the same damp sites. Molluscs also attack the plant.

Not surprisingly, therefore, in view of the critical nature of the food supply, the first Orange tip larva to become active on a particular plant will not tolerate another of the same species – it eats it! I don't know what happens apropos larvae of other species.

Finding larvae

Finding the orange eggs, which are laid just under the flowers, was easy in May and June. Finding the young larvae was easy. They are long, tubular and, to my eye, a sort of indeterminate grey. But finding larger larvae on Cuckoo flowers was impossible, however hard I tried.

On 21st May 1990, for example, in a local flood-plain of the young Western Cleddau river, below Mathri (SM 898318), a count of Cuckoo flowers revealed the following:

Plants with no eggs or larvae	46
Plants with one egg	24
Plants with two eggs	5
Plants with one larva	10
Plants with two larvae	2
Total =	**87**

July is the problem season. By then the plants have ceased flowering and are swamped by other marsh-loving species and so are difficult to find. Because of this, I marked with stakes 11 groups of Cuckoo flowers at the same Mathri site on 12th May 1995, but by 18th June I could only find four stakes: even the stakes were overgrown! In other words, without being eaten by larvae, the plants were difficult enough to find in the first place, which also applied to all the other Cuckoo flower meadows I visited in Pembrokeshire, many of which were unbelievably rich in plants in May. Add to this the fact that by the time the caterpillar has had its fill and is full-grown it will have completely demolished the plant, one can understand the difficulty of studying its life-history on the Cuckoo flower. And incidentally when I inspected some of the staked sites the following year, 1996, in one or two cases there were no Cuckoo flowers, which could mean that either it is a short-lived perennial or that "predation" even by a single caterpillar can exhaust its underground food supply.

I have found and photographed medium-sized Orange tip larvae on Garlic mustard without difficulty, but then it is a much larger plant, providing a more robust food supply. I suppose my only answer is to pot some flourishing Cuckoo flowers with their attached Orange tip eggs (preferably more than one egg!) and monitor progress at home. But what is the betting that some further unforeseen problem will frustrate my efforts!

Two notes on migrating Painted lady butterflies (*Cynthia cardui*)

by Michael Majerus, Rachael Atkinson, Miranda Ager, Clair Brunton, Danielle Kemp, Lowenna Thomas and James Stalker

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In this extraordinary year for the Painted lady (*Cynthia cardui*), a couple of observations that we have made seem sufficiently out of the ordinary to be worthy of report.

The first occurred on the night of 26/27th June in the grounds of Juniper Hall Field Centre, Mickleham, Surrey. We were operating a novel type of mercury vapour moth trap, developed by engineers at Anglia Polytechnic University, which rotates automatically during operation at fixed time intervals. This effectively splits a night's catch into six parts, each part being contained in a different segment of the static base container. On emptying the trap following the night question, a male Painted lady was found in the section corresponding to the hour between midnight and 1.00am. This observation seems of interest in two ways. First, it suggests that night active butterflies may be attracted to light. Because of the nature of the trap, we can be confident that, in this case, the butterfly did not enter the trap at twilight or dawn. Second, while it is obvious that migrating species of butterfly must fly at night when crossing wide expanses of sea, records of them flying over land at night are rare. Yet, this is the only explanation of the trapping of this individual in the middle of the night.

The second record of interest involved the sighting of three Painted lady butterflies in Lapland in July. While seeking two sub-Arctic species of *Colias* at high altitude (>500m) in the Albisko region of Swedish Lapland, we made the following observations. Räkkasorda, at 600 metres, 1.00pm, 11th July 1996, a male Painted lady flying fast very close to the ground (in the main, less than 200mm above the ground), up a steep slope in a south-westerly direction, directly into a strong wind. Same location (within ten metres of the same spot), 1.55pm, same day, female Painted lady behaving in precisely the same manner. The butterflies were netted for examination of condition. The colours of both were worn and faded with age, and the outer edges of all the wings showed the tattered signs of wear. Láirecohkka, at 750 metres, 20th July 1996, worn Painted lady (sex not determined), flying low in a northerly direction up the eastern side of a narrow gorge.

Henriksen and Kreutzer (1982) note that the Painted lady has been recorded throughout Scandinavia, including The Abisko region of Sweden in 1976. However, the species does not reach this latitude every year by any means. The sighting of the three individuals mentioned above suggests that the flight this year must have been substantial.

The magnitude of the northerly migratory flight of Painted ladys this year emphasises one important conundrum in respect of this species and others that behave this way. Why does it do it? Painted ladys generally do not survive the winter in Britain or Lapland. Nor, as far as we are aware, is there a significant southerly flight of this species in the autumn. So, is there a convincing explanation of why Painted ladys, and for that matter Red admirals (*Vanessa atalanta*) and several sphingids that are regular migrants to Britain but rarely survive the rigours of our winter, behave in this apparently maladaptive manner? Why has natural selection not reduced the extent of this apparently mad and ultimately fruitless annual dash towards higher latitudes, or is there some selective advantage to the sojourn northwards?

Reference

Henriksen, H.J. & Kreutzer, I.B. (1982). *The Butterflies of Scandinavia in Nature*. Skandinavisk Bogforlag: Odense.

Cocoon recycling

by Alan Bowtho (7931)

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While trimming a Birch tree in the garden at the end of September I found a lone Poplar hawk larva in its final stage prior to pupation. Putting leaves and a large piece of bark into a cage with the larva it was quickly gone. Three weeks later on clearing the cage there was no sign of a pupa. The answer was in the bark, it had previously been used for breeding Puss moths.

The Poplar hawk had carefully cleaned out an old cocoon, removed pieces of the old pupal shell and larval skin and sealed itself within. Do members have other examples of this resourceful approach?

Fig. 1. Heathland habitat of the Reddish buff moth *Acosmetia caliginosa* at Torimbia on the north coast of Spain, 17th May 1995.
(P. Potts & P. Waring – A search for the Reddish buff . . .)

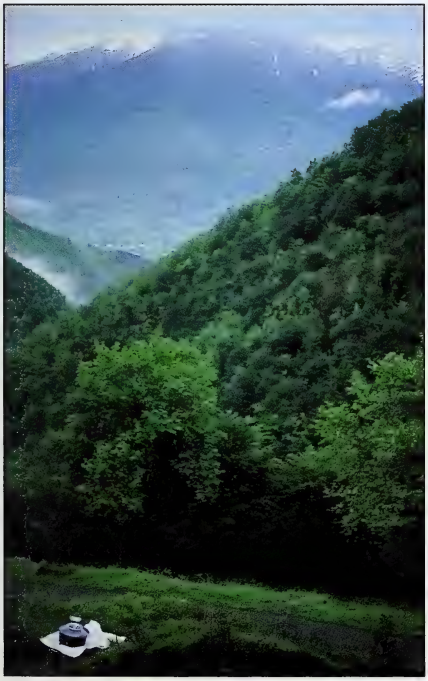

Fig. 2. Light trap site at Osse-en-Aspe, French Pyrennes, 19th May 1995.

(P. Potts & P. Waring –
A search for the Reddish buff . . .)

Fig. 3. Light trap site in the Urdaibai Biosphere Reserve near Bilbao, Spain, 18th May 1995.
(P. Potts & P. Waring – A search for the Reddish buff . . .)

Fig. 4. Paul Waring and Peter Potts recording the catch at Menil by Chateau-Gontier, Mayenne, France, 21st May 1995.
(P. Potts & P. Waring – A search for the Reddish buff . . .)

Fig. 5. *Aricia agestis* ab. *glomerata* + ab. *obsoleta*.
(P. Tebbutt)

Fig. 6. The Tiger beetle, *Cicindela campestris*.
(G. Knight – The Tiger beetle in Pembrokeshire)

Fig. 7. A firebreak in the coastal *Pinus* forest on the island of Poros, Greece.
(C. Turner – An outline of seasonal entomology . . .)

Fig. 8. Coastal fringe along the north coast of Poros, Greece.
(C. Turner – An outline of seasonal entomology . . .)

Further Notes on the Brown argus (*Aricia agestis* L.) in Northamptonshire

by Peter Tebbutt (7941)

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In the AES *Bulletin* Vol. **54** page 204 I had a short article published relating to the spectacular appearance of the Brown argus in Northamptonshire. I was delighted that this prompted several other articles on the subject and I also received some private correspondence on the matter.

It would seem that many new areas now have populations of this delightful little butterfly, its spread and sudden appearance bearing some resemblance to the impressive spread of the Comma (*Polygonia c-album* L.) that occurred earlier this century.

Some of the Northants colonies appear to have been transient, but this may simply be because the forest areas in which they appeared had been mown, but the grasses *etc.* have grown to their original density and may have choked the larval foodplants. These losses have been more than compensated for by other new colonies which seem to be establishing themselves. The subject of larval foodplants created some confusion, but at least on the major sites Cut-leaved cranesbill (*Geranium dissectum* L.) is being used, and possibly other cranesbills are being utilised.

One colony is quite remarkable, not merely in the number of adults that abound, but also the frequency of major aberrations that occur. The most extreme have the forewing submedian spots drawn in close to the discal spot, whilst most of the hindwing spots are absent, often only a small spot either side of the discal spot are the only ones that remain (ab. *glomerata* Tutt + ab. *obsoleta* Tutt). Any number of intermediates can be found, and on several occasions I have seen about 20 of these aberrations among something like 250 adults. This is quite an extraordinary number of aberrations in any species, but even more so in one that is normally very constant in its markings. It has been commented that this may be an indication that the colony is about to crash, as the most spectacular and numerous aberrations in the Chalkhill blue (*Lysandra coridon* Poda) occurred just before this species suffered a dramatic decline around the early 1920s. I am hopeful this is not the case with this particular colony, but only time will tell if the gene(s) responsible have a detrimental effect.

The Tiger beetle in Pembrokeshire

by Gordon Knight (10332)

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The Green tiger beetle (*Cicindella campestris*) that *runs* along Pembrokeshire's 180 mile coast path (henceforth c.p.) could hardly be more different from the two other beetles that *walk* the c.p., the Oil beetle (*Meloe proscarabaeus*) and the Bloody-nosed beetle (*Timarcha tenebricosa*). They walk slowly, the Tiger beetle runs; they are typically beetle-black, like so many British beetles, he is green; he takes off at the slightest provocation, they have abandoned flight; he is a savage predator, they are gentle herbivores. But above all, he is a sun worshipper while they appear indifferent.

The c.p. is the Tiger beetle's strip of Africa. In fact it is an important, permanent and unique habitat in its own right, attracting dozens of insect species because it is warm, dry (though not quite always), sheltered from winds, with good all-round visibility and on a firm soil. Indeed the ground beneath the many tramping feet of c.p. walkers, along with its "verge", is home to thousands of larval bees, beetles and ants.

When the sun shines the three-centimetre long, long-legged, sharp-eyed Tiger beetle quickly detects movement in this open habitat, runs down its prey and dispatches it with large, white jaws. This can be seen along most sections of the c.p. on sunny days between March and mid-June if one stands still, but of course most walkers rarely stand still except to look through their binoculars, although even they should notice the green beetles that constantly lift off in front of them, to land a few metres further on. If the day is not "African" enough, they will merely run or, more likely, creep into a crevice.

Mating was observed in April and May only, the smaller, lighter-green male seizing the female's square shoulders without ritual and hanging on for at least an hour while she goes about her business as if unaware that she is giving him a piggyback. Indeed he is often still there while she oviposits in the hard, preferably somewhat moist path surface or while she "trowels up" some soil beforehand with her rear end.

Actually I have only seen c.p. Tiger beetles catch ants, small beetles, wolf spiders and nomads, but Shelford (1908), observing the behaviour of the related *C. purpurea,* recorded the capture of land crustacea – presumably he means woodlice, centipedes, dung flies, butterflies and

sundry larvae. My poor results are not due to impatience so much as the difficulty of stopping on the c.p. in the summer because of the continual "traffic".

Studying Tiger beetle larvae along the c.p. was even more difficult. Their peculiar shape and behaviour is illustrated and described frequently in the literature and all I wish to do, is to describe my own observations. One needs the patience of an angler to observe any action, for when the larva is "angling" for prey it remains totally immobile for minutes, perhaps hours, at the entrance to its vertical burrow with its flat, lid-like head flush with the ground surface, so that neither prey, nor human observer are aware that there is anything there, but a slight movement by the observer, tapping the ground, or the landing of an insect too large for prey, *e.g.* a Wall butterfly, and the larva swiftly withdraws to the bottom of its burrow, revealing a hole on the surface. I did once observe a Wolf spider disappear into the depths naturally, *i.e.* without encouragement from me, and likewise sundry small larvae, their remains being forcefully ejected three minutes later. A fly dangled on a thread, one centimetre above the surface, was snatched down and ejected after ten minutes and likewise a dangled Small heath butterfly, in both cases the thread being tugged down five centimetres. But as can be appreciated, dangling flies and butterflies above the busy c.p. surface is an exercise bound to attract more than passing comment, and futile attempts at explaining the activity would merely add to the onlooker's apprehension!

Excavations revealed that the larger five-centimetre diameter burrows could be as deep as eight centimetres including the oval chamber at the bottom. In any terrain they are easily distinguished from other insect holes, by their resemblance to precision Black and Decker drill holes, but the disappointment was that the majority of holes were old and empty, albeit retaining their new appearance. In addition, there were of course holes of different diameter and even holes that had been closed by the occupant either for moulting or for hibernation, so that when excavating, one occasionally unearthed larvae from ground where there were no visible surface holes, which brings me to the most difficult part of the study, the development of the larva and, in particular, the length of its stay underground.

At the end of its first summer, the larva closes the entrance to its burrow and retires to the cell at the bottom, where it hibernates until the following June. Then according to Enoch (1903) it resumes feeding for another summer until about August when it pupates, shortly

afterwards "emerging" as an adult, but remaining in its cell until the following spring. I have to say that once only have I recorded an adult along the c.p. in August. In other words it hibernates over two winters.

My own observations neither confirm nor deny the above life-history as it applies to the situation in Pembrokeshire, but it does make sense. For example, the winters of 1993/94 and 1994/1995 were extremely wet, much of the coast path being under standing water for weeks on end, and to make matters worse, Pembrokeshire was assaulted by a vicious, wet, southerly gale on 16th and 17th May 1993, at the height of the Tiger beetle's active, above-ground season. Very few Tiger beetles were seen in the summer of 1994 and only five during the "African" summer of 1995, when the c.p. should have been overrun with them. And only a few more were seen on Ramsey in May/June 1996. Having thus an extended life-history reminds one of dormant seeds. Possibly at the end of a good summer, with good summer "catches", adults are produced in quick time, but some or most larvae survive in a "dormant" state over more than one season, "biding their time."

References

Enoch, F. (1903). Life history of *Cicindela campestris*. *Ent. Soc. of London*. 1903 **X-XIX.**

Shelford, V.E. (1908). Life history of the Tiger beetle (*Cicindela purpurea*). *L. of Linnean Soc.* **XXX** (1907-1910), 157-184.

White-letter hairstreak (*Strymonidia w-album*)

by M.J. Dawson (9130)

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A small butterfly was hit by a passing motor car in the centre of Brighton in New England Road on 3rd July 1995. It fluttered on the pavement before expiring. It was a specimen of the White-letter hairstreak.

There are a few elm trees along the main Brighton to London railway line, a few hundred yards away. It, no doubt, came from there.

I have preserved the specimen, which is in very good condition.

Observation of the tops of the trees visible from the road did not reveal any flying hairstreaks.

An outline of seasonal entomology on the coastal fringe of Greece

by C.R. Turner (7709)

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Following several visits to Greece I discovered that collecting can be very different when compared to Britain. The areas of Greece I have visited are exclusively those near the coast and generally within close vicinity of Athens. Most of my visits have been to the island of Poros, adjacent to the south-eastern end of the Pelopennes.

The entomological seasonality in the coastal areas is overall very distinct. The emphasis on various groups varies from spring to autumn and August is generally the poorest month entomologically. This is an unfortunate situation as many people take their holidays in August. I have given a general outline to the pattern I have observed over the years. It should be stressed that it will vary with the weather and the distance from the coast. Many of the larger islands will vary from the trends outlined, which will also be the case where watercourses are to be found. The sort of habitat related to here can be divided into two main types. The first is the pine (*Pinus* sp.) woodland that dominates the less disturbed islands and coastal fringes. These areas are usually continuous woodland and hard to penetrate but increasingly they are criss-crossed with fire-breaks. These fire-breaks and other uncultivated areas, sometimes with herds of sheep or goats, consist of a low scrub which primarily consists of holly oak, heather, grasses, rockrose and herbs.

All the Neuroptera collected have been from the tail-end of August and early September, the vast majority captured at light. The several species of antlion are difficult to see arriving at the light source but in spite of this are best caught in flight. Many settle a distance away and even on a whitewashed background can be difficult to spot, the same can be said of the many lacewings I have captured. The antlions tend to arrive throughout the night individually at varied intervals but the lacewings usually arrive in bursts of several individuals at once. The numbers of antlions and lacewings captured tend to gradually increase through the last week of August and the first week of September. Lacewings are most frequent in early September and the timing for these can be quite critical. I have previously only captured one or two in a week or as many as 150 in the same period in another year.

The Coleoptera are most frequent in April and May when there are still occasional showers and the temperature is gradually rising. The appearance of increasing numbers of beetles in April is very dependant on the weather and can be very hit and miss. For this reason it is best to hunt for Coleoptera at the end of April and into May and early June. In the cooler years such as 1995 there may still be a few beetles around in August but usually they are few and far between. The Hemiptera have tended to follow the same pattern as the beetles.

The Lepidoptera tend to follow no distinct trends as a group but when divided into butterflies, macro-moths and micro-moths then there is some semblance of a pattern. The butterflies are few and far between until the end of April when a small number of species emerge, mostly Nymphalids and Satyrids. Into June several more butterfly species emerge but towards August the emphasis lies more with migrants arriving to feed on the nectar of those few still-flowering plants. The macro-moths are most frequent in April and May but few occur later and earlier. The micro-moths are present throughout the spring, summer and autumn but tend to drop off in the hotter parts of August. The greatest Lepidopteran diversity seems to occur in the April/ May period.

The Hymenoptera are present in numbers from spring to autumn but their highest diversity appears to be around May. The ants are present throughout the spring, summer and autumn as are many of the hunting wasps. A peak in the numbers of solitary bees and wasps seems to occur in the April/May period but their numbers can still be relatively high going into August in the cooler years. In August the hunting wasps and scavengers such as *Vespula* predominate.

The Orthoptera are most frequently caught as adults in the late summer, July/August/September. Several Mantis species come to light at the end of August and into September and can also be swept from vegetation. The grasshoppers and crickets are best located by walking over areas of ground hoping to disturb them and listening for their calls. The cockroaches are to be found throughout the year although juveniles seem to predominate in the early spring (April).

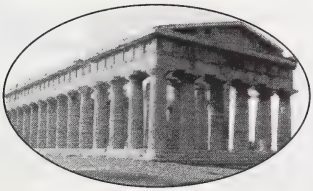
Spiders are to be found throughout the year but by far the best time is April/May when adults dominate. Watch out for the large burying grey *Lycosa*. The millipedes and centipedes are frequent in the April/May/June period but disappear as soon as the full heat of summer arrives. Occasionally some may be found in August if damp areas exist.

The woodlice (Isopods) follow a similar pattern to the centipedes and millipedes but some can be found in the *Pinus* leaf litter all year round.

Many of the groups of insects I have dealt with above can occur in abundance outside their usual seasonality where permanent water or irrigation occurs. In August a good hunting ground is hotel grounds, public parks and areas of pipe leaks where vegetation is still green and thriving.

Many entomologists are required to allow for the wishes of their non-entomological spouses and the following may serve to encourage them. The temperatures in the spring are usually in the low 20°C range but beware of the sun which is much hotter because the protective dusty atmosphere prevalent in August has not yet developed. There are frequent showers in April/May/June with some major rainstorms but in my experience it is generally pleasant. The sea is a few degrees cooler than in August but still comfortable to swim in. In late August/ September the temperature is again in the low 20°C range, with the occasional shower/rainstorm, but the sea is warm and sun hot. August is usually a scorcher with 30+°C not unusual and usually very dry. Obviously the nearer to winter you get at either end of the year the more likely it is to rain so be prepared to take your chances. In the spring the coastal fringe is green with the flourishing vegetation many of which are flowering. In addition holiday expenses tend to be lower in the spring as it is not yet peak season and consequently the beaches are usually less crowded! It is usual for most people to travel through Athens when arriving in Greece and the city is more pleasant in the spring and autumn than in the summer.

Basically the best overall collecting time is around April/May but if you are prepared to look there are always insects of some description around the coastal zone of Greece.



Invertebrates and their care discussed in Mexico

by J.E. Cooper (2343)

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The 1996 conference of the AAZV (American Association of Zoo Veterinarians) was held in Puerto Vallarta, Mexico, from Monday 4th to Friday 8th November. Nearly 400 people attended – almost all of them veterinary surgeons involved with non-domesticated animals in zoos or in the wild – and while the majority of the registrants were from the USA, Canada and Mexico, there were small numbers from South America, Europe, Africa and Asia.

A novel part of the AAZV's programme this year was a session on "Invertebrates: Medicine and Management", organised and chaired by Dr Mark Bodri. Ms Susan Kenny was the first speaker, from Omaha's Henry Doorly Zoo, Omaha, USA, and her talk was aptly entitled "All star lineup of marine invertebrates for public display". With the aid of excellent slides she discussed the features of such groups as cnidarians, crustaceans and cephalopods and pointed out that they were becoming more and more popular in zoos and aquaria. The theme of aquatic invertebrates was continued by Mr Julian Spring, a private consultant and author from Florida, USA, who covered "Identity and husbandry of soft and stoney corals". He outlined the ecosystem management necessary to maintain corals, including biological filtration, water changes, use of supplements and the maintenance of calcium alkalinity.

Attention then turned to terrestrial invertebrates, with a presentation by Mr Randy Morgan from Cincinatti, USA, on "Arthropod public display, rearing and containment at Cincinatti Zoo's 'World of the Insect' exhibition". Mr Morgan described how his zoo's Insectarium, which opened in 1978, had been adapted in order to provide education and entertainment for visitors and thus teach them about insects and other arthropods.

"The husbandry of desert arthropods" was the subject of Mr Steve Prchal's talk, based on his work at the Sonoran Arthropods Studies Institute, Arizona, USA. The various centipedes, millipedes and arachnids that originate from the Sonoran Desert region were discussed and Mr Prchal pointed out that they were of special interest and value in collections because of their long lives and the relative ease in caring for them.

Dr Nancy Greig, Houston Museum of Natural Science, USA, introduced her audience to the beauty and charm of the Lepidoptera in

a presentation entitled "Butterflies are not free: live butterfly 'zoos' in North America". Dr Greig discussed the evolution and refinement of live butterfly exhibits over the past 15 years. Such collections have long been popular in Europe, especially Britain, but are a fairly recent concept in North America. Butterflies are excellent subjects for display and offer many opportunities for education.

The concluding paper in the session, "Hoppers, hermits and haemolymph: a veterinary approach to invertebrates", was by Professor John Cooper from the National Avian Research Center, Abu Dhabi. Professor Cooper pointed out that there had been awareness of diseases of invertebrates for centuries but only a modest involvement by the veterinary profession (a handful of pioneers from both sides of the Atlantic) and that in recent years. The field remained a fertile one for zoo veterinarians and for those with an interest in comparative pathology. He discussed how invertebrates should be handled and examined, the methods available for diagnosis and investigation of ill-health and some practical approaches to treatment and prevention of disease.

This session proved to be very successful. The speakers were all enthusiasts, with a deep and long-standing interest in invertebrates, and very effectively conveyed to the audience the interest, pleasure and excitement of working with these creatures. The veterinary profession clearly still has much to learn but, working together with entomologists and others, could contribute substantially to the health, welfare and conservation of invertebrate animals – both in the wild and in captivity.

Weavers fritillary (*Boloria dia* L.) in Wiltshire

by Peter Tebbutt (7941)

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On 15th July 1996 two male Weavers fritillary were seen within a few yards of each other in Wiltshire. Originally thought to be aberrations of Small pearl-bordered fritillary (*B. selene* D.&S.), it soon became obvious they were something different, and the better of the two was retained for identification and presented to me.

A quick check in Higgins and Riley, *Butterflies of Britain and Europe,* soon confirmed the true identity. However, one question immediately springs to mind, where did they come from? This is not a noted migrant, and even if this was the case it is highly unlikely that two would have travelled so far inland and still be so close together. So despite 1996 being an excellent year for some migrant species, it would seem likely that these were released, as they were too far from human habitation to be escapees.

I know some larvae were "put down" on the Surrey North Downs during July 1984 and these produced some adults, but I have been unable to find out about any other attempted introductions of this species.

Were these the only two released, or were several introduced to this area? If the latter, then when, how many and at what stage? If anyone can offer any answers to these queries I would be most grateful. I shall, of course, treat all information in strict confidence unless told otherwise.

Hummingbird hawkmoth – A sighting

by P.G. Dowty

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I would like to report a definite sighting of a Hummingbird hawkmoth feeding on my phlox in the afternoon of 22nd August 1996. The temperature was about 22°C and the weather was sunny.

Notes on the Common social wasp *Vespula germanica*

by Stuart Cole (10159)

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The following are some observations on unexpected aspects of behaviour in the social wasp *Vespula germanica* and are taken from my notes made some years ago on colonies in south-west London.

In July 1992 I discovered that a colony of *V. germanica* had made their nest in a cavity in the outside wall of my flat at the top of a building in Putney High Street. The wall formed the wall of my bedroom and throughout the following months of August and September I could hear the insects ceaselessly scraping at something during the night until as least 2.30am. Worker wasps are diurnal, or at least are not seen outside the nest after dusk, but it seems that they may be active during the night within the nest. From the noises they were making, the wasps were, presumably, enlarging the cavity in the brickwork. The original cavity was probably quite small, a fault or decay in the solid brick wall of a mid-Victorian building and far too small for a normal sized colony of *Vespula*. The material they were working was much harder than the wood or soil they would usually have to deal with. Perhaps the insects were making the most efficient use of their time by loosening the material during the night and disposing of it outside in the daytime. When these wasps make their nest in an earth bank, workers can be seen in the daytime flying out of the entrance at the surface carrying pellets of soil. The insects fly some distance before dropping the material; this may be so as not to attract attention to the nest site – this is certainly the case with some solitary wasps such as the Sphecids.

When damp weather arrived in October, the scraping sounds in the wall ceased. The colony was no longer expanding and the workers would be dying off quite rapidly; there were few still to be seen flying in and out of the hole in the brickwork. At this time of the year the adult wasps may deliberately kill off the remaining larvae in the cells. In October 1989 I observed the workers of another colony of *V. germanica* in Kew carrying full-grown grubs out of their nest and dropping them on the ground just outside. The larvae appeared to be already dead or dying, possibly after having been stung.

This particular nest in Kew was situated beneath the floorboards of the ground floor flat that I had moved to from Putney. The wasps'

access to the nest was through an airbrick in the outside wall about 12 inches from the ground. When I sat in the room immediately above the nest at night I would clearly hear, every so often, buzzing from the multitude of wasps below. A dull rhythmic humming would occur at intervals of 15 to 30 minutes and would last about one minute. I assumed that the reason for this activity was temperature control with the worker wasps vibrating their wings to create an air flow. I did not notice the sound during the daytime and it was probable that heat became a problem only after dark when the whole colony were in the nest together. In the summer the noise was quite faint but as the colony reached maximum numbers in early autumn the buzzing became so loud that it was easy to imagine the horde was about to invade the room. Incidently, I never heard a similar noise from the wasps in the wall at Putney – perhaps it did not get so hot in this nest.

One incident of puzzling behaviour was of a worker wasp that I came upon crawling sluggishly about the ground one cold, damp October day. When I placed her on my hand she appeared to bite at my skin but when she came to my watch something about the metal made her get quite excited. She crawled all over it, moving her mandibles over the casing. When I placed the watch on the ground the wasp continued her interest for some minutes until I removed it. She reacted in a similar way over a length of wire on a wall but not for so long. She then wandered off along the wall after stopping to clean her feet and antennae thoroughly.

I wonder if there is any connection between the wasp's attraction to metallic objects and the behaviour of some ants which I once observed in Australia. Sitting in one of the harbourside reserves in Sydney, I noticed some worker ants of a species of *Chalcoponera* dragging along small fragments of silver foil from a chocolate wrapper. The pieces were taken to their nest almost immediately upon being discovered but the ants had difficulty in pulling the foil down into the hole in the ground. After I tore some of the pieces into a more manageable size, two or three millimetres or so square, the ants took them straight down into the nest. What possible use they would have for silver foil I cannot imagine. Perhaps readers might have some views.

An incidence of the Cerambycid *Arhopalus rusticus* (L.) in Surrey

by Ian Boler (8720)

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At home on the evening of the 18th August 1996, I happened to place my hand on the arm of my sofa and came up with a surprisingly large, brown longhorn beetle. This adult beetle was about one inch long and with relatively short antennae (for a longhorn), short head, long, straight elytra and powerful-looking mandibles. This species turned out to be an example of *Arhopalus rusticus* (Linnaeus, 1758), of the subfamily Aseminae of which there are three species in Europe. In Britain it is scarce but present locally in the southern part of England and seems to be spreading. This species is also found in North America (as four geographic races).

A. rusticus lives mainly in pine forests and flies from June to August, especially in warm twilight hours, and is known to be attracted to light. The eggs are laid in the scales of the bark of slightly decaying or recently dead stumps of *Pinus,* apparently especially those whose roots have been scorched by fire. The larvae prefer the roots, initially living under the bark, then boring downwards into the wood, making longitudinal galleries. Pupation occurs in the roots or in the base of the stump in June and July, usually near the surface of the wood or in the bark, the cell lying parallel to the grain. The adults emerge after three to four weeks in July and August. This species has occasionally been found infesting structural timbers in France, seriously damaging roof timbers, the adults boring through wood, zinc plating and even solder on emerging!

"Sofie" as we came to call her, proved to be a female, and had mated as she proceeded to lay eggs in the collecting box. These were small (about 2mm long) elongate cylinders with rounded ends. They were laid in batches of five to fifteen (about 40 in total) in gaps in the base of the box and were pale yellow with very soft cell walls which collapsed easily when pushed with a soft paint brush and unfortunately most were destroyed when attempting to move them. Of those that survived, five hatched within two weeks into tiny white grubs with small black head capsules. This occurred during our holiday and, unfortunately, when we returned both "Sofie" and all but one of her larvae were dead. The remaining grub ("Sofie jnr.") was kept alive for a further five days on sugar water soaked into a cotton wool ball.

Although introduced to small pieces of pine dark, it showed no inclination to bore within and eventually also perished.

On searching around, no recently cut or fallen pine stumps were located in my immediate area and presumably it must have flown some distance searching for some. Extensive pine woodlands occur nearby on Box Hill and Leith Hill and it is likely to have originated from one or the other. That it was located in town, away from the woods, suggests that it was having difficulty finding a suitable oviposition site and this example highlights the difficulty such specialist "dead timber" species have in finding correct habitat. Fortunately, a breeding colony exists in its original habitat as the female was already mated and fertile, and the species appears to be spreading, but competition for relatively few breeding sites may have caused this one to seek elsewhere. *A. rusticus* females are known to lay around 150 eggs, so, hopefully, "Sofie" managed to lay most of her eggs in suitable pine stumps before flying in through my lounge window (and not on the legs of my settee).

Many thanks to Dr M.L. Cox of the International Institute of Entomology, based in the Entomology Department of the Natural History Museum, London, for helping me identify this species and for providing me with references and information.

References

Cherepanov, A.I. (1990). *Cerambycidae of Northern Asia,* Volume 1 – Prioninae, Disteniinae, Lepturinae, Aseminae, E.J. Brill: Leiden, pp. 569-577.

Duffy, E.A.J. (1953). *A Monograph of the Immature Stages of British and Imported Timber Beetles (Cerambycidae).* British Museum (Natural History), London, pp. 147-151.

Harde, K.W. (1984). *A Field Guide in Colour to Beetles,* Octopus Books.

Wildlife and Agriculture: problems of pest species

by Jenni Johnstone (9214)

10 Ruthrieston Circle, Aberdeen AB10 7JX.

As long as man has been growing and harvesting domestic crops there has been both beneficial and damaging interactions between the crops and other wildlife. Agroecosystems are habitats in themselves and rely on other organisms for pollination, predation on pests, breakdown of leaf litter and for the recycling of nutrients. Agricultural land is not a stable environment; it is forever changing. Farmers may grow different crops each year or every few years, but each year there is an aggregated concentration of any one resource and this can lead to the problem of pest species. A pest can be defined as a "species that has become so abundant and so injurious to some commercial plant" (Wardle). The majority of pests are from foreign origin and have spread, migrated or been introduced from other areas. A high percentage of these are insects.

Why should it be that crops are so vulnerable to attack and what causes an insect to become a pest? To answer these questions we must firstly look at the differences between natural communities and agricultural communities. An insect's distribution is chiefly determined by the distribution of its food. In agricultural communities there is a plentiful supply concentrated in one area thereby providing an ideal environment for insect pests. Frequently species are introduced to an area and, in the absence of their natural predators, have nothing to regulate their populations. Native species can acquire the status of pest by switching their original host plant to a cultivated crop. As a result annual primary productivity is much lower in agricultural communities than in natural systems. This is especially so in areas such as western Europe where rapid technical advances in agriculture have led to the presence of more pests. The problem of controlling pests has become a constant battle for farmers.

The majority of pests attack the foliage of crops but some will also feed on or utilise seedlings, seeds, flowers, stems, roots and fruits. Crops can withstand 30-40% defoliation without this resulting in any harm to the final harvest, but damage to seeds and/or flowers can have more devastating results. Foliage damage can vary from that done by leaf miners, which are among the smallest insects and live in tunnels made between the upper and lower surfaces of the leaves, and locust damage which can destroy entire fields of crops. Foliage is also

commonly attacked by insects such as other grasshoppers, caterpillars, aphids and leaf bugs. Some insects bore into roots and shoots, feeding and pupating there.

Pest problems are worldwide and occur in a variety of different agricultural crops. In south-east Asia crops such as rice, tea, coffee and cotton are attacked. Scolytid beetles are the main pests of tea and coffee; *Xyleborus fornicatus* attacks tea plants whereas *Stephanoderes hampei* attacks coffee plantations. In Central America and West Africa sugar cane is preyed upon by Pyralid moth larvae which tunnel into the stems. In north-western Europe cereals are attacked by Hessian flies but pests of cabbages and potatoes are also main problems. The Euro-Asiatic region also has cereal pests such as the Swedish fly *Oscinella frit*. Cutworms of the moth family Noctuidae, for example, *Euxoa segetum*, feed on many other crops. North American tobacco plantations often succumb to predation by Sphingid moths, *Protoparce sexta* and *P. quinquifasciata* are two examples. In Australasia pests of sugar cane and cotton are common and in South America, banana plantations are frequently attacked by butterflies of the genus *Colias*. These are just a few of the crops and their pest that occur throughout the world.

Farmers are constantly trying to find and implement methods of controlling or eradicating pests. In order to do so a thorough knowledge of the pest and his crop are necessary so that effective practices can be suggested and then adopted. Pest control includes any factor which kills, repels or in any way interferes with the normal life-cycle of the insect. Control factors which are used include both natural and artificial means. Natural control of pests results from weather conditions; temperature, light intensity, humidity, air currents; physical and biotic factors including predators, parasites, viruses and disease. One, often effective, means of control a farmer can use is concerned with the timing of planting and harvesting his crops so as to avoid synchrony with the insect's life-cycle. In some cases early planting is necessary whereas late planting is required in other cases. Delayed planting of two to three weeks can decrease the number of generations and, for example, in the Hessian fly whose adults only live a few days, planting should be delayed until after the last flies have emerged.

Another fairly simple yet effective method of control is to have a system of crop rotation. Some insect grubs have a life-cycle lasting two or three years, as in the case of the corn rootworm. This feeds

exclusively on corn and no other alternative is acceptable therefore, by rotating crops and planting a different one each year the population will soon die out. Research has shown that potatoes planted in a field that the previous year contained another crop such a rye or wheat, produced 40 times more harvest than potatoes that had been planted in a field previously containing potatoes.

Deep ploughing can remove the breeding and over-wintering places of insects thereby keeping their population numbers to a minimum. Any crop residue should be destroyed or utilised soon after harvest, in particular, decaying fruit should be disposed of to reduce infestation by fruit flies. Weeds should be removed if they are likely to provide an alternative host plant to the pest but if these weeds provide food and/or shelter for any natural enemies of the pest then they should be cultivated and encouraged. If a farmer knows his crops are under attack by a species of insect then there are a number of other measures that can be taken. Insect repellents do not actually harm the insect but deter it from feeding on the crop plant. Light traps and physical hand picking help to keep numbers down. Alternatively predators, parasites or disease can be introduced into the population but these must be carefully controlled to avoid any non-desirable consequences. Finally, farmers may decide to use insecticides.

Insecticides have been used since early times, indeed as far back as the Roman times man knew the potential of chemicals like arsenic and mercury. The increased use of insecticides in the last twenty years has resulted in an average 50% increase in agricultural productivity. However, there are many side-effects associated with the use of insecticides; continuous use can lead to serious ecological disturbances in agroecosystems. The use of DDT, a chemical insecticide introduced in the late 1930s, has virtually stopped now because of its disastrous effects on other organisms in the environment. Many insecticides can cause pollution. One problem with insecticides is that they are not species specific and therefore useful species such as the Honeybee (*Apis* spp.) may also be destroyed upsetting the natural balance, and there is always the possibility that insects may become resistant as often happens. Therefore, insecticides must be used with care and the situation carefully monitored to ensure that they are helping the situation and not causing further problems. We will now look at a few specific examples of agricultural crops and their pest species.

Seventy-nine percent of the world's rice is produced in south-east Asia in countries such as India, Burma, China, Borneo and Java. Rice is,

without doubt, an extremely economically important crop and so the control of its pests is vital. Pests of rice range from moth larvae, flies, and aphids but one of the most important is the Pyralid moth *Schoenobius incertellus* commonly known as the yellow riceborer. This is an indigenous species originally thought to have fed on wild grasses. The adult moth lays eggs in clusters on the leaves of young rice plants. The caterpillars hatch, feed, and when they are fully grown make their way into the stems where they pupate and spend the summer. After the rice has been harvested short stalks known as stubble are left still containing the pupae so an easy way to try to control this pest is to destroy any remaining stubble.

Pieris brassicae and *P. rapae* (the Large and Small white butterflies) are European pests of cultivated and garden plants. Their larvae feed on plants of the family Brassica namely cabbages, cauliflower, brocolli, brussel sprouts and the garden plant nasturtium. *P. brassicae* is a major problem in Britain where the indigenous population is reinforced by migrants from the continent. The caterpillar skeletonises the leaves of Brassicas often destroying the entire plant. *P. rapae* is sometimes found in the company of *P. brassicae* and feeds in the hearts of cabbages so damage is often not seen until it is too late. This butterfly is more of a problem in eastern Europe and Russia than it is here.

Another crop of immense importance is the potato, with 90% of world production being produced in Europe. It is a hardy, short season crop which is able to mature further north and at higher altitudes than any other crop except barley. This combined with its ability to adapt to different soils makes it an ideal crop to be grown in Britain. Two main pests of potato are the Chrysomelid beetle *Leptinotarsa decemlieata*, also known as the Colorado beetle, and the Potato tuber moth *Phthorimaea operculella*. The latter is a Pyralid moth whose caterpillars tunnel in the tubers of the potato. Its presence was first noticed to be a problem in 1906 whereupon measures were taken to destroy infected potatoes, disinfect any contaminated premises and store any sound potatoes under a layer of sand. Thanks to these procedures a potential catastrophe was avoided. This moth and the Colorado beetle are pests in countries such as Britain, France, Belgium, Holland, Germany, Poland and Russia among others. Both the adult and the larva of the Colorado beetle feed on the foliage of potato plants and had become firmly established as a pest by 1922. Again, measures were taken to prevent extensive damage and included lead arsenate spraying, daily hand picking, soil sterilisation and prohibition of any imports from America where there was also a problem.

Finally any assessment of worldwide insect pests cannot be complete without examination of the case of the locust. *Schistocerca gregoria,* or the Desert locust has caused the most serious damage of any insect pest. Mass swarms of these insects have devastated huge areas of agricultural land, caused human starvation and famine, and spread disease. The Desert locust has both a solitary and gregarious phase. During most years there is only enough available food to sustain small populations of the solitary phase, however, the locust can suddenly change to its gregarious phase and this usually happens after there has been heavy rains. There is now an abundance of food to exploit and bands of hoppers, or locust nymphs, march great distances leaving everything eaten in their wake. Once the adults begin to emerge the swarm takes to the air covering more distance and causing more devastation. Between 1948 and 1963 several swarms were recorded as exceeding 160 square kilometres. The areas mainly affected were in North Africa, Saudi Arabia, Iran, Iraq and part of India. These huge populations were eventually stopped by natural means, for example, the Alps in the north and the sea to the west. Unfortunately, too much damage was already done by the time the locust swarms had reached these physical barriers. The Anti-locust Research Centre was set up many years ago and its work has proved extremely valuable. There has not been a locust breakout of any considerable size since the 1960s.

Agroecosystems are forever going to have problems with pest species and the solution must lie in controlling these insects in the most acceptable way possible. Scientists working in the field of agriculture face pressure from all sides, from farmers, the public, conservationists and other countries. Fortunately there are a variety of different methods farmers can now use to control insect pests but as insects become resistant to insecticides and more persistent in their nature man must find new ways of controlling them. To conclude, there will always be conflict between wildlife and agriculture but we must not forget the vital parts insects do play in agriculture, in particular, in pollination, for without them we would not have these crops.

References

Barbosa. P. & Schultz, J.C. (eds) (1987). *Insect Outbreaks.* Academic Press, Inc.

Baron, S. (1972) *The Desert Locust.* Eyre Methuen, London.

Begon, Harper & Townsend (1990). *Ecology: individuals, populations and communities.* Blackwell Science.

Carter, D.J. (1984). *Pest Lepidoptera of Europe.* Dr W. Junk Publishers.

Chinery, M. (1993). *Insects of Britain and northern Europe.* Harper Collins Publishing.

Evans, K. (ed) (1991). *Agricultural Zoology Reviews*. Intercept Ltd. Vol. 4.
Gullan, P.J. & Cranston, P.S. (1994). *Insects: An Outline of Entomology*. Chapman and Hall.
Little, V.A. (1972). *General and Applied Entomology*. Harper and Row Publishers.
Odum, E.P. (1969). *Fundamentals of Ecology*. W.B. Saunders Company.
Price, P.W. (1984). *Insect Ecology*. John Wiley & Son, Inc. 2nd ed.
Wardle, R.A. (1929). *The Problems of Applied Entomology*. Manchester University Press.

Hardtack

by Keith Lewis (3680)

108 Park View Road, Welling, Kent DA16 1SJ.

Included in *Bulletin* **52**, page 282, "Ant takeaway" I reported on the interaction between the swarming of the Garden ant *Lasius niger* and the Common wasp *Vespula vulgaris*. On the 17th August 1996 whilst sitting in the garden I thought I was seeing a similar encounter. A wasp was showing particular interest in an entrance hole located in a mound of extracted earth from which ants were swarming. The wasp would fly around the hole and, although many ants were going in and out, it would squeeze its body into the hole and would stay in this position for up to two minutes, its body pulsating. It then withdrew and would fly off but with nothing in its jaws that I could see. Taking a stick I moved away some of the earth and observed what I thought was a small twig about 3mm diameter and 75mm long. The wasp was soon back and went straight to the twig and began rasping it with its jaws. I assumed it was gathering wood to chew into paper to enlarge the nest. After watching this a number of times I picked up the twig and found that it was in fact a desiccated worm. The worm was so hard and dry it is puzzling to see the point of what the wasp was trying to achieve.

The Red admiral and its associated plant

by Steve Eden

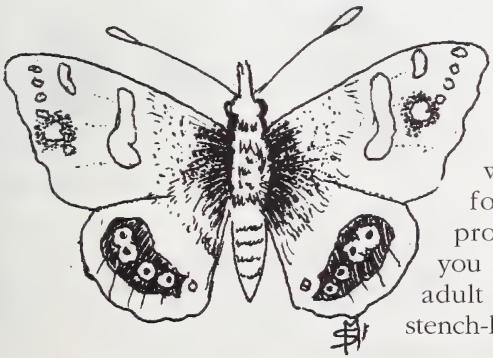
14 Stafford Street, Waihi, B.O.P., New Zealand.

The Red admiral (*Vanessa gonerilla*) has long been a favourite butterfly of mine, due to the fact that it was always there in the mountainous ranges over the last 30 odd years when I had gone deer-stalking. This butterfly has the tendency to bring a flash of gaiety under the dark damp bushland. It would land on a silver beech trunk, and open its wings to face the source of the filtered sunlight. Sometimes it would be searching for the fermented sap that weeps out of the bark.

The New Zealand form of the Admiral has different markings from the European specimen. It also has a different foodplant which is the tree stinging nettle *Urtica ferox* which usually prefers to establish itself along the edges of bushland. Sometimes it can be seen beside little streams in the bush where the light has penetrated overhead. This plant is dangerous if you inadvertently fall against or onto it. So much so that one man some years ago did this very thing, and his body was found near the plant some time later. The cause of death is shock. Eighteen years ago my brother and I were collecting the pupae on a patch of tree nettle and I was stung slightly on my wrist. The pain was immediate, severe and also quite long-lasting.

It simply amazes me how the admiral can alight among these forests of hypodermic-like needles and place her egg upon the side of one of these.

The greatest enemy of these pretty insects is the parasitic ichneumon wasp called *Echthromorpha (intricatoria)* which is about 14mm long. Coloration: Jet black, bright orange, with white spots along its thorax and abdomen.



This wasp is an expert at detection, seeking out the pupae then stinging it with her ovipositor in order for her offspring to be provided with ready food. If you kill or just brush against the adult wasp, it will emit a musk stench-like odour.

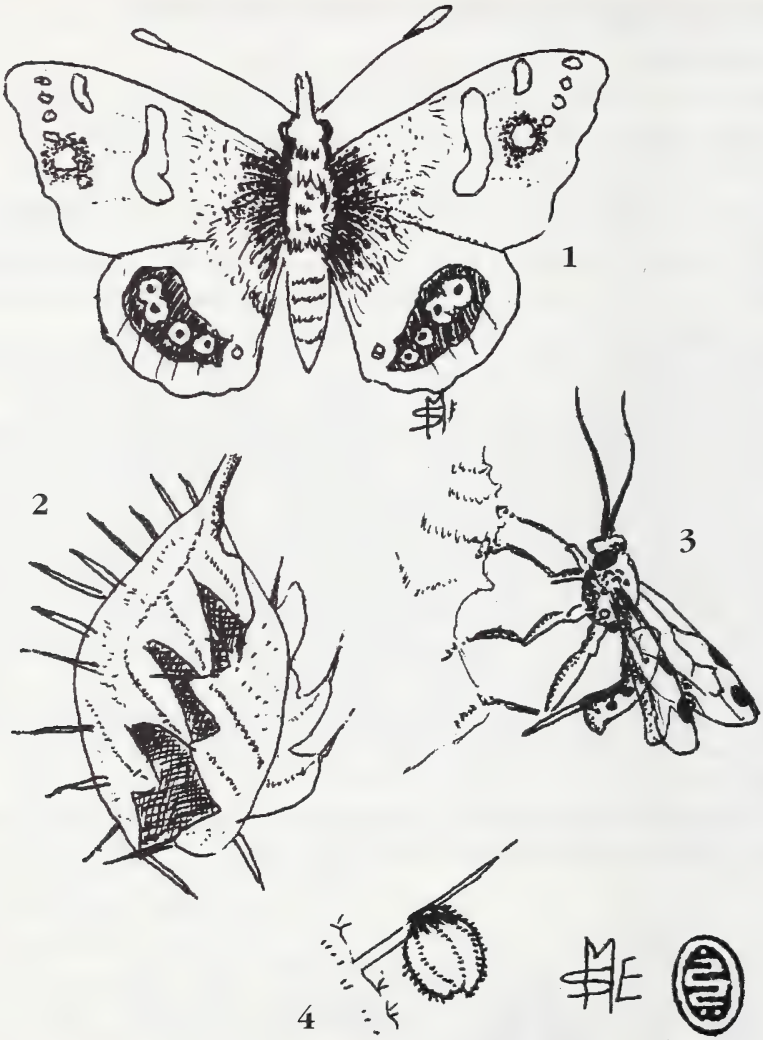


Fig. 1. New Zealand Red admiral.

Fig. 2. A leaf tent of the larva.

Fig. 3. The parasitic ichneumon wasp, *Echthromorpha intricatoria* has orange legs and glossy black body.

Fig. 4. The barrel-shaped egg placed on a neddle.

Conclusion

This butterfly has been slowly declining over the last ten years. Reports from people scattered over the North Island tell the same story – "We haven't seen a Red admiral for years!" they say.

Why?

Well, farmers are being a lot more industrious in clearing up those areas adjacent to native bush land, which means tree nettles as well. However, back in 1994 the German wasp *Vespula germanica* had a massive population explosion which caused scientists a lot of concern. It seems that global warming is the culprit.

That is really a story all of its own. However, it is my opinion that these wasps, as well as others that have toddled over from our closest neighbour, Australia, have resulted in some pressure on our Red admiral. And let's face it, how do you convince New Zealanders that a noxious weed is a friend?

More Moths of Glasgow

by Frank McCann (6291)

3 Langbar Path, Easterhouse, Glasgow G33 4HY.

On the morning of 5th August 1996 I found a small nicely marked moth at Riddrie, Glasgow. It was resting on a low wall of a school, near lichens and some mosses. I managed to secure it and noticed the wings had dark markings and blotches. I put it in a small container with lichens from the wall (confluent species) and another piece of lichen from a tree. I have still to examine it more closely to determine exactly what species it is, but it looks very much like the Marbled beauty.

There are lots of moth species which I find difficult to recognise or identify in the field, so I usually refer to my books and plates therein for identification – I am still very much an amateur entomologist.

Two nights prior to this a moth came into the house via the kitchen window which was open slightly. It looked very much like the Scalloped oak. I examined it as closely as I could and released it back into the wild.

AES ANNUAL GENERAL MEETING AND MEMBERS' DAY

at the Royal Entomological Society of London

on Saturday 26th April 1997 – Doors open 10.30am

Migrant dragonfly recording project

by Adrian Parr

10 Orchard Way, Barrow, Bury St. Edmunds IP29 5BX.

Although many adult dragonflies remain relatively close to where they emerged, certain species may sometimes undertake long distance movements or migrations. This was dramatically illustrated by the events of 1995, which can have escaped few naturalists' attention. In Britain, migration is most obvious in the occasional appearance of non-resident species, but there are also influxes of several species where there are already resident populations. Substantial movements, but entirely within our own isles, can also apparently occur with a number of species. Unlike the migration of birds, and even of some Lepidoptera, the details of such dragonfly movements are however often very poorly understood. Their conservation significance is also not clearly defined. With the growing number of enthusiasts interested in dragonflies this situation seems likely to change. A major recording programme designed to focus attention on dragonfly migration has recently been initiated by the national Odonata Recording Scheme and British Dragonfly Society. Several people, including myself, will be involved in getting this up and running, and ultimately it is hoped to establish a computer database of all known migrant sightings.

Although the events of 1995 are unlikely to be repeated for many years, it has become clear that a number of species are currently almost annual visitors to Britain. These include *Sympetrum fonscolombei* (Red-veined darter) and *Hemianax ephippiger* (Vagrant emperor). For much of this century *S. flaveolum* (Yellow-winged darter) also used to be a regular visitor, and it is hoped that the invasion of 1995 may signal a return to this status. Immigration of certain species which also have resident populations, *e.g. Aeshna mixta* (Broad-bodied chaser), *L. quadrimaculata* (Four-spotted chaser), *Sympetrum danae* (Black darter), *S. sanguineum* (Ruddy darter) and *S. striolatum* (Common darter) must also be far commoner than is currently documented. Even in a "quiet" year there is thus great potential for migrant recording. In addition to the species mentioned above, other documented immigrants which might potentially be observed on migration include *A. affinis* (Mediterranean hawker), *Crocothemis erythraea* (Scarlet darter), *S. pedemontanum* (Banded darter), *S. meridionale* (Southern darter), *S. vulgatum* (Vagrant darter) and *Pantala flavescens* (Globe skimmer). Other species of dragonfly are also likely to be recorded as migrants in years to come (including even perhaps some American species?), and in

addition it seems probable that certain species of damselflies might also occur as migrants.

One problem with migrant recording is in deciding exactly which individual insects are "migrants". Species which do not normally breed in Britain seldom present problems in this respect, though there is evidence that at least *S. fonscolombei* and *S. flaveolum* have produced "locally-bred" individuals following major invasions. Where a species has an established resident population, then individuals must be carefully assessed for migrant status. In years gone by, records from manned off-shore light-vessels provided useful information on movements of such species, but nowadays this sort of evidence is hard to get. The occurrence of extra-limital forms and direct observations of individuals coming in off the sea, or all travelling in the same direction, provides evidence of migration. The sighting of a species outside its known breeding range, or its preferred habitat, is also a good clue. Large concentrations of dragonflies sometimes also indicate migrant origin, though the possibility of a mass emergence must not be overlooked. Instances of individuals attracted to light, or otherwise found flying at night, might similarly suggest migration, since this may continue overnight provided that the ambient temperature remains sufficiently high. It must be remembered, though, that non-migrating individuals of some species (*e.g.* several from the genus *Aeshna*) can also fly well into evening during suitable warm weather.

Recording of migrants has been taken up by the national Odonata Recording Scheme, and for those interested in taking part formally, details of sightings should be submitted on special RA72 forms available from Brian Eversham at I.T.E. Monks Wood, or from me. These forms allow a range of relevant information to be concisely summarised. Completed forms should then be submitted to me as early as is convenient. For those who wish to submit records a little less formally, I would be happy to receive casual records in any sensible format. Recorders should be able to support their identification of the rarer species by field notes or photographs, though at present these need not automatically be submitted with the records.

Diary Dates

To make the diary effective contributions are needed from members. Any relevant items should be sent to the *Bulletin* Editor. No charge is made for entries. Please allow three months advance notice.

MAY

17th ***Emperor moth expedition and bug hunt.***

2-5pm at Snelsmore Common Country Park, Berkshire (SU463710). Meet at main park entrance just off the B4494 Donington to Wantage Road.
Children welcome for this bug-hunt at which we hope to attract the spectacular day-flying emperor moth, and will also be finding what other mini-beasts inhabit the woods and heathland of Snelsmore. Please bring a bug-box. Children should be accompanied by an adult. Joint with Butterfly Conservation and the AES Bug Club.
I: Martin Harvey (01491) 671889).

Spring moth-watch at Snelsmore Common.

8pm until late, at Snelsmore Common Country Park, Berkshire (SU463 710). Meet at main park entrance just off the B4494 Donington to Wantage Road.
Please bring a torch and warm clothes (and a Thermos flask to ward off the British spring!).
Please contact leader in advance to find out about access details (the car park is locked after dusk).
I: Martin Harvey (01491) 671889).

JUNE

21st ***Make a start with moths.***

BBONT/Reading University Saturday School. 2-6pm at Reading University, London Road, and then 9pm until late in the field.
With over 800 larger moths, plus about 1600 micromoths, trying to identify these creatures can be a daunting task. The first step is to recognise the family grouping to which each moth belongs, and this one-day course will help you to do just that. The course is open to all, no previous experience of moths is required. The course costs £12 (concessions £8) and must be booked through Reading University Extended Education Department. Tel: 0118 931 8347.
Information available from course tutor:
Martin Harvey (01491) 671889.

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Obituary

Ralph Sydney Tubbs, OBE (1912-1996) (AES 3684)

It is with great sadness that we have to report the death on 24th November 1996 of Ralph Tubbs. Ralph was educated at Mill Hill School and then trained as an Architect at the Architectural Association School in London. After qualifying he gained experience within established practices and was greatly influenced by both Erno Goldfinger and Walter Gropius, both of whom he worked with before setting up his own practice in 1948. He was heavily involved in the 1951 Festival of Britain and was the architect of the popular Dome of Discovery, then, at 365 feet diameter, the largest dome to be constructed, but it was sadly demolished by orders of the newly elected Conservative Government after the end of the Festival. He was deservedly awarded the OBE for his Festival work.

Ralph was not just a keen entomologist but had an equal interest in many aspects of nature. He served on the RES Council 1981-84 and was Honorary Treasurer 1984-1989. He also served as President of the British Entomological and Natural History Society as was a long-standing member of the Amateur Entomologists' Society. His main interest was in the experimental breeding, of and studying of, the genetics of various varieties of the British butterflies, all of which species he managed to breed at one time or another during his long life. In this he was particularly successful with some of the so-called "difficult" species. The results of his breeding investigations were regularly exhibited, particularly at the British Entomological and Natural History Society's meetings. Ralph's philosophy and common-sense approach is best summed-up by his remarks in his 1978 paper *The breeding of butterflies with special reference to the genetics of aberrational forms* (*Proceedings and Transactions of the British Entomological and Natural History Society* **11**: 77-88) where he stated:

"It is only by breeding that you really get to know an insect. I am an inquisitive naturalist. I am not satisfied with just having an aberration killed on capture in the wild. I want to know how it came to be different. To kill an aberration without getting eggs or a pairing is killing the Golden Goose, I do not collect butterflies, I collect genes. Of course it is a gamble, the insect may ruin itself without laying eggs – but the prize, both in terms of knowledge and in bred specimens is worth the risk."

A quiet and unassuming man he was excellent company and always ready with help and advice. His editorial help will be greatly missed. To his wife; children and grandchildren we extend our sympathy.

Brian Gardiner.

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AES Annual General Meeting and Members' Day

Saturday 26th April 1997

Royal Entomological Society of London

(See Map on inside back cover for travel details)

Programme of Events

Doors Open 10.30am for coffee

11.00am **Talk**
Dr Ian Menzie – Insect trickery.

Midday **Annual General Meeting**

12.30pm **Lunch**
Incorporating a Publications Committee Meeting and AES Bug Club Activities.

1.30pm **Talk**
Subject and Speaker to be finalised.

2.30pm **Natural History Museum Wildlife Garden Bug Hunt**
Wander across the road and help the Natural History Museum update its records by hunting the bugs in their conservation garden. We will be demonstrating techniques for beating, sweeping and pond dipping for those who wish to attend as well as attempting to identify those species which we find.
(Indoor activity will take place if weather is unpleasant.)

Other attractions:

Competition for Bug Club Members

Bring your own specimens for us to identify

AES Publications with copies of the Society's two new publications:

A Guide to Moth traps and their use *by Reg Fry and Paul Waring*

and

Rearing Parasitic Hymenoptera *by Mark Shaw*

Please note: there are no parking facilities at the RES and we urge all members to travel by public transport. There are numerous places to purchase food at lunch, however, please feel free to bring a packed lunch.

FOR FURTHER DETAILS, PLEASE TELEPHONE THE SOCIETY ON 0976 828142

AES MEMBERS' DAY AND ANNUAL GENERAL MEETING

Saturday 26th April 1997

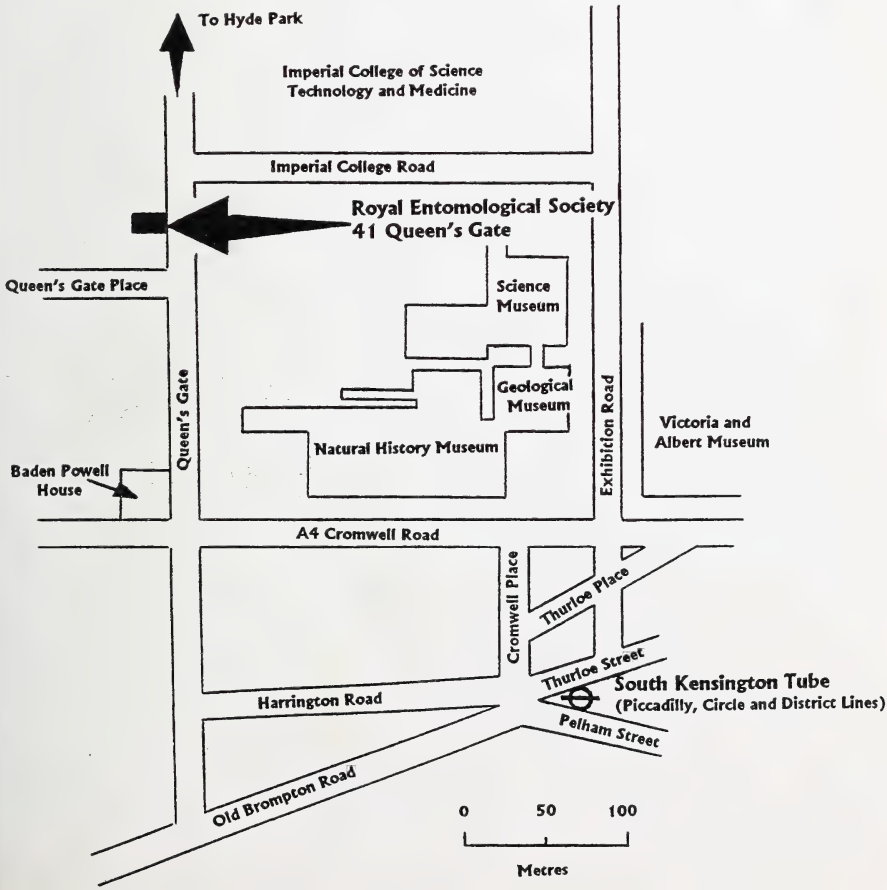
the Royal Entomological Society of London, 41 Queen's Gate, SW7

HOW TO GET THERE

re is no car parking facility at the R.E.S. and it is therefore strongly advised that public sport is used.

Train: The nearest mainline station is London Victoria from which the underground or bus systems should be used.

Underground: South Kensington Station is served by Piccadilly, Circle and District Line trains.
Gloucester Road Station is served by Circle and District Line trains.



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The Amateur Entomologists' Society

Founded in 1935

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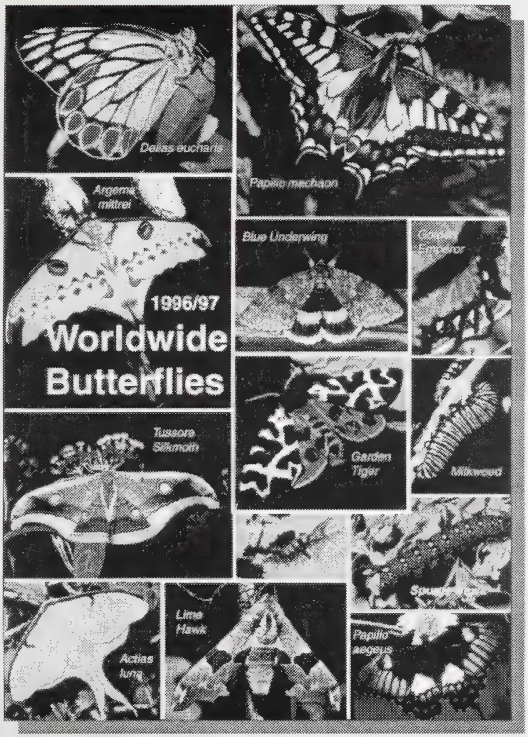

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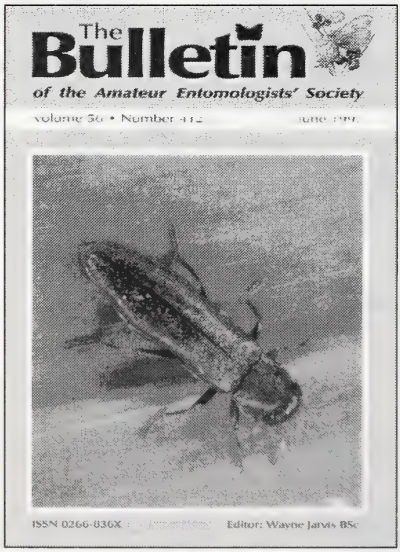

The cover of this issue of the *Bulletin* features the Buprestiid beetle (*Agrilus laticornis*)

Photo: Nick Holford

The Bulletin
of the Amateur Entomologists' Society

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Notice from Council

by Reg Fry

The AES Council, has over the years, been doing their upmost to improve the quality and frequency of the *Bulletin* in order to attract (and keep) more members, as those of you who have been members of the Society for several years will appreciate. In addition, we have recently launched the *Bug Club Newsletter* for our younger members this year.

Unfortunately, none of these initiatives have as yet been particularly successful, and your Society urgently needs your help to recruit more members – as the alternative will inevitably be to reduce the number of publications and/or to substantially increase subscriptions, which will be of great disappointment to us all. Although we have to rely on the written word for most of our communications, please remember that we are not a commercial organisation, but a Charity, which is totally reliant upon members giving up their time to run the Society and to write all its publications.

How can you help? Well, most of us have friends who are interested in entomology – can you persuade one or more to join? Do you have a local museum, society, butterfly farm, school, etc. that you could place extra copies of the *AES Prospectus* on display? Do you have any ideas for improving our publications or suggestions for new titles? On the latter point, members sometime write in saying that they would like more articles on their particular interest – but are often apologetic when asked if they have written for the *Bulletin*! The only way that we get a mix of articles is if they are sent in, as the *Bulletin* Editor can only publish what you send him. He puts a great deal of his spare time in to producing the *Bulletin* and is not able to commission specific articles.

We are also still seeking a Treasurer and Advertising Secretary for the Society.. Despite numerous attempts to fill these positions, we are still awaiting our first response!

If you can help in anyway, either write to the Society or telephone 0976 828142 or 01206 251600.

Argema mimosae Boisduval (Lep.: Attacidae)

by Robert Vuattoux

409 Chemin des Caillades, 06480 La Colle sur Loup, France.

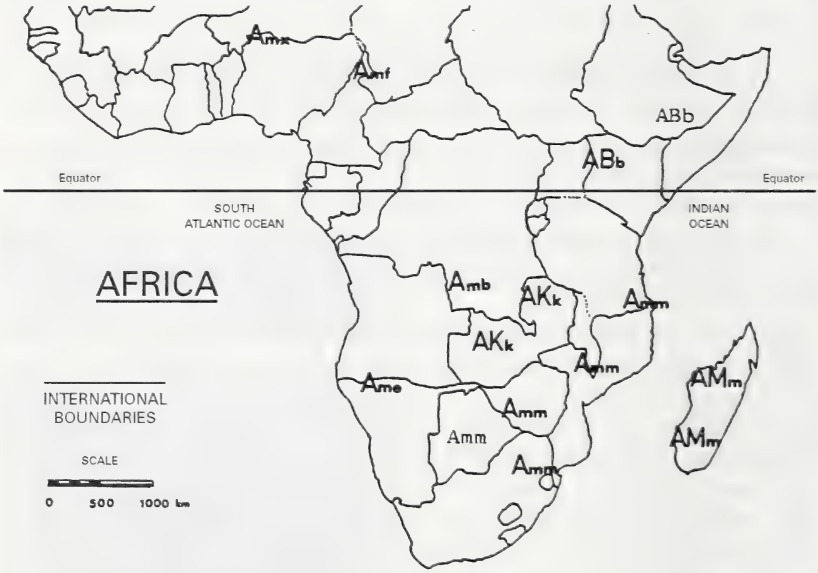
Geographical distribution

Moths belonging to the genus *Argema* only occur in Africa, including Madagascar; there are four species:

A. mittrei, which is the largest, is confined to Madagascar.

A. mimosae is the most widely distributed.

A. kuhnei from Zambia and *A. besanti* from Kenya and southern Ethiopia are very local and have so far not been bred in Europe.



Recorded distribution in Africa of the genus *Argema*.

ABb: *Argema besanti*
AKk: *A. kuhnei*
AMm: *A. mittrei*
Amb: *A. mimosae bouvieri*
Ame: *A. mimosae elucida*
Amf: *A. mimosae fournieri*
Amm: *A. mimosae mimosae*
Amx: *A. mimosae* ssp. (latest localities recently discovered in Nigeria)

Argema mimosae is widely distributed, and its range extends almost throughout Africa, especially south of the equator; however, it has been recorded from northern Nigeria and northern Cameroon. It certainly occurs elsewhere in this region, provided the foodplants are present, but has yet to be recorded.

Several sub-species have been described, on account of this wide distribution: *A. mimosae bouvieri* from southern Zaire, *A. mimosae elucida* from south-west Africa, *A. mimosae fournieri* from northern Cameroon.

Foodplants

This species seems to accept a wide range of plants, and larvae have been found feeding on *Sclerocarya caffra, Spirostachys africana, Commiphora mollis*; this seems to indicate that outside Africa the larva could be reared on various plants. Tests have been carried out, using Liquidamber, *Schinus molle, Rhus typhina, Schinus terebinthifolius* and *Eucalyptus gunnii,* and the results have been satisfactory.

Biology

The egg is of medium size, with a diameter of 1mm, slightly flattened, and cream in colour. The larva much resembles that of *Actias selene*; during the first instar it is russet-red with a darker saddle. In the second instar it is a uniform russet-red and changes to green with orange warts in the third instar. In the fourth and fifth instars the larva becomes dark-green throughout with bluish intersegmental rings, and very prominent tapering tubercules. The larva is now without any coloured warts and very closely matches its surroundings until it starts spinning its cocoon. When the larvae are reared in July/August under hot and humid Mediterranean climatic conditions, the larval stage lasts from 42 to 45 days.

The pear-shaped cocoon is spun against a branch of the foodplant; it is very tough, silvery-grey and perforated with many small holes.

The moth usually emerges shortly after nightfall; the pupal stage lasts three or four weeks. The moth does not take long to develop and paring takes place as from the first night. However, in Africa, pupae must need to enter diapause during the dry season, therefore if cocoons are kept under hot, dry conditions, then emergence should be delayed.

The general appearance of this species resembles that of the larger, closely related *A. mittrei* from Madagascar, however, it is smaller (100 to

120mm) and is yellow-green in colour. It is easy to obtain pairings in captivity and the female lays 200 to 250 eggs over three nights; these hatch after 12 to 16 days.

Larvae sleeved outdoors are lethargic if they are well supplied with food. They appear to be hardy and can be bred in company.

Note

These moths are very closely related to those of the genus *Actias,* as far as their ways and habits are concerned, and it would be interesting to carry out experiments to produce hybrids.

References

Darge, P. (1971). Description d'une sous-espèce nouvelle d'*Argema mimosae* Boisduval. *Bull. Soc. Ent. Fr.* 1971.

Kühne, K.W. (1973). Further notes on the African lunar moth *Argema kuhnei* Pinhey (Lepidoptera: Saturniidae). *Entomologist's Rec. J. Var.* **85**: 27-30. (Translator's note)

McCrae, A.W.R. and Walsh (1973). The African moon moth in Northern Nigeria, The Nigerian Field.

Pinhey, E.C.G. (1986). *The Emperor Moths of Eastern Africa.*

Vuattoux, R. (1986). *Argema mittrei,* une espèce de plus en plus élevée, *Sciences Nat. Bull.* **49**.

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Woman killed by caterpillar

by Keith Lewis (3680)

108 Park View Road, Welling, Kent DA16 1SJ.

The following news item has been reprinted by kind permission of *The Daily Telegraph,* 11th October 1996.

And I quote:

"Travellers to South America are being warned to avoid a species of caterpillar after a woman touched one in Brazil and died two days later. Hairs on the *Lonomia obliqua* contain a venom that stops blood clotting, causes uncontrolled bleeding and death, according to a report in the *Lancet.*"

Butterflies of the Chamonix Valley, France, 1995

by Tony Steele (4106)

57 Westfield Road, Barnehurst, Kent DA7 6LR.

Topography

Situated in the Haute Savoie region of France, and 85 kilometres to the south-west of Geneva, the Chamonix Valley runs approximately north-east to south-west at an average altitude of 1030 metres and is bordered on both flanks by mountains, including Europe's highest, Mont Blanc at 4807 metres (Plate 97I, Fig. 1). The valley sides are afforested, with conifers at the higher levels and a conifer/deciduous mix lower down. Above the tree line there are alpine meadows rich with flora, backed by expanses of scree. There are several glaciers descending almost to the valley floor, including the famous Mer de Glace at Montenvers, with its ice grotto. The woodland is punctuated by clearings created by small-scale tree fellings, open areas under cable ways and the occasional avalanche site. During my week-long stay, I did not see any form of either agriculture or livestock keeping. The whole valley is well served by a network of buses, trains and cable-cars, giving access to some excellent habitats. I found that the easiest way of observing the native fauna and flora was to get a cable-car up, and take a leisurely walk down on one of the many marked paths, so I have documented my visit as a series of walks. Some visits were made to single localities, including one to Switzerland, which is only 18km away. The hotel in which I stayed was called Le Sapiniere, situated on the edge of Chamonix. It is ideally placed, just five minutes walk from the town centre, and very close to some woodland, so close that one evening a specimen of the Silver-washed fritillary (*Argynnis paphia*) was found in the dining room! Although I went fairly late in the season, 5th to 12th August, I still managed to record 38 species. All critical species were netted, identified, and then released unharmed.

Les Plans (1065m)

Situated on the northern edge of Chamonix and only five minutes walk from the hotel, it was wooded with wide paths and herb-rich clearings. Only an hour was spent exploring it, shortly after my arrival in Chamonix. The first species encountered was the Black-veined white (*Aporia crataegi*) which was moderately abundant. This was followed by a single Speckled wood (*Pararge aegeria tircis*), and then two specimens of the Wood white (*Leptidea sinapis*). Some large fritillaries

were seen feeding at the back of a large patch of bramble, and on identification proved to be Silver-washed. A singleton of the Small skipper (*Thymelicus sylvestris*) was noted, and some smaller fritillaries were netted and identified as the Meadow fritillary (*Mellicta parthenoides*).

Montenvers to Les Planards (1909m to 1100m)

The start of this walk was through dense coniferous woodland on the shaded part of the valley side, consequently no butterflies were seen at first. It was not until I entered the sunny expanses that I started to record any. Large wall brown (*Lasiommata maera*) and Arran brown (*Erebia ligea*) were relatively common, as were Essex skipper (*Thymelicus lineola*) and Large skipper (*Ochlodes venata*). There were just singletons of False heath fritillary (*Melitaea diamina*), Mountain ringlet (*Erebia epiphron*), Painted lady (*Cynthia cardui*), Ringlet (*Aphantopus hyperantus*), Dark green fritillary (*Mesoacidalia aglaja*) and Small white (*Pieris rapae*). Also two examples of the Large ringlet (*Erebia euryale*) ssp. *adyte*, were seen. Whilst on this walk, I had the opportunity to observe a Large wall brown egg laying amongst a tuft of annual meadow-grass (*Poa annua*).

Planpraz to La Mollard (1999m to 1087m)

At this high altitude, the Lesser mountain ringlet (*Erebia melampus*) (Plate 97J, Fig. 3) was particularly common on the grassy slopes, also in large numbers were the Scarce coppers (*Heodes virgaureae*), with their bright gold/red wings glowing in the sunlight (Plate 97I, Fig. 2). Next to be seen were two specimens of the Alpine heath (*Coenonympha gardetta*) a true alpine species, and several late-flying examples of the Bright-eyed ringlet (*Erebia oeme*). As I descended through the meadows and woodland, I recorded Small pearl-bordered fritillary (*Clossiana selene*), Black-veined white, Large wall brown, Arran brown, Silver-washed fritillary, False heath fritillary, Dark green fritillary and Common blue (*Polyommatus icarus*).

Les Grands Montets (3295m)

An excursion was made by cable-car to this mountain-top attraction, for the spectacular views it offered over the glaciers and snow fields. Whilst there, three specimens of the Small tortoiseshell (*Aglais urticae*) were seen basking on the rocks.

Le Plagnolet to Argentiere (1250m)

This short level walk was through coniferous woodland, from the lower Le Grand Montets cable-car station, to Argentiere village. Most of the species seen were just singletons starting with a Painted lady, and a Large wall brown. Three of the Hesperiidae were recorded, these being Small, Essex and Large skippers. Several small fritillaries were observed, and I netted three, upon identification they were Titania's (*Boloria titania*) and Heath (*Melicta athalia*). Numerous examples of the Pieridae were seen, and of those netted, all were Small white (*Pieris rapae*) the singleton being a Black-veined white (Plate 97J, Fig. 4).

La Flegere to Les Plans via Le Jora (1877m to 1060m)

This was the most rewarding walk of my week-long stay in France – 20 species. As I left the cable-car station there was a light shower of rain; undeterred I carried on with the walk, and after some ten minutes the rain stopped. Although it remained cloudy, the ambient temperature was very warm. First species noted was Scotch argus (*Erebia aethiops*) which was quickly followed by Large wall brown (Fig. 1), Alpine heath and Small skipper. A stop was made in a natural amphitheatre just above the tree line, which was rich with flora, and here I observed Niobe fritillary (*Fabric-iana niobe*) (Fig. 2), Lesser mountain ringlet, Scarce copper and Heath fritillary. Some bright yellow and black butterflies were flying around and I managed to net one. Upon ident-ification I was surprised to find that it was the Moorland clouded yellow (*Colias palaeno*

Fig. 1. Large wall brown, *Lasiommatta maera.*

Fig. 2. Niobe fritillary, *Fabriciana niobe*

europome), which is a very local species and normally found further north in the Jura and Vosges mountains. As I made my way down the mountain along a wide track, there was a profusion of Silky ringlets (*Erebia gorge*) and a few examples of Mnestra's ringlet (*Erebia mnestra*). Some of the other species seen were Provencal fritillary (*Mellicta deione*), Grizzled skipper (*Pyrgus malvae*), Brown argus (*Aricia agestis*) and False heath fritillary and a Green-veined white (*Pieris napi*).

Barrage d'Emosson, Switzerland (1970m)

Easily reached from Chamonix by train, coach or bus, it is a dam and reservoir open to the public, with a restaurant, gift shop and toilet facilities, set high in the mountains overlooking the alpine village of Finhaut. The best location for butterflies was to be found across the dam, which itself is a magnificent sight. A warning though, if you suffer from vertigo, do not look over the landward side of the dam!

There was the usual abundance of Black-veined white, Scarce copper and False heath fritillary. A single example of the Mountain clouded yellow (*Colias phicomone*) was seen nectaring on Shining scabious (*Scabiosa lucida*), alongside a Dark green fritillary. A female Sooty copper (*Heodes tityrus*) was seen, the only female "copper" seen during my week-long holiday. Other species noted here included Small and Essex skipper, Silver-spotted skipper (*Hesperia comma*) and Large ringlet.

Conclusion

Whilst the town of Chamonix itself is a highly congested place, the surrounding countryside provides some ideal habitats in which to observe the butterflies. When I went, 5th to 12th August 1995, the main flight season appeared to be almost over. This could have been due to the remarkably good weather that this region had earlier in the year. If so, it would account for the small number of some species seen. A full locality/species list is available.

I would like to express my sincere thanks to the French Department of the Environment, for their helpful assistance during the planning of this visit. All the specimens that were captured were released unharmed after identification.

References

Higgins, L.G. & Riley, N.D. (1984). *A Field Guide to the Butterflies of Britain and Europe*. Collins, London.

Ruckstuhl, T. (1994). *Schmetterlinge und Raupen*. Grafe und Unzer, München, Germany.

Whalley, P. (1987). *The Mitchell Beazley Pocket Guide to Butterflies*. Mitchell Beazley, London.

Chistopher Grey-Wilson (1988). *The Alpine Flowers of Britain and Europe*. Collins, London.

Species list

Hesperidae	
Small skipper	*Thymelicus sylvestris*
Essex skipper	*T. lineola*
Large skipper	*Ochlodes venata*
Silver-spotted skipper	*Hesperia comma*
Grizzled skipper	*Pyrgus malvae*
Pieridae	
Black-veined white	*Aporia crataegi*
Small white	*Pieris rapae*
Green-veined white	*P. napi*
Wood white	*Leptidea sinapis*
Mountain clouded yellow	*Colias phicomone*
Moorland clouded yellow	*C. palaeno europome*
Nymphalidae	
Silver-washed fritillary	*Argynnis paphia*
Meadow fritillary	*Mellicta parthenoides*
Heath fritillary	*M. athalia*
False heath fritillary	*M. diamina*
Dark green fritillary	*Mesoacidalia aglaja*
Small pearl-bordered fritillary	*Clossiana selene*
Titania's fritillary	*C. titania*
Niobe fritillary	*Fabriciana niobe*
Provencal fritillary	*Mellicta deione*
Small tortoiseshell	*Aglais urticae*
Painted lady	*Cynthia cardui*
Lycaenidae	
Common blue	*Polyommatus icarus*
Brown argus	*Aricia agestis*
Sooty copper	*Heodes tityrus*
Scarce copper	*H. virgaureae*
Satyridae	
Speckled wood	*Pararge aegeria tircis*
Large wall brown	*Lasiommata maera*
Arran brown	*Erebia ligea*
Ringlet	*Aphantopus hyperantus*
Large ringlet	*Erebia euryale*
Mountain ringlet	*E. epiphron*
Lesser mountain ringlet	*E. melampus*
Bright-eyed ringlet	*E. oeme*
Mnestra's ringlet	*E. mnestra*
Silky ringlet	*E. gorge*
Scotch argus	*E. aethiops*
Alpine heath	*Coenonympha gardetta*

It's my delight

by Arthur Cleverly (7265)

32 Cornwall Crescent, Devizes, Wiltshire SN10 5HG.

There must be very many reasons for people to become poachers – hunger and poverty probably head the list. Another high on the list is the sheer joy that some people get from putting one over on the law, the land-owner and, of course, the gamekeeper. But there cannot be many who have taken up poaching because of moths, so perhaps this puts me in a class of my own and surely must have made me the youngest poacher in the district.

I had been interested in, or perhaps I should say, mad about, butterflies and moths from an early age and at that time in the 1930s these insects were much more plentiful than they are today. My grandfather had encouraged this interest – he could name any wild flower, bird, beast and insect that one might see in our local countryside. He also told me that there had been a man in Devizes who had bred huge foreign moths such as the Himalayan moon moth which, said my grandfather, was the most beautiful moth that he had ever seen. This talk of course fanned my interest even more. Added to that was the fact that one of the few books in the house was Gene Stratton Potter's *A Girl of the Limberlost*. This was a romance, and at that age I knew nothing about romances but the book was woven around the theme collecting the giant silk moths of North America such as *Luna*, the American moon moth and *Cecropia*, the Robin moth. Reading this book fired up my interest even further, if that were possible, and I had a longing to see and to breed such moths.

This may have come to nothing had not someone given me a copy of *Boys' Own Paper* and in it was an advert headed "Giant Moths of the Jungle". It was offering a small catalogue of living material of moths that were available together with instructions on how to breed them. This was for me! I scraped together the necessary coppers needed to send away for this booklet which was to become my bible and I could scarcely sit still until it arrived.

It was all that I had hoped for and more. I absorbed every word in it, practically learning the contents by heart. It even recommended species for the beginner, the door was open for me to become a breeder of these giant moths.

Only one obstacle stood in my way. The lack of money. The cheapest pupa listed was sixpence, two and a half pence in today's

money. Now it sounds almost nothing, but to a small working-class boy in those days it was a small fortune; sixpences did not grow on trees. Somehow I had to find the means of earning money. As things turned out, maybe I should have said of the getting of money.

We lived in one of a pair of cottages in a remote spot well off the beaten track surrounded by fields and woods just outside of the deer park of a large estate that employed gamekeepers whose job it was not only to breed and to tend pheasants for his lordship's shooting interests but also able to keep out trespassers, poachers and the general public, but they took scarce interest in a small boy. I had very few playmates and spent most of my spare time roving these fields and woods. Anything going on of course acted like a magnet to me and it was not long before in my wanderings I encountered poachers. Not gangs of organised poachers of whom tales are told – men who would stop at nothing, men to whom violence was a way of life – but of men who were only out for a rabbit for the pot or maybe raise a bit of beer money. They usually operated in pairs, snaring rabbits or taking them with nets and ferrets. They knew just how to get a few rabbits without attracting attention to themselves. Guns were never used, the sound of a gunshot would have alerted the keepers at once and cartridges cost nearly as much as a rabbit would.

Rabbits only were poached, never pheasants, they would never have been worth the risk involved, the keepers might turn a blind eye to a few rabbits being taken but pheasants or indeed any game at all would have been a very different matter, such things were taboo to all but his lordship and his guests, so a little "live and let live" existed but only up to a point, the rule it seemed was "don't overdo it".

Like the gamekeepers, the poachers took little notice of a small boy hanging about as they worked, in fact they encouraged me, some times daring me to put a ferret inside my shirt as they did when carrying them. So it was that I soon learned how to poach if not to practice this art. Snares were the most popular method being quick and easy to set and not a big loss if they had to be abandoned.

Rabbits are easy to snare, they are creatures of habit, so much so that if poachers are at work a rabbit is its own worse enemy, for they have their own paths that they always use. Even more than that, they always put their feet in exactly the same place. A rabbit hops along, a series of little jumps as it goes along its path to its feeding area, so it is easy to spot this path, it is a series of worn patches where its feet touch the ground and a tuft of grass where it leaps. So the poacher sets his snare,

a noose of wire well pegged down at one end over the tuft of grass. The leaping rabbit puts its head through the noose that at once tightens, strangling the rabbit almost instantly, it is all over in seconds and in silence. This type of snare was not illegal to use, only the taking of the rabbit was breaking the law. Though rabbits were more plentiful and to the farmers, a pest, they did belong to the landowner and most farmers were tenant farmers only, so there were regular court appearances of people charged with "trespassing in pursuit of conies". The first appearance usually attracted a fine of ten shillings.

At that time there were hundreds, in fact thousands, of rabbits in the countryside all around me. Go into almost any field and a clap of the hands would start dozens of white tails bobbing to safety as the rabbits fled. Rabbits galore and I was in need of money and knew how to catch them. It had to be the answer to my problem.

Only one link was needed, someone who could sell those rabbits. That is where my grandmother entered the scene, for she was willing to sell a few rabbits for me if I could catch them. It would only be a few since it would have been easy to flood the market. The best price that one could expect was sixpence if one was lucky, four pence was the more usual price. If a rabbit did not sell then grandmother's cat lived well and at least one could get a penny for the skin. I did not have parental support for my enterprise, but on the other hand they did not stop me. I already had a few snares that I had found so I was in business.

It proved to be a very slow start, I found that knowing how to do it and actually doing it was not quite as easy as I had thought. At the end of the week I had caught two rabbits. These at least paid for a dozen new snares. Soon I was improving and my catch increasing, now all profits were set aside for my moth breeding programme.

These profits were not great, for a poacher has many enemies beside the risk of getting caught. Foxes, badgers and crows heading the list. And to avoid being seen the snares had to be set and collected under the cover of darkness, so it was easiest to set them in a straight line across a field. But not only was this the easiest for the poacher, it made it easy for the foxes and badgers, a line of meals laid out for their feasting. They were able to see in the dark, a poacher could use no light at all for fear of attracting publicity, not only from the keepers but from patrolling policemen. Not that these guardians of the law actually patrolled in that area, but they had a habit of strolling down a nearby lane in order to have a quiet smoke so that the catching of a poacher

would be to them an added bonus. It was the foxes and badgers that gave most problems. Often I would find just the head of a rabbit left in the snare, the rest having been carried away to be enjoyed in a safer place. Or sometimes a rabbit would be carried away complete with snare, so the loss of snares was quite high. This meant that the snares had to be visited at frequent intervals to gather up any rabbits that may have been caught. If the snares were left out overnight they had to be collected before it got light or the crows would arrive to have breakfast. Crows are choosy eaters, they always start on the eyes and then tear the body open to eat the liver, thus making the rabbit unsellable.

I talk of working in the dark, this was always so because rabbits were only sellable during the winter months, outside of the breeding season. Bad weather then played a part in the operation, for rabbits are not only wary creatures, they like to look after their comfort a little. They rely on their acute sense of hearing to keep them out of danger so on noisy windy nights they will not venture far from the safety of their burrows. Nor do they venture far on wet nights but do not mind frosts. They will come out when snow is on the ground, but a poacher cannot, his tracks would be plain for all to see.

There is yet another hazard. The saying has it that there is no honour among thieves and I could add to that by saying that there is certainly none among poachers either. On one occasion I lost a whole line of snares and their contents if any to a fellow poacher. Revenge, though, is sweet, I emptied his snares of rabbits the following night, but left him the snares. Two nights later I repeated the operation. More rabbits than I could possibly sell, grandma's cat and all of the neighbours' cats lived well that week! My fellow poacher took the hint, after that my territory was left alone. I don't say that my snares were not emptied at times, but at least no snares were taken.

I had never been scared of the dark, living where we did it was no good being scared, for the path that led to our house from the town and its gas lights led down a narrow lane by the side of the local cemetery where, on moonlit nights, the tall white marble headstones gleamed like ghostly figures in the surrounding darkness. Then the path narrowed as it plunged through a wood filled with sounds, sounds that one did not notice during the daytime, the creaking and groaning of branches as they rubbed together even on windless nights. But even more eerie were the sounds of the unseen, the rustles, the grunts, the scurrying of small feet as foxes, badgers and other small creatures went

about their business in the darkness. It may astonish some people, but even worms can make a noise as they slither through leaves. Add to this the hooting of owls and one realises that woodland at night is not a place of silence.

From the wood the path led across a few fields. Now cattle by day can be seen, but seem to be silent animals for the most part. By night however, they seem noisy, they crop the grass with a tearing sound, they breathe heavily and their hooves make loud sucking noises as they move on wet ground. There is nothing very quiet about cattle by night. Also in those fields one could be surprised by a grey wraith rising from the ground, herons often feed by night, stalking in marshy fields in search of frogs. No, if you are used to such things by night you are not scared of the dark, but the lights of home were still a welcome sight.

One night I did get the worst fright of my life – never before or since did I experience such sheer terror. I can still recall that night and the sheer horror that I felt. It is as clear now as if it was only yesterday, even after more than sixty years.

It was an ideal night for poaching, a night of broken cloud that from time to time obscured a near full moon. There was no wind and a touch of frost tempered the air. I had set a line of snares across a field a little further away from home than usual, that in itself made me just a little jumpy. I had crossed over a rise in the ground and was looking down towards an old deep mill pond around which was clinging a faint veil of white mist. There was an old tale about this pond, it was said that many years before, the owner of the estate had drowned himself in its dark waters. This tale and the white mist that clung around the pond made me think of ghosts.

Just then a ragged dark cloud drew a curtain across the moon though it still shone its cold light on the pond making it look even more eerie. Suddenly, almost it seemed in my ear their was a most hideous scream as if from some tortured soul tormented in the flames of hell, or even worse, some awful fiend from the underworld that had selected me as its next victim. I was frozen in sheer horror. I felt my hair stand on end and am sure that for a moment my heart stopped beating.

Then a wave of common sense prevailed, I realised that my fiend from hell was merely the scream of a fox, the sound often made by these animals in the mating season, but it is truly a terrifying sound when one is not expecting it. But it had shaken me up, and I gathered

in my snares as quickly as possible, for that night at least I had lost interest in rabbits and was not sorry to get back home. I did not give up poaching, but I never set snares in that field again.

But the poaching paid for ova, larvae and pupae of those giant moths that I had been told about and had read of, soon I had live specimens of the moon moths and those beautiful silk moths that had featured in *The Girl of the Limberlost*. I had achieved my goal.

By the time that war broke out I had rather gone off poaching, but oddly enough took it up again for a short time when in the army. This time it was not to pay for moths and the like or actually to pay for anything in particular, it was more a case of putting one over on the army and the system in general.

It took place in deepest Hampshire and was the fault of a young lieutenant. We were on an overseas draft, had we known, it was to take us on the North Africa landings, but at that time we were doing nothing in particular, just killing time, training for something yet unknown. We had lectures on snakes and such hazards which lead us to believe that we were heading for jungle warfare. But that young officer had the bright idea that night exercises would do us the world of good, although we had no wish to spend our evenings and half the night creeping through nettles and brambles, such things had no appeal to us at all.

The last straw though was the fact that he insisted that, on these unloved night exercises we fired blank cartridges and he examined our rifles to make sure that we had done so. This meant that we had, when we got back to camp, to clean our rifles thoroughly, pouring boiling water through the barrels and then cleaning and oiling them. This rifle cleaning took up nearly as much time as the exercises themselves, our spare time was getting less and less.

Then I had an idea that I did not pass on to my comrades. On these night exercises I had noticed, silhouetted against the night sky, the shapes of numerous roosting pheasants in the tall thorn bushes that made up the hedges in that district. Well, I thought, there was no escaping the exercises, so I might as well get a little gain from them. So I scrounged a supply of ball-bearings from the vehicle maintenance section and once again I was in business.

So, with my rifle loaded with blank cartridges I would creep along the hedges until I was right under a roosting pheasant, then dropping a ball-bearing down the barrel, aim up at the bird and fire. At such point

blank range I just could not miss and down would drop the bird. In hungry wartime England I had no difficulty in selling such birds and many changed hands at the local pub and no questions asked. The business became so good that the young lieutenant must have thought that he must have made a convert to military enthusiasm when I actually started to volunteer for his night exercises.

As is always the case, all good things must come to an end and the Hampshire countryside was exchanged for that of Algeria, a country that was not much use for poaching, but a wonderful place in which to see and study butterflies, moths, mantids, scorpions and the like. Once more I was in my element. It was, too, the end of my poaching days for ever.

Request for assistance – beetles of north Germany

by Bill Hardwick (6408)

4 Caister Way, Over, Winsford, Cheshire CW7 1LT.

I have recently been contacted by Andreas Hermann from Germany with a request for assistance. I am no longer working the Coleoptera and consequently unable to help, but I am publishing this note in the hope that someone may be interested and willing to participate.

Andreas and his colleagues are currently working on a new publication *Verein für Naturwissenschaftliche Heimatforschung zu Hamburg e. V.* documenting the fauna and biology of the beetles of north Germany. To facilitate the taxonomical aspect of their work they need as complete a collection of the European Coleoptera as possible. Andreas is therefore keen to make contact with anyone who is prepared to exchange specimens of species that may be relatively common here but rare in his part of Germany and *vice versa*.

He is also particularly interested to learn of anyone with knowledge of the beetle fauna from regions outside of central Europe who may be prepared to help in their identification.

If you would like to exchange specimens or help with the identification of the exotics, then please contact Andreas directly at: Andreas Herrman, Bremervörder Straße 123, D-21682 Stade, Deutschland.

Notes on the Genus *Brahmaea* (Walker) The Brahmaeid Moths of the Family Brahmaeidae

by Don McNamara (5537)

6 Fulham Close, Hillingdon-Uxbridge, Middlesex UB10 0SU.

New discoveries

The first article on this subject, *Bulletin* **49** (368), was concerned with (a) distribution – Middle East, Far East and South East Asia (with *Brahmaea (Acanthobrahmaea) europaea* (Hartig) a lone species from Italy), and with (b) sorting out the two main groups, referred to as the "*Wallichii* group" and the "*Certhia* group". The drawings on page 13 of Vol **49** illustrate this.

A further note, *Bulletin* **50** (379), showed the problems with naming insects when different authorities make discoveries of the same species, their finds being separated by time or geographical location – in this case the confusion which arose regarding *Brahmaea (Brahmaea) certhia*.

Both groups, while being distinct as groups, show that the closely-related species (or sub-species) within each group are difficult to separate merely in terms of the appearance of the phenotypes. I suspect that this also contributes to the arising of synonyms – as in the case of *certhia*.

During a visit to the "Leicester" on the 23rd May 1997 (the last to be held at the Granby Halls venue) several dealers had set specimens of the *certhia* group with the appellations "*christophi*?", or "*ledereri*?", and a couple of faded specimens from the Wallichii group, also with question marks after their species names.

However, as mentioned in Vol. **49** it was thought that the development of the Chinese hinterland, as well as Indonesia and the Philippines "new and exciting forms" may appear. Indeed they have.

Three new brahmaeids are illustrated in *Entomotaxonomia* (China), **16**: (2) and **16**: (4), under the joint authorship of ZHANG Xiurong of the Department of Agricultural Machinery of the PLA University of Agriculture and Animal Husbandry, Changchun, Jilin, and YANG Chi-kin of the Department of Plant Protection, Beijing Agricultural University, Beijing. These three insects are of the *certhia* "tribe" and according to the illustrations show little obvious differences either among themselves or to *Brahmaea (Brahmaea) certhia* to which they are likened. However, drawings of the genitalia confirm the differences.

These are described as:

Brahmaea (Brahmaea) separata
(Holotype male, Wuchang, Hubei Province – 13.viii.1964)

Brahmaea (Brahmaea) recta
(Holotype male, Mt. Xitianmushan, Zhejiang Province – 28.vii.1974)

Brahmaea (Brahmaea) goniata
(Holotype male, Zhenan, Shaanxi – 8.vi.1977

Please note that the second name *Brahmaea* in brackets has been inserted to follow the consistency whereby the *certhia* group is distinguished from the *wallichii* group.

Descriptions of the phenotypes are given in the editions of *Entomotaxonomia* – these describe very slight differences in pattern – as is a history of when and where they were collected. This was in English but the bulk of the articles were in Chinese.

The actual specimens are kept in the Insect Collection of Beijing Agricultural University.

My thanks to the staff of the Natural History Museum, Entomology Library, especially Julie Johnson.

Orthoptera Recording Scheme: Request for Devon records

by Peter Sutton (7388)

Could members please send their Devon records of Orthoptera (grasshoppers and crickets), Dermaptera (earwigs), Dictyoptera (cockroaches) and Phasmida (stick-insects) to the new recorder for Devon:

Dr Peter Sutton,
16 Belgrave Road, Mutley, Plymouth, Devon PL4 7DP
or e-mail: pgsutton@plymouth.ac.uk

It would be helpful if records received contained the locality, habitat, and if possible, the grid reference of the site where each species was recorded. I will be more than happy to help resolve any problems with recording procedure or species identification.

If you require record cards, they can be obtained from the Biological Records Centre (BRC), Institute of Terrestrial Ecology, Monks Wood, Abbots Ripton, Huntingdon PE17 2LS.

I thank you all in advance for your participation.

Fig. 1. Chamonix from Aiguille du midi.
(Tony Steele – Butterflies of the Chamonix Valley)

Fig. 2. *Heodes virgaureae*, the Scarce copper.
(Tony Steele – Butterflies of the Chamonix Valley)

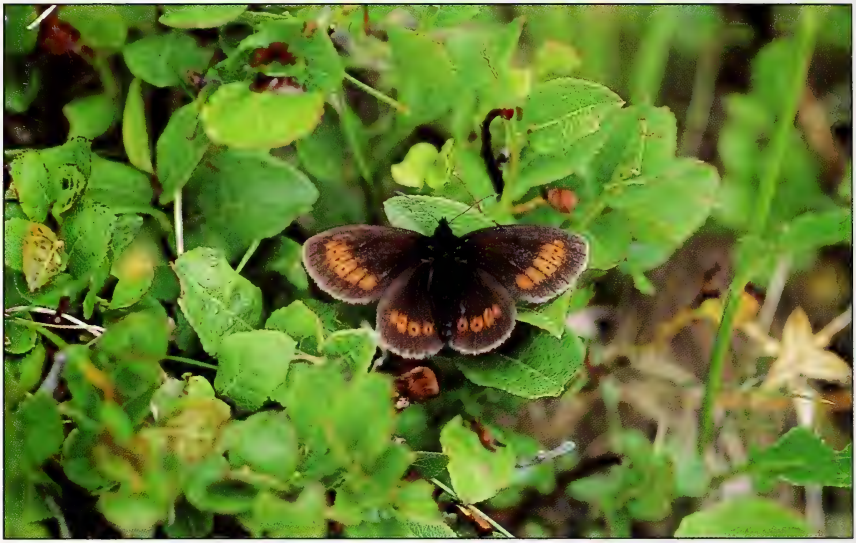


Fig. 3. *Erebia melampus,* the Lesser mountain ringlet.
(Tony Steele – Butterflies of the Chamonix Valley)

Fig. 4. The Black-veined white, *Aporia crataegi.*
(Tony Steele – Butterflies of the Chamonix Valley)

Fig. 5. *Heteropteryx dilatata* – the typical female colour form.
Note particularly the darker green underside.
(Paul Brock – The Jungle Nymph, *Heteropteryx dilatata*)

Fig. 6. A rare yellow female colour form.
(Paul Brock – The Jungle Nymph, *Heteropteryx dilatata*)

Fig. 7. A male nymph, form with stripe which is often absent. Note the small left foreleg which is gradually being re-grown.
(Paul Brock – The Jungle Nymph, *Heteropteryx dilatata*)

Fig. 8. An adult male.
(Paul Brock – The Jungle Nymph, *Heteropteryx dilatata*)

The Jungle nymph, *Heteropteryx dilatata* (Parkinson)

by Paul D. Brock (4792)

"Papillon", 40 Thorndike Road, Slough SL2 1SR.

This beautiful species of stick-insect quickly became established in the 1980s as one of the most popular culture stocks, and a common sight in worldwide zoos and butterfly houses. Virtually all the culture stock originates from the Tapah Hills in Perak, Peninsular Malaysia, where thousands were collected alive for dispatch to the pet trade. Fortunately this trade appears to have diminished considerably, although many specimens are still used in the framing industry. It is unnecessary to collect such numbers from the wild, especially when they could easily be cultured on a large scale if entomological and pet dealers wish to persist in exploiting this species.

The following observations, mainly from my forthcoming book, may be of interest to readers, especially those rearing, or considering rearing this delightful species.

Fig. 1. *Heteropteryx dilatata*

Description

Females are usually apple-green, with the underside darker green (Plate 97K, Fig. 5). Very occasionally mustard yellow, with a green underside (Plate 97K, Fig. 6). This is a very broad, spiny insect, with large green forewings. Hindwings pink, short, concealed beneath forewings and

unable to fly. Body length 145-160mm from head to end of abdomen, which is extended into a hardened ovipositor, which is used to bury its eggs. Males are mottled dark brown, spiny, the long wings with a pale green or whitish margin (Plate 97L, Figs 7 & 8). When opened, the hindwings are bold pink, with a pattern of dark brown veins; body length 80-90mm.

Distribution

Extremely common in some parts of Peninsular Malaysia and its range extends to Sumatra, Java, Borneo (Sarawak) and Thailand. It is probably extinct in Singapore.

Breeding tips

In order to breed this species successfully, the following points should be noted.

- eggs should be buried in sand or peat for hatching (with the operculum upwards) and these typically take 8-18 months to hatch. Care should be taken if mould forms, as this may infect eggs. This should be carefully removed with a fine, small paint brush and carefully cleaned. A mould inhibitor, such as *Methyl hydroxybenzoate* sprinkled on the sand nearby, helps to prevent mould.

- keep nymphs and adults in humid conditions, at around 21-27°C (70-80°F), rather than in well-ventilated cages. Plastic plant propagators are ideal for smaller nymphs. Regularly spray leaves but keep the container clean and beware of mould forming. Nymphs are robust and easily reared. Males are easily distinguished as they lack a developing ovipositor, or pointed structure, at the tip of the abdomen, and have a small bump underneath the end of the abdomen. Nymphs often have white patches on a brown body colour and males sometimes have a long white longitudinal stripe. Males reach adult stage after five moults, the females after six moults. Nymphs mature in 12-16 months and adults usually live about a year.

- adults start egg-laying two to three months after reaching maturity. They must be given a container filled with peat, or similar, to bury eggs in. These tend to be laid in small batches of about six eggs, but may be laid in bulk rather than daily. When fully laden with eggs, females are very heavy and the 1982 Guinness Book of Animal Facts

and Feats estimated a specimen in my collection to weigh at least 65g (2.29oz) in its egg laying prime.

- bramble, *Rubus fruticosus,* is the favoured foodplant in captivity, which is not surprising, as a relative, *R. moluccanus* (Rosaceae), is one of its natural foodplants. Guava, *Psidium guajava* (Myrtaceae) is frequently used in south-east Asia and many other plants are used with varying degrees of success in Europe.

Behaviour

Defensive behaviour is very elaborate, particularly in the female. When disturbed she will cling to a branch rather than adopt the usual phasmid practice of dropping off and feigning death, before arching her body forward with hind legs splayed, displaying large spines on the hind legs. The fore and hindwings are rubbed together, producing a hissing sound. If this fails to produce the desired effect *e.g.* if a human is still holding its body, she will repeatedly drive home the spines with great speed, capable of inflicting a painful wound and, more rarely, attempt to bite. Both these actions can draw blood.

The male operates a similar defensive display, but cannot produce a hissing sound and he is content to fall off the foodplant and feign death. Upon a further threat, he will probably open his wings, displaying bright colours and use the hind legs in a similar manner to the female.

In the wild these insects are particularly plentiful following rains and one would expect this rather extreme behaviour successfully to ward off a predator.

Gynandromorphism

This phenomenon occurs in several species of phasmid and is particularly striking in this species, of which I have seen more gynandromorphs than in any other phasmid. Gynandromorphs are abnormal individuals in which some parts of the body show female characteristics, while the remaining parts are male. Frequently one side of the insect is male *ie.* brown, and the other side female *ie.* green (known as a halved gynandromorph), but mosaic forms, or partial gynandromorphs are also known. These have partial characteristics of one sex *eg.* I have a male with some green patches and the right-hand side of the pre-anal part of the hindwing reduced in size and coloured green instead of brown (for examples of these see *Bull. Amat. Ent. Soc.* **53**: 33 plate NN: 9-10 (1994) and **55**: 49-51 plate 95E: 1 (1995)).

Local beliefs/medicinal

Malaysian newspaper reports from October 1989 caused quite a stir when it announced that a lecturer "discovered that droppings of the 'stick-insect' are an instant cure for diarrhoea". This information was quoted out of context and related to the medicinal properties from guava leaves the insect feeds on.

Traditional Chinese families, who know the insect as *Char Kee Leng* or *Kee Loong* rear stick-insects for the healing powers of the droppings. Dried excreta mixed with herbs are said to cure a number of ailments, such as asthma, stomach pains and muscular pains. To cleanse the body, a brew is also made from the droppings and drunk like tea. Droppings have recently been found to be a concentrate of Vitamin E.

Malaysian people believe the presence of stick-insects in their house is a sign of good luck. However, Tamils believe that the presence of a stick-insect in a house is a sign that God has appeared in the house to punish the occupants for a wrong.

Back in 1900, Annandale reported that the Kelantan Malays believed that the leaves of the jack-fruit tree, *Artocarpus integrifolia,* gave birth to *H. dilatata.* Rich men of the same region kept this species in cages to secure eggs, which they set in rings like jewels, and considered them a most powerful charm against all kinds of evil spirits.

Postcards

This popular species has appeared on at least three postcards, including one published by the Natural History Museum, London (1993) of a kokoro (giant robotic model) insect, which has been exhibited at various worldwide museums.

Reference

Brock, P.D. (*in press*). *The Stick and Leaf-Insects of Peninsular Malaysia and Singapore.* The Malaysian Nature Society, Kuala Lumpur.

Book Reviews

The Copaxa of Mexico and their immature stages (Lepidoptera: Saturniidae)

by Kirby L. Wolfe. *Tropical Lepidoptera* Vol. 4, Supplement 1. 4to, pp26, many coloured illustrations. Association for Tropical Lepidoptera 1993, Price not stated. Obtainable from Dr John Heppner, c/o Florida State Collection of Arthropods, PO Box 141121, Gainsville, Florida 32614-1210, USA.

When I published my *Silkmoth Rearer's Handbook* fifteen years ago, the only *Copaxa* species then known to be reared in captivity was *lavendera*. Now we have no less than eleven species described and illustrated in full colour as both larvae and adults.

This work is the result of nine years' collecting in Mexico and rearing the species obtained over the years. All stages from egg to adult through the larval instars are fully described together with the successful foodplants used in captivity and the natural foodplants where known, although in a few species the larvae died before pupation, so the appropriate foodplant still remains a mystery.

This is not just an account describing and illustrating the genus; its affinities to other groups are discussed, some taxonomy clarified and previous work on *Copaxa* cited. There is a brief mention of mating and rearing procedures and flight times and of course the distribution of the species in Mexico is given.

To the would-be rearer of Saturniidae, however, the chief merit in this work will not be the scientific information and arguments, but the magnificent illustrations of all stages and the exceedingly useful and informative lists of foodplants, amongst which members of the family Lauraceae take pride of place. This family include the common "avocado" (*Persea americana*) to be found in all foodshops and AES members might be interested to hear that I have succeeded in

germinating the seeds, although they have not yet grown large enough to support any caterpillars!

I feel that it is useful to give a summary of the species and foodplants dealt with in this journal supplement.

Species	**Foodplant**
C. lavendera	*Schinus molle; Quercus; Salix babylonica; Persea; Rhus trilobata; Malosma laurinea; Cinnamomum camphora.*
C. mannana	*Quercus agrifolia; Q. suber; Q. ilex; Q. chrysolepis; Q. kelloggi; Q. lobata.* Refused: *Persea; Rhus*
C. muellerana	*Quercus* spp. Died on *Rhus;* Refused *Persea.*
C. copaxoides	Avocado. One only survived to sixth instar but failed to pupate. Accepted but rapidly failed on *Persea americana;* refused *Quercus* or *Schinus.*
C. cydippe	*Pinus radiata* and *P. thunbergiana;* accepted *Persea, Liquidambar* and *Salix* but soon died.
C. denda	*Persea americana.*
C. sophronia	Unknown, not reared.
C. rufinans	*Persea americana; Cinnamomum camphora;* reluctantly accepted *Quercus, Rhus.*
C. escalantei	*Persea americana.*
C. mazaoram	*Persea americana.*
C. multifenestrata	*Persea americana.*

Anyone interested in the genus *Copaxa* or in rearing Saturniidae, should obtain a copy of this work. The colour illustrations alone are worth it.

Brian Gardiner (225)

The Butterflies and Moths of Bedfordshire

by V.W. Arnold, C.R.B. Baker, D.V. Manning, & I.P. Woiwood. Foreword by A.M. Emmet. Hardback, 1997, 24.5 x 17.5cm, 416pp + 104 colour plates. Retail price £20.00 (£14.90 + £3.75 p&p (UK) from Gill Dickens, Hon. Librarian, Bedfordshire Nat. Hist. Soc., 9 Ullswater Road, Dunstable, Bedfordshire LU6 3PX). ISBN 0 950 6521 5 6. Limited edition of 500 copies.

As far as the English County Lists go, this has got to be one of the extensive, comprehensive, exhaustive (and at the risk of over-taxing the superlatives) weighty volumes that I have seen since the *Butterflies and*

Moths of Yorkshire (Sutton & Beaumont, 1989). Considering that Yorkshire is the largest county, making Bedfordshire look like a mere scrape in a sand-pit, the sheer size and quality of this book is more than ample testimony to the immense amount of work that has gone into producing it. There are over 1300 species listed and distribution maps (10km square format) are produced of nearly all entries. Species are arranged in the (well adopted) systematic list and nomenclature of Bradley & Fletcher, making cross-referencing to other standard county lists easier. Foodplants are also included for all the entries, alleviating the usual need for P.B.M. Allan's *Larval Foodplants* in your other hand!

Comprehensive introductory sections cover the various habitats, Bedfordshire Lepidopterists and Monitoring and there is an extensive Bibliography and Index. The colour plates are confined to 16 pages in the middle of the book and in all honesty, can be considered as no more than a short recreational hiatus in the middle of a serious reference work. To sum up – if you want a good colour field guide, then go and buy a good colour field guide . . . but if you collect the current county lists and you want one of the best available, then get a copy of this book. The quality is good, the hard-cover is like sheet-steel and the book weighs 1.2 kilos, so don't drop it!

Paul Batty (8926)

Catalogo de las Familia Saturniidae de Mexico

by Carlos R. Beutelspacher-Baigts and Manuel A. Balcazar-Lara. *Tropical Lepidoptera* Vol. 5, Supplement 1. 4to, pp28. Association for Tropical Lepidoptera 1994, Price not stated. Obtainable from Dr John Heppner, c/o Florida State Collection of Arthropods, PO Box 141210, Gainsville, Florida 32614-1210, USA.

The Lepidoptera of Mexico and of Costa Rica are by now perhaps the best known group of Central American insects and this journal supplement now lists all Saturniidae and the localities where they have been recorded in the country. Sixteen percent of all described Saturniidae occur in Mexico, a total of 193 species. Of the four subfamilies there are nine Arsenurinae; 35 Saturniinae; 41 Ceratocampinae and 108 Hemileucinae. The list is compiled from three sources: Specimens in several relevant museums; a very extensive literature search (there are five pages of these references) and on-going studies from entomologists in Mexico. In such a vast territory there are

still many unexplored areas and this publication is intended to bring the present knowledge up-to-date (the last listing was in 1942) so that people will know what and where to look.

The first few pages are devoted to an historical discussion on the classification and the authors who have published on the Saturniidae, not necessarily specifically of Mexico but certainly of relevance to its fauna, such as Seitz, Hoffman, Michener, Peigler and Lemaire. The bulk of the work is then taken up with the list of species which is given under each genus and synonyms are also given. Many species are endemic to Mexico but where they are known to occur elsewhere, such as Guatemala or USA this is stated followed by their recorded Mexican localities.

To anyone intending to go and collect in Mexico this listing is indispensable. It does have the slight draw-back that it is in (Mexican) Spanish which presents no problem over the locality listings but does make the introduction more difficult although there is a short summary of it in English.

Brian Gardiner (225)

Gibraltan butterflies

by Anthony Crawforth (9510)

Whilst climbing a steep path near the summit of the Rock of Gibraltar I was surprised to see and be able to positively identify a specimen of the African emigrant *Catopsilia florella*. The date was the 25th April 1997 at about noon. The weather was exceptionally fine although there was a slight breeze. My attention was drawn to the fast and furious flight of the butterfly which was a female and bright yellow. I knew this butterfly from travels in tropical Africa and of its distribution in the eastern Mediterranean and the Canary Islands but I did not know it could be seen in Gibraltar. Is this an unusual sighting?

On the following Sunday, near the bullring at Mijas, I saw a Two-tailed pasha *Charaxes jasius*. I had previously seen this butterfly in Cyprus many years ago but never before in Spain.

Rearing semi-aquatic cockroaches

by Phil Bragg (8737)

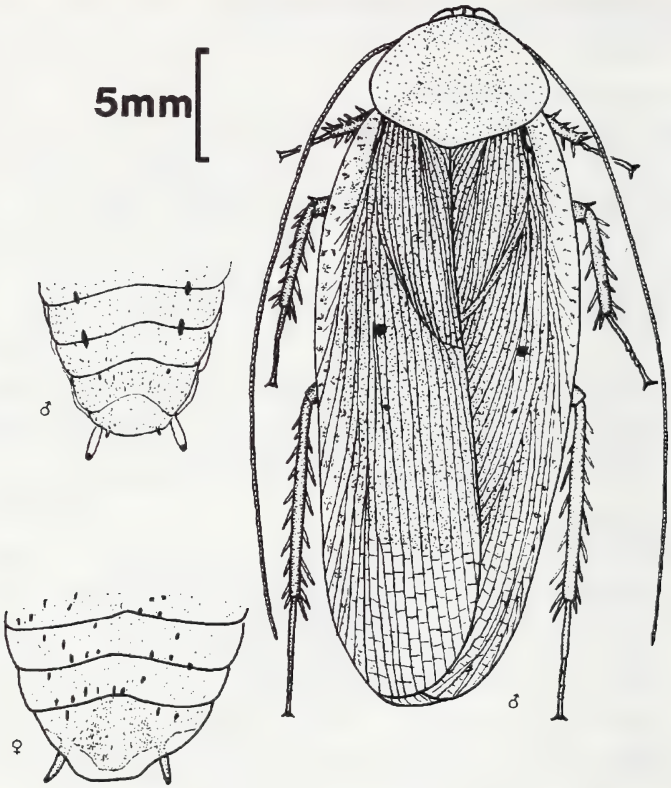
51 Longfield Lane, Ilkeston, Derbyshire DE7 4DX.

At the mention of cockroaches most people think of domestic pest species, make a disgusted grunt and change the subject. This is rather unfair since only about 1% of species are domestic pests, and most of these only occur in the tropics. The majority are found in rainforests and would soon die in a domestic environment: the rare escapees from my cultures appear to die of dehydration. A graphic example of the need for high humidity by rainforest species is provided by the semi-aquatic cockroaches of south-east Asia. Little has been recorded about their habits, and few species are recorded as semi-aquatic although there are probably many such species. Recently I managed to establish a culture of semi-aquatic cockroaches from Borneo.

Identity and origin

In November 1994, with the assistance of Ian Abercrombie, I collected a number of nymphs from the bank of the river Sarawak Kanan, near the Wind Cave at Bau in Sarawak (E110°08'N001°24'). They were collected at night and placed in a plastic bag. The bag was put in the boot of our hire car and left until the following morning when it was discovered that they had chewed through the bag and most had escaped! I returned home with four nymphs which developed into adults of two species: two males and a female of one species and a single male of the other species. The first of these species reproduced and gave rise to the culture discussed below. Both species belong to the Epilamprinae but due to not having a key to the subfamily, I have been unable to identify them so far.

Both the male and female are fully winged with the wings extending to well beyond the end of the abdomen. The female is slightly larger than the male, typical lengths are: female 29mm, 39mm including wings; male 25mm, 33mm including wings. Adults are light brown, with speckles of darker brown and sometimes a few small black spots on the elytra, there is a small white patch near the base of the elytra; the ventral surface is creamy-white with black speckles. Females seem to be more a grey-brown than the males. The nymphs have a dark brown thorax, the abdomen is yellowish-brown with numerous rows of dark brown spots; they blend in quite well with the rotting leaves on the river bank.



Housing

The cockroaches are housed in a plastic aquarium, 30cm long, 20cm wide and 20cm high which is fitted with a wooden lid. The lid has a ventilation grill made of net curtain material at one end, and a light fitting holding a 15W pygmy light bulb at the other end. The light is the only source of heating and is on from 0800 to 2100. The cage has sand at one end and a peat-based potting compost at the other end, the compost is kept moist, the sand is generally quite dry. Dead leaves are provided for cover (and potentially food). There is a water bowl 11cm in diameter which is never allowed to become more than half empty, a sloping piece of bark is provided so they can get a good grip when in the water.

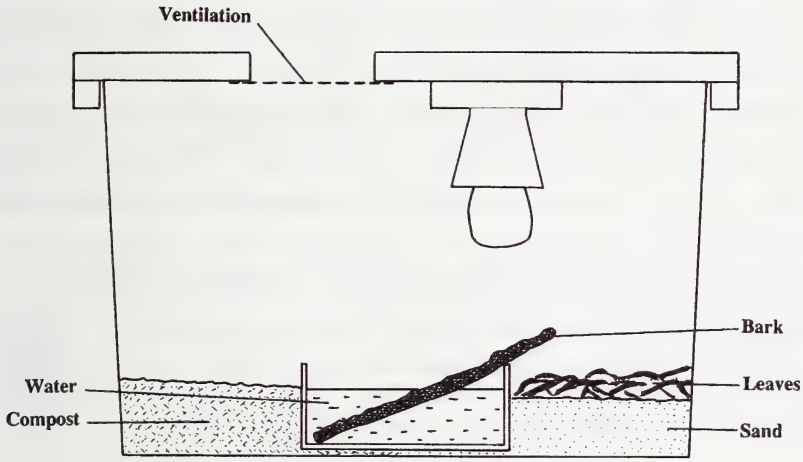


Fig. 2. Cockroach housing

Feeding

I provide pieces of fruit as the main food, usually apple, at intervals of one or two weeks. I also put leaves in the cage, adding one or two fresh bramble (*Rubus* sp.) leaves roughly every month, these slowly decompose in the cage. I do not have any evidence that the cockroaches feed on the leaves but neither can I exclude the possibility. In addition I occasionally put pieces of dead stick-insects into the cage. The peat-based compost is also a potential source of food. Fruit which starts to go mouldy is left in the cage unless several lots are visible, if there is fruit left after two weeks I put less in next time.

Natural habitat

This species was very common at Bau, it took only five minutes to collect twenty or more nymphs from the steeply sloping, sandy riverbank. I have collected specimens of what appear to be the same species from similar habitats at Tarum in Sarawak (E111°28' N001°34'), Teraja in Brunei (E114°25' N004°17') and Singai Ratu Miri in Kalimantan Tengah (E113°35' N000°40'). The area around Bau is lowland rainforest with numerous large outcrops of limestone. The riverbank is largely

sand, there is no obvious vegetation in the river, but there are large numbers of fallen trees, branches and leaves both on the bank and in the river. The banks of the river are covered with trees which overhang the river; little, if any, sunlight ever falls directly on the riverbank. The bed of the river is a mixture of sand and gravel. All rivers in the area are subject to frequent extensive flooding. Air temperatures are typically in the region of 30°C with little variation, humidity is very high and probably never falls below 80% in the area near the river.

I have collected adults of this and similar species at night from the leaves of low-growing vegetation, mainly from small tree saplings. The adults are usually no more than one metre above the ground. I do not recall seeing adults on the sandy riverbank at Bau, however this may not be significant as I have not deliberately looked for them and they would be better camouflaged on the sand than the nymphs.

Behaviour

Adults and nymphs are both nocturnal and not seen during the daytime when I think they hide in the leaf litter. Adults rest on leaves of low-growing plants and remain still when approached, however once touched, or before if the collector is wearing insect repellent, they become extremely active, running along the plant and dropping to the floor where they scuttle into the leaf litter and usually escape. The best method of collecting seems to be to ease a plastic bag over the leaf and insect, then knock the cockroach into the bag, closing it quickly.

Nymphs walk about on the riverbank and run under the piles of decomposing leaves when approached. Nymphs near the water will run into the water and continue running under the water, on the river bed, eventually stopping and holding on to a stone or pieces of wood; they remain under water long enough for me to become bored!

In captivity both adults and nymphs hide under the dead leaves in the cage, wriggling into the substrate until their back is level with the surface; neither show any inclination to burrow below the surface. Adults and nymphs can also be found resting in the water (without having been chased there first). Sometimes after the light has gone out the adults will climb to the lid and rest on the light fitting, this may be to get the warmth from the light fitting or may be a desire to climb (there is nothing else in the cage on which they could climb). The adults are very fast runners and because the cage has such a large opening I try to disturb them as little as possible.

The males display to the females before mating. The male stands next to, or walks around the female with both his elytra and wings held vertically above his back. I have seen this display on two occasions, on both it took place on the lid of the cage in the early hours of the morning; the display lasted for at least ten minutes, I did not attempt to watch for any greater length of time.

Current status of the culture

The first captive reared generation became adult in early 1996, about nine specimens. One pair was given away at the Blattodea Culture Group meeting in May. Unfortunately my culture suffered from neglect during the summer of 1996; the water bowl dried out, and I now have only one pair left alive. They seem easy to keep in the conditions described above so maintaining a long-term culture should be possible – providing they are kept supplied with water!

Ornamented woodlouse in Gateshead

by Wayne Clynes (10927)

Ryton Willows Warden (Department of Leisure Services), Thornley Woodlands Centre, Rowlands Gill, Tyne & Wear NE39 1AU.

I would like to tell you about one of my latest invertebrate finds on Ryton Willows which you may find interesting. Recorded on 10.3.96 and 28.3.97. I have started a mapping programme for Arthropods in Gateshead because when I looked through our recorder system I found that for the whole of Gateshead there were only three records of Isopoda (woodlice), all from one quadrat, which is very poor.

While looking at different sites and recording species I was lucky to find under an old railway sleeper next to the Curling pond marsh (OS NZ154 647) a colony of *Haplophthalmus mengi* the Ornamented woodlouse. The woodlice in this spot will have to be looked at again this season to see if any of the other Ornamented species are present in this colony.

As far as I can tell this record could be the first for Gateshead and may be the first record for the north-east, but information for this species seems so hard to obtain.

Dancing with Dinosaurs

And on the golden morn
Who will put butterflies on her brow and at her feet?
I see her neatly whorl around
And wonder at her artist's skill –
Of dance, of paint, of brush.
She captures flight's rhapsodic sweep.

Dreaming of Lara,
Another time, a place, we marched silently
Footsteps cushioned by the snow
Brotherhood for all in the manifesto
Of her chestnut eyes.

I've been here before,
Held in thrall, a maiden sways
And says it all a thousand ways.

A reassuring tug,
The music brings me back, a gentle chide,
A host of guys and gals sway in artificial mist
Play on –
Each step and gesture a creative urge
To sculpt and morph
Some force explained in terms of dance,
A semaphore,
It's in the bones,
Played out beneath this vaulted sky.

I've been here before but not quite like this.
Dancing with dinosaurs, a manic rock-opera.
My cherished boyhood friend
Balanced on her plinth of wired bones,
Grins approvingly.
Diplodocus, old Jurrasic chum,
Gently sways.

In this brick cathedral gargoyles leer,
Sharp-toothed bat-stares, stone simian smiles
Look down on our electric firedance,
Eternal rite –
Stroboscopic butterflies flock and pass before the stage,
Fly the curtained walls, the floor, the dreaming night.

As young Will said:
Perchance to, but that's the problem,
What metamorphoses out of dreams is strange,
Like fish deep in glacial slumbers arise and sway,
Like our season's frantic hop we hold and spin,
Tap and feel, pulse and twist the Mayfly night away. *Don McNamera (5573)*

Notes on Beekeeping in the Georgian Republic

by Murray Eiland (9731)

1110 Eagle Nest Court, Danville, CA 94506, USA.

During a recent trip to Caucasian Georgia, one of the countries that made up the former Soviet Union, I was interested to find that Georgian beekeeping continues, despite the fact that the bee museum had closed. Fortunately, there was some printed material available, and the Director kindly answered questions on what equipment was still available for study. There were apparently three types of hive used in Georgia before the introduction of the European type in about 1950, which completely replaced traditional methods. The most common was the log hive. Placed either in a tree four or five feet above ground, these hives varied in length, but many were about four feet long, although there were shorter examples. They were serviced through a lid that ran the length of the hive and divided the two sections into roughly equal parts. The opening, perhaps ten inches long, was located in the centre of the hive along the boundary between the two halves, and was often provided with a small wooden landing strip. Unlike bark hives, these examples were clearly made from hollowed logs. There were also hives similar to the latter type of hive but for their vertical position. These hives clearly offered little space for the bees and would prove to be more difficult to access by the apiarist, although they required less skill to build. A typical example of "forest" type beekeeping, there is apparently no evidence as to the antiquity of the log hives in Georgia.

Other hives were also in use, particularly skeps. A typical example was perhaps two feet high with a flat base a little over a foot in diameter, and these baskets quickly tapered to a small and easily defensible opening that was smothered with daub. From what I could understand bees in Georgia are harassed by wasps, although as yet there is little problem with pests such as the wax moth. There were also fantastic hives – with mythical or amusing figures – on display, but these examples were not related to traditional beekeeping.

From information that I obtained from the Director, I found that Georgian bees – which apparently have not been hybridised with German and Italian strains – are now kept in European style hives. In order to keep stock pure they can export but not import bees into the region. By temper they are not aggressive and are easy to manage, and they will work in a wide range of temperatures. They behave like

European bees when subjected to smoke. The most particular physiological trait of the bees from this region is that for their size (they are small to medium sized by European standards) they have a very long tongue.

In order to fertilise a range of plants and obtain varied honey products, the bees are set at low tropic levels to exploit Acacia in particular, and from the information that I received this tree is almost impossible to exploit by European bees because of its long flower. Hives are also taken above 3000 metres, but at this height, due to rapid changes in weather, they must be monitored. Alpine regions are particularly favoured for annual plants. The Apiarists Union is a state-run organisation of private bee-keepers who pool their products together for sale. Their output for 1995 was as follows:

Honey	– 30,000 kg/year
Royal Jelly	–1000 kg/year
Propolis	– 5000kg/year
Venom	– 100 kg/year
Bread	– 100 kg/year
Queens	– 20,000 year

I have sampled some of the honey, which has a distinct flavour and should be of interest to the open market. Like many other industries in the region, however, the relative isolation of the Georgian Republic does not favour exchange, although they are eager to receive up-to-date technology. The Apiarists Union may be contacted at: 380100, The Republic of Georgia, 15a Tamarashvili Street, Apiarists Union of Georgia, Head of Presidium - Zara Menteshashvili.

Request for help

I would be very grateful if any members know of, or have access to, specimens of the Mazarine blue (*C. semiargus*) with data labels bearing any kind of the following key words: Epworth; Lincs.; Hudson.

I require this information for research into the Epworth colony of this long extinct butterfly. If anyone can help would they please contact: Ted Rimington, 8 Riverside Drive, Sprotborough, Doncaster, South Yorkshire DN5 7LE.

Spring butterflies in Cambridge

by Brian O.C. Gardiner (225)

2 Highfield Avenue, Cambridge CB4 2AL.

March has been an unusual month in Cambridge with all the signs of global warming present, although it has often been cold at night with occasional frosts extending even into April. The days, however, have been warm and sunny and the rainfall almost non-existent – only about half a centimetre over the past five weeks! Although not as early as last year when the first Red admiral (*Vanessa atalanta*) was seen in January, the first butterfly to appear was a Brimstone (*Gonepteryx rhamni*) on 2nd March and this was rapidly followed by both Peacocks (*Inachis io*) and Small tortoiseshells (*Aglais urticae*). All these three species then continued to appear regularly throughout March and finally on Easter Monday, 31st March, no less than three Holly blues (*Celestrina argiolus*) and a Green-veined white (*Pieris napi*) put in an appearance. During the first week of April not only did Holly blues appear every day in my garden but everybody I spoke to mentioned, or asked me to confirm, that the butterflies they had seen in their gardens, which were spread throughout Cambridgeshire, with one indeed in Essex, were indeed Holly blues, so it looks as if this species has got off to a flying start in 1997.

Early butterflies in north Wales

by William C. Casebourne (5118)

3A The Oatlands, West Kirby, Merseyside L48 7HN.

It may be of interest to hear that on the 30th March 1997, a warm sunny day, I saw four butterflies on a large bed of early flowering heather in the garden of a house 1100 feet above sea level in the Berwyn mountains in north Wales.

Upon inspection these were found to be a Small tortoiseshell and a Red admiral, both in fair condition, and to my amazement a Comma and a Painted lady, both very battered but thoroughly enjoying their unexpected feast.

In mid-April the Berwyn Moors were almost swarming with Emperor moths.

A visit to Prees Heath, Shropshire, and Hem Heath and Burnt Wood, Staffordshire

by Jan Koryszko (6089)

3 Dudley Place, Meir, Stoke on Trent, Staffordshire ST3 7AY.

ON 13th August 1996, in the company of Charles Byatt and Derek Heath we set out for Prees Heath in Shropshire. The weather was fine and sunny, we arrived around 11am. We saw only two female Silver-studded blues *Plebejus argus* but quite a few Common blue *Polyommatus icarus,* Small copper *Lycaena phlaeas* and Small skippers *Thymelicus sylvestris.* The most common moth was the July belle *Scotoptery luridata plumbaria* Fab. On the gorse bushes we also recorded a single True-lover's knot *Lycophotia porphyrea* D.&S. on heather. The Painted ladies and Silver-Y were very common in the area.

We then moved on to Burnt Wood, Staffordshire. Our first sighting was the Dark marbled carpet moth *Chloroclysta citrata citrata* L. Along with a number of common species, we came upon a patch of thistles and, what a sight for sore eyes, we counted 70+ Painted ladies *Cynthia cardui* on the small patch of thistles, along with Peacocks *Inachis io,* Red admirals *Vanessa atalanta,* and one Comma *Polygonia c-album.* Speckled woods *Pararge aegeria,* Gatekeepers *Pyronia tithonus,* around a dozen Large whites *Pieris brassicae* and 40 or so Silver Y's *Autographa gamma* were also counted – it was a sight we will never forget.

We then moved on to Hem Heath Wood where our first moth was a Small fan-foot *Herminia nemoralis* Fab. We also sighted the beautiful burying beetle the Sexton beetle *Necrophorus vespillo* but no dead animals were found, so it may have been flying through the wood. We then came to a small pond and I netted a fine male Southern hawker dragonfly *Aeshna cyanea* and let it go after identification. Again Silver Y's and Painted ladies were very common.

To make the diary effective contributions are needed from members. Any relevant items should be sent to the *Bulletin* Editor. No charge is made for entries. Please allow three months advance notice.

JULY

5th ***Moths and butterflies at Bernwood.***
10am. Meet at main Forest Enterprise car park, Bernwood Forest, Bucks/Oxon border. SP612117.
Meet at the car park to view and release moths caught the previous night. Followed by a guided walk around this famous butterfly site. Organised by Forest Enterprise. There will be a small charge for this event. (If you would like to join in with the moth-trapping on Friday 4th July please contact Martin Harvey) Joint with Butterfly Conservation.
I: Martin Harvey 01491 671889.

5th ***Dragonflies and people – The first Corbet lecture.***
At the National Dragonfly Museum at 5.30pm.
The first lecture in the museums series given by Philip Corbet will be entitled "Dragonflies and People". The programme will be divided into two parts: first, the Lecture, and then a Buffet Dinner, enabling guests to circulate freely and to meet Philip. Tickets for the Lecture will cost £5 and tickets for the Lecture and the Dinner (including wine) will cost £15. Places can be booked by sending a cheque for either £5 or £15 to the information address.
I: National Dragonfly Museum, Ashton Wold, Ashton, Near Oundle, Northants PE8 5LZ. Tel: 01832 272427.

12th ***West of England Creepy Crawly Show.***
At Newton Abbot Racecourse, Devon.

12th & 27th ***Dragonflies and Waterplants.***
With K. de Koenigswarter and Stuart Irons. 10.00am – 5.00pm.
For further information please send SAE to the information address. Courses cost £25 per person (including lunch).
I: National Dragonfly Museum, Ashton Wold, Ashton, Near Oundle, Northants PE8 5LZ. Tel: 01832 272427.

13th ***Hidden Gems: Summerhouse Hill and Stargate Pond.***
2pm – 4.30pm. A three mile stroll taking in the orchids of Path Head Meadows, the dragonflies of Stargate Ponds as well as the panoramic views and butterflies of Summerhouse Hill.
Meet: OS Map ref. NZ 163 633 off the A695 (West) in the lay-by on Stella Road, West of Blaydon roundabout.
I: Matt Hawkins or Don Attkinson. Tel: 0191 477 1011 ext. 3442.

20th ***Butterflies, Bugs and Beetles of Ryton Willows.***
2pm – 4pm. The afternoon will be spent exploring the woodlands, grassland and ponds for different types of invertebrates. All information gathered will be used to help protect this site for the future interest of naturalists.
Meet: OS Map ref. NZ 152 647 at Ryton Willows on the village green near Ryton Church, approximately quarter of a mile north of the A695.
I: Wayne Clynes. Tel: 01207 545212 (Thornley Woodlands Centre).

AUGUST

2nd ***AES conservation field meeting at Devil's Spittleful, near Kidderminster, Worcestershire.***
A field meeting at this Worcestershire Wildlife Trust reserve, one of the few remaining areas of heathland in the county. The aim is to record a wide range of invertebrates and to provide a chance for entomologists who live in or visit the county to find out more about local recording and conservation activities. Joint with BENHS. 10.30am for daytime meeting, 8pm for moth recording. Contact leaders for directions/meeting place.
I: Geoff Trevis 01905 774952
or Martin Harvey 01491 671889.

2nd ***LCES Field Meeting (inc. moth trapping)***
At Waunfawr, Caernarfon. Meet at Mike Hull's house at 2.00pm. Specialities include Ashworth's rustic, Weaver's wave and Welsh wave.
I: Mike Hull. Tel: 01286 650550.

SEPTEMBER

10th-12th ***Entomology '97.***
University of Newcastle, UK. First National Meeting of the Royal Entomological Society to run concurrently with the Society's Symposium on Population Ecology.
Further information available from: The Registrar, Royal Entomological Society, 41 Queen's Gate, London SW1 5HR, UK. Tel: +44 171 584 8361. Fax: +44 171 581 8505. e-mail: reg@royensoc.demon.co. uk
I: Martin Harvey (01491) 671889).

14th ***LCES Field Meeting***

At Whitegate Way (Leaf miners). 11.00am start (but will not be returning to cars for lunch) at Whitegate Station Car Park (SJ 617678).
I: Mike Hull Tel: 01928 722274/Bill Hardwick Tel: 01606 594778.

21st ***Nightwalk at the Thornley Woodlands Centre***

7pm – late. A walk in the twilight world when everything in the woods take on new shapes and sounds. You will have the chance to see and hear owls and bats. There will be a mercury vapour moth trap running and there will be a display of specimens previously collected in the Derwent Walk Country Park. All identification guides will be available on the night.
Meet: OS Map ref. NZ 178 604. Thornley Woodlands Centre, two miles south of Swalwell roundabout on the A694 Swalwell to Consett road.
I: Wayne Clynes. Tel: 01207 545212 (Thornley Woodlands Centre).

OCTOBER

4th ***AES Annual Exhibition***

Kempton Park Racecourse. 11am - 5pm. Entrance free to members on production of pass (to be issued with August *Bulletin*).
Information on stand booking to Maxwell Barclay, advertising in show guide and all other queries to Wayne Jarvis at usual PO Box address or phone 0976 828142.

21st ***LCES First Ordinary Winter Meeting***

at Liverpool Museum commencing at 19.00hrs. Review of the 1997 season.

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THE AMATEUR ENTOMOLOGISTS' SOCIETY

ANNUAL EXHIBITION, 1997

Saturday, 4th October

11 a.m. to 5 p.m.

KEMPTON PARK RACECOURSE,
STAINES ROAD, SUNBURY, MIDDX.

ACCESSIBILITY: The Racecourse is easy to reach by road and rail, and there is adequate free car parking. The M25 is very near and is linked to Kempton Park by the M3, which is less than a mile away. Sunbury Railway Station with trains from Waterloo, is a short walk away. The site is served by two bus routes, Green Line No. 290, and Red bus No. 216. Both these buses stop right outside.

ADMISSION: *Members free* on production of pass to be issued with the August Bulletin.

PARKING: in the free car parks *only*. NOT outside the Grandstand. Keep all entrances clear.

EXHIBITORS AND DEALERS ONLY will be admitted between 8 am and 11 am.

TROLLEYS are not provided and provision should be made for heavy loads.

ENTOMOLOGICAL DEALERS are attending.

REFRESHMENTS: Full facilities are available. All food and drink to be consumed in the Refreshment Area.

SURPLUS MATERIAL: will be welcome for sale on behalf of the Society's funds.

ANSORGE BEQUEST: Cash prizes and certificates to Junior Members for exhibits at the Exhibition.

LIVESTOCK: It is the duty of both dealers and buyers to ensure that all livestock is kept in containers which are roomy, hygienic and secure against any possible escape.

EXHIBITS which show long series of wild-caught, rare or endangered species will not be allowed.

ALL ENQUIRIES:
The AES, PO Box 8774, London SW7 5ZG.

The Bulletin
of the Amateur Entomologists' Society

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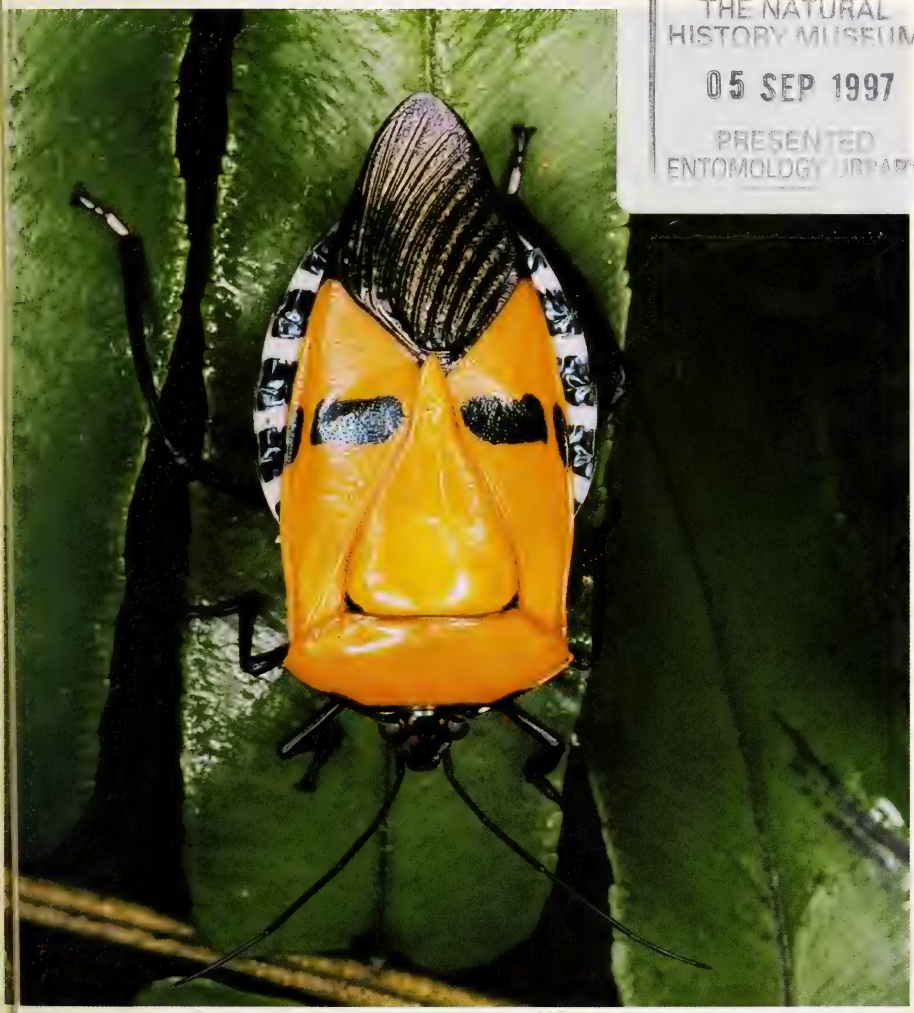

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The Amateur Entomologists' Society

Founded in 1935

Where to write

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Advertising Rate: The following charges apply to adverts in the body of the *Bulletin*. Full page £60, Half page £40, Quarter page £25. Insert charges available on request to Advertising Secretary, address as above.

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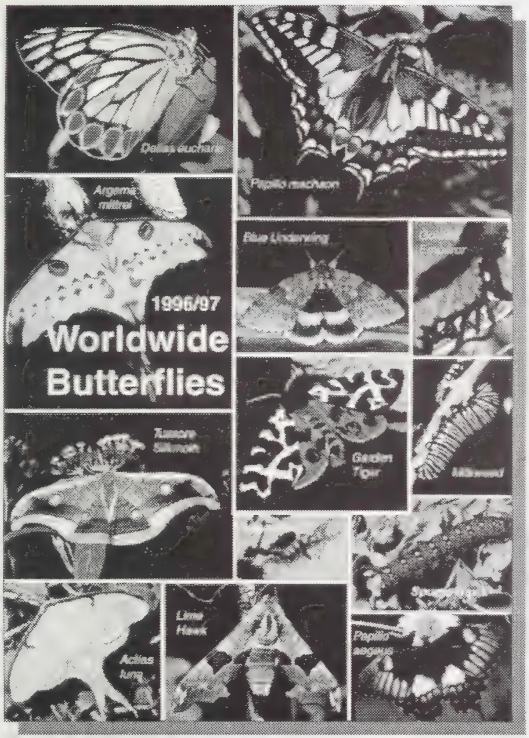
Sherborne, Dorset, DT9 4QN. *Tel 01935 74608 Fax 29937*



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Please mention AES.
50p in stamps would be greatly appreciated.

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EXHIBITION NOTICE

AES ANNUAL EXHIBITION

SATURDAY, 4th OCTOBER, 1997

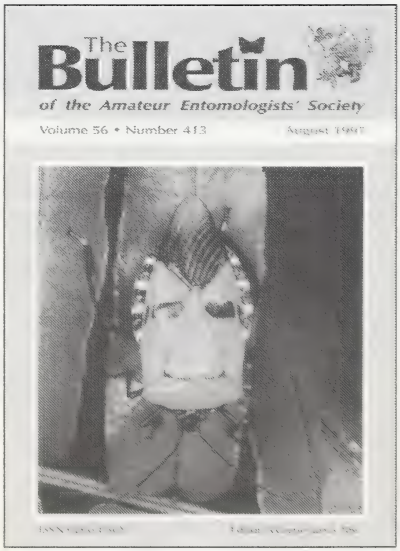
KEMPTON PARK RACECOURSE
Staines Road, Middlesex

Doors open at 11am

Admission £1.50 Adults, 50p Children

Members free on production of pass to be issued with this *Bulletin*.

For further information please write to:
The AES, PO Box 8774, London SW7 5ZG.



The cover of this issue of the Bulletin features the Man faced beetle, *Catacanthus incarnatus*.
The insect is not a coleopteran, but is actually a hemipteran.

Photo: Paul Brock.

The Bulletin
of the Amateur Entomologists' Society

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Editorial

We are fast approaching Exhibition time again, and with this issue of the *Bulletin* is your pass to the exhibition and an application form for an exhibit/trading space. We are not entirely sure what the layout of this years Exhibition will be as there is rebuilding work currently taking place on the Exhibition Hall. However, in an attempt to attract more exhibits, we are looking to situate the exhibit area in a more secure place. Although we have never had any exhibit damaged or taken whilst at the Exhibition, Council agrees that an increase in security would be beneficial to all.

I apologise to all members who experienced a return of mail from the PO Box address since the publication of the last *Bulletin*. We are not entirely sure what happened during the few days of the Box closure, but it was caused due to an error by the Post Office, and was quickly rectified.

We were somewhat disappointed, however, by the lack of response to Reg Fry's note in the June issue of the Bulletin. As a Society we are attempting to provide members with the services that they want, but it is becoming increasingly difficult to do this as we are getting less and less feedback from our members. Membership is slowly decreasing, and costs due to the increased amount of colour in the Bulletin are rising. As was mentioned previously, if you know of somewhere where we can advertise the Society by distributing our prospectus, or know a friend who may be interested in joining, please contact us. We also need help in informing primary and junior schools about the Bug Club. The cost of mailing these individually is far too much for us to consider, but by telling your local school about us, we should be able to increase our membership. At the end of the day, the more members the Society has, the cheaper the cost per member and the less we have to charge you to be a member of the Society.

As always, all suggestions about the services that we can provide are welcomed. Remember we are your Society. I hope that you will be able to attend the Exhibition on Saturday 4th October, and I look forward to meeting you.

Wayne

Life and habits of the clothes moth in relation to the pianoforte

by Brian O.C. Gardiner (225)

2 Highfield Avenue, Cambridge CB4 2AL.

I was recently presented with an aged leaflet by a friendly bookseller I am on good terms with and who knows my interest in all things entomological. It bears the above title and was issued by the Army & Navy Stores Ltd, which still exists in Victoria Street, London. From its internal evidence of prices and phone number, I would place it to the 1920s. It makes interesting and amusing reading, as follows.

Prevention and Extermination: Life

Emerging from cocoon, early mating takes place, and, within 24 hours after pairing, eggs may be laid, and laying may continue from two to 24 days or be completed in 24 hours. Seven to ten days is usually the period for eggs to hatch out in the form of caterpillars. After hatching, the caterpillar may attain maturity in three months, when it ceases to feed. At this stage it constructs a cocoon and becomes a chrysalis, emerging some two weeks later as a moth. Forty to sixty is the approximate number of eggs laid by the female, and when egg laying is finished, the female dies, but the males may remain active and breeding for three or more weeks.

The life-cycle may continue throughout the year, but June to October is the usual period for the appearance of the adult. Temperature, humidity, quality and quantity of food supply are factors that may accelerate or retard the process.

Habits

In the winged state moths cannot do damage as they are incapable of feeding. The sole purpose is to reproduce their kind, and in this respect only are they harmful. Actual damage is caused by the caterpillar, which, immediately after hatching, feeds upon felts and cloth under keys of the piano, cloth parts of action and hammer felts. The caterpillar usually feeds voraciously, and only on reaching maturity does it cease to do so.

Experiments carried out at the British Museum (Natural History) show that at a temperature of 65°F the entire life-cycle occupied 16 weeks and three days – *ie.* eggs laid 16th May hatched into caterpillar 20th May, existing in an active state to 12th August, then became a chrysalis, and emerged from the cocoon as a moth on 29th August.

Precaution

Should a moth enter a room, a place likely to be chosen for the deposition of eggs is often under the keys or on or underneath the felt on the back of the key frame. Therefore a room containing a piano should be kept spotlessly clean and all likely breeding places frequently disturbed. The interior of a piano must also be kept clean and a "Mothite carton" hung inside the top as near to the action as possible; also contents of a "Mothite sprinkler" should be sprinkled between the opening of the keys, where it will deposit itself below in one of the most dangerous breeding grounds of this pest. Infallibility is not claimed for this method, but the risk of egg deposition is reduced to a minimum.

Extermination

A piano having been severely attacked by moth, the eradication of all affected parts is essential; it may be necessary to remove and replace certain parts attacked or liable to harbour eggs. Where unhatched eggs of caterpillars are found, although no actual damage has been done to prevent the piano functioning in a proper manner they should be brushed from all affected parts, and the interior of the instrument thoroughly cleaned. The whole interior, including all woollens and felts, should then be treated with a strong insecticide. Successful treatment requires specialised knowledge, and is best left to those qualified to carry through the work in a skilled and proper manner.

Points to note

Dirt in piano or room attracts moth. Pianos kept clean and constantly used are seldom attacked by moth. Frequent inspection for signs of moth is advised, and, when discovered, immediate steps for eradication should be taken. Delay is dangerous. Eggs being so minute are difficult to detect, and until the caterpillar appears are not usually noticeable. Eggs hatched in a piano may infect other woollen and cloth materials in the house. When a piano has been freed from moth, and to prevent a recurrence of the trouble, take precautionary measures.

Moth eradication service specialised by the Society.
Efficiency has been attained by long and thorough tests.

Section 1: Cleaning and preparing key frame, action and interior – saturating and spraying all parts with solution 1.A.N. Destroying clothes moth in all stages and entirely freeing the piano from the pest. The work is executed at customer's residence. Cost of service within eight miles of the Store is – Upright piano £2-2-0; Grand piano £2-12-6.

Section 2: The action and key frame are removed to factory and treated as in Section 1. An application of solution 2.A.N. is then made which renders the material impervious to the ravages of the caterpillar. The action and key frame are then returned, re-assembled and regulated. This process is effective up to three years with a possible permanent result and is not injurious to the materials. Cost of service within eight miles of the Store – Upright piano £4-4-0; Grand piano £5-5-0.

MOTHITE (Carton) A CLOTHES MOTH PREVENTIVE (Prepared and sold only by the Society). Moth will not deposit eggs in pianos or other receptacles where a "Mothite" has been installed. Only requires hanging inside, and will remain effective over a period of twelve months. Price 1/9 each. Equally suitable for use in wardrobes, linen chests etc.

Small tortoiseshell butterfly attracted to glue vapour

by Jan Koryszko (6089)

On the 1st December 1996 I was using some Bostik all purpose glue in my kitchen when a Small tortoiseshell (*Aglais urticae*) flew circles around my head. No doubt the strong smell of glue awoke the butterfly from hibernation (I had left the kitchen door ajar) and the Small tortoiseshell must have been roosting in my toilet. Perhaps although in a state of hibernation, the "sense of smell" is still very strong in the butterfly.

Magnificent Malaysian Insects

by Paul D. Brock (4792)

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My fourth trip to Malaysia in May 1996 allowed me to check out jungle walks in areas I had not previously visited and presented opportunities to obtain further photographs of yet more spectacular insects. Malaysian insects are amongst the largest, most colourful species in the world and whilst my main objective was to search for different stick-insect species by torchlight at night, I came across many different insects on my travels.

Sarawak

My well-planned 1996 visits were to take me to Sarawak in East Malaysia, then to fly to Kuantan in Peninsular or West Malaysia, before finally driving to Fraser's Hill, staying at pre-booked hotels, each within a short walking distance of jungle walks. I prefer to make a daytime walk on a jungle trail to assess its suitability for an evening trek and to try to familiarise myself with any "difficult" aspects, including fallen logs, or changes in footpath route. Several species of winged and wingless stick-insects (Plate 97M, figs. 1 & 3) were found at night towards Mount Santubong, Damai Beach, including adults and many nymphs of one of the commonest species from Sarawak, *Acacus sarawacus* (Plate97M, fig. 2). This stick-like wingless species is fairly variable in appearance, ranging from plain greenish, brown or grey, to various mottled patterns, with females measuring 76-90mm from head to tip of abdomen, males 67-71mm. An interesting diversion from stick-insect hunting was watching colourful butterflies in the daytime and fire-flies (beetles with a green "glow" at the end of their bodies), "lighting up" at night. Fireflies are a popular tourist attraction in Selangor, Peninsular Malaysia, with some night-time excursions to view the many tiny, bright lights. Non insects, such as a giant scorpion, were also spotted.

Peninsular Malaysia

The stick-insect fauna of Peninsular Malaysia usually consists of different species to those found in East Malaysia. Several different species were found at each of Telok Chempedak, near Kuantan and Fraser's Hill (Pahang) (Plate 97M, fig. 4). The first locality is a seaside resort, and the second a hill resort, both very popular with tourists and locals alike. I only spent two nights at Fraser's Hill and the first evening

was rather wet, which encouraged leeches to appear in greater numbers than usual. However, despite the presence of rain clouds, the next night was dry and more favourable for insect life. I stayed in a fourth-floor apartment and early next morning it was a pleasure to observe some magnificent insects on and around the balconies, which had been attracted to the lights overnight. The list of finds included giant and smaller cicadas, larger silk-moths, including the dark-veined *Antheraea helferi borneensis,* hawk-moths, moths galore, rhinoceros beetles (Plate 97N, fig. 5) (of which only one attractively horned male was found, along with many hornless females) and longhorn beetles; altogether a very attractive assortment. Silk-moth cocoons of several species are, of course, very popular for their silk qualities in various parts of Asia. I drove to one tourist attraction, the Keladi silk factory, near Pekan, a scenic one-hour drive from Kuantan. (However, for those who wish to observe the whole process, a visit to Worldwide Butterflies at Sherborne, Dorset, is much more educational.)

Man face beetles

I missed observing the beautiful green and black birdwing butterflies *Troides trogonoptera brookiana* by waterfalls on this particular trip, but did see a number of gold and black *Troides* specimens. These are always a pleasure to observe, especially when they are in groups. Without a doubt a beautiful insect, whose name has an obvious meaning, is the "Man Faced Beetle" *Catacanthus incarnatus* (a bug, not beetle) (Plate 97N, Fig. 6 and front cover). Another highlight was to observe the rare, yellow female form of the large, bulky stick-insect *Heteropteryx dilatata.*

Further reading

I strongly recommend a magnificent photographic book on peninsular Malaysian insects by Kazuo Unno (with minimal text in Japanese):

Unno, K. (1989). *The Orchid Mantis and Insects of Malaysia.* Nippon Television Network Corporation, Tokyo (ISBN 4-8203-8919-X).

My book *The Stick and Leaf-insects of Peninsular Malaysia and Singapore* will shortly be published by the Malaysian Nature Society and includes colour photographs of some of the most attractive species, in addition to sketches or photographs of almost all other species, with a number of new species described. This will be the first book dealing with tropical stick and leaf-insects and covers their distribution, habits and foodplants (where known), along with formal descriptions of each species.

A survey of Roesel's bush cricket near Spurn, East Yorkshire

by John Killingbeck

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This survey of Roesel's bush cricket (*Metrioptera roeselii*) took place mostly between the years 1992 and 1994 following a brief "scout" in 1991. The basic method followed was to count the numbers of stridulating males along given areas. Sound seems much the best way of surveying this insect, since it is very hard to see without a careful search. Unfortunately loud and constant stridulation only occurs in bright warm sunshine, so clear stable weather is required for a thorough survey. Stridulation will occur in dull conditions but is much more erratic and often fainter. It is possible that the cricket may occur in other parts of the Humber estuary or even further away. Other surveys may reveal this.

General information

Roesel's bush cricket is a fairly localised insect in Britain, most common in the south-east of England, particularly the Thames estuary. The Spurn colony is the only one known in Yorkshire and also one of the most northerly in Britain. In this respect the cricket is one of the most important biological features of the Spurn peninsula, perhaps on a par with such birds as the Little tern. The cricket is known to feed mainly on grasses and occasionally small insects. Its eggs are said to be laid in plant stems. Stridulation is a surprisingly penetrating and high-pitched continuous buzz, not unlike the crackling of electricity in pylon wires. The sound may be familiar to summer visitors to the Spurn area. It is therefore surprising that the species does not seem to have been recorded until 1930 (by W.D. Hincks in 1947) and then only in small numbers. Little more mention was made of the insect until the mid 1970s when two separate observers (E.C.M. Hayes and M. Limbert) made small records. A more organised survey between 1974-1980 revealed more widespread distribution and density in which the song is described as "a major feature of that area" (Long Bank) in 1980 by J. Biglin and S.A. Moran. Most of the sites in this survey were "in each case associated with a drainage channel". This broadly remains the case in the current survey, indeed it is interesting to note the general pattern of distribution which seems to coincide with previous salt marshes, now farmland, exemplified by the "Marsh

Cottage" area. Almost any ditch in farmland south of Easington may potentially harbour a cricket population.

Distribution of Roesel's bush cricket at Spurn

Long Bank appears to be the core of the cricket population at Spurn and it is vital that this area in particular is well protected. Most other areas are less densely populated and some of the outer populations may not be permanent. Some fluctuations were noted in the four years of the survey, for example, Beacon Lake (reduced), Soak Dyke (expanded).

Key

x = isolate groups with numbers in bold

The areas below refer to the map. The first records are from 1991/2, the second 1993/4.

Long Bank east (1): This is the most densely populated area with about 160+ males recorded.

Long Bank west (2): Also densely populated, about 140 males recorded.

The Long Bank population occurs for a little way along the dividing road verge from about Kilnsea Grange towards but not reaching Firthholme Farm, also in small numbers along some of the adjacent ditches.

New Bank (3): When first surveyed in 1991 after it had been mown, there were no crickets to be heard. In 1992 before mowing took place, 33 males were noted, mostly to the south.

Long Bank (from New Bank to Howlsons Well) (4): 58 singing males mostly to the south.

Nature Reserve (5): Generally only thinly scattered in dunes and grassy areas. It has been suggested that periodic inundation by the sea restricts cricket numbers here but it may also be due to the vegetation being too sparse. The provision of this particular reserve is obviously no guarantee of the insects survival.

Grassy meadow (6): A good area of long grass which is well though not densely populated with around 40+ males recorded.

Beacon Lane (7): 22 males recorded in 1992 but seem to have declined recently. In 1991 they were noted from the Kilnsea roadside.

Small meadow (8): About 27 recorded from the areas with long grass. Absent from short grazed areas.

Soak Dyke (9): A thin scatter of crickets along here culminating in a colony of 25 or so at Winsetts Clough. This seemed to have spread a little further west in 1994.

Marsh Cottage (10): A number of crickets were found here in 1991 and in the field borders in 1994 in groups ranging from two or three to twenty.

In addition to the areas mentioned, crickets are scattered elsewhere as indicated on the map, for example, Easington Bank and nearby roadside. A fair number have been located in the ditches around Kilnsea Grange.

It is interesting to note that in the last few years there appears to have been a rapid expansion of *Metrioptera roeselii* numbers in the south-east of England with a greater number of totally new sites discovered (Orthoptera Recording Scheme newsletters). This expansion does not seem to have occurred in the Spurn population. This has led to the suggestion that it is genetically distinct from the southern insects. Certainly there is no obvious reason why it continues to cling to its old saltmarsh habitat at Spurn whilst readily invading set-aside land and roadside verges further south.

Habitat requirements

In general terms it would appear that the cricket requires long uncut grassy vegetation of reasonable density with good exposure to the sun. It is notably absent from sparse vegetation and short grass. Cutting of the grass seems to cause a crash in numbers. Whilst grass seems to be the most favoured habitat, with perhaps sea couch and false oat grass the most favourable, many insects are to be found in coarser herbage of nettles and brambles. They also show some ability to colonise waste ground which contains enough long grass.

There is a tendency for the cricket population at Spurn to follow drainage channels. However, this may be largely coincidental with the fact that these are the areas most often containing the long grass habitat. In most parts of Europe, ordinary meadows are widely occupied.

Conservation

It would seem that for Roesel's bush cricket to thrive, the provision of extensive areas of unmown grass is important. Where mowing is essential it would be preferable if it could be carried out on a small scale, not too extensively with long grass corridors between known colonies and beyond, which may strengthen the population and even allow it to expand.

Interesting possibilities arise in the future conservation of this (and other creatures) in the Spurn area. The advent of set aside and the removal of farmland from production into coastal managed retreat offers exciting possibilities of restoring saltmarsh habitat. The amenity

and biological value of Spurn is now widely acknowledged and would greatly benefit from a more extensive "wild" aspect with perhaps more rough pasturage and wetland spreading out from its currently very marginalised status. All of these would offer the chance for Roesel's bush cricket to expand its range. It is interesting to speculate whether the existing population is an advanced guard of northward British expansion or whether it is a shrunken relic of a once much larger population hanging on from the days when the marshes covered great acreage.

Superficially at least, the habitat needs of Roesel's bush cricket do not appear to be specialised or unusual. The greater mystery is why the insect is confined to such a small area of the county. Subtle climatic effects are one possibility. This is on average the sunniest corner of Yorkshire and also one of the driest parts, combined with slightly higher minimum night time temperatures than inland, with a reasonably long growing season. Daytime temperatures are often low, with chilling sea breezes and mist. It seems likely that the Roesel's bush cricket would be responsive to small climatic change in so marginal a location as Spurn and will make a good indicator species for environmental change.

Camberwell beauty in Suffolk

by Mark Iley (9551)

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On the 17th March 1997 a Camberwell beauty *Nymphalis antiopa* flew into my garden in Trimley St. Mary, Felixstowe (VC25, TM 372276). The butterfly alighted on ivy, basking briefly in the sun, and I was able positively to identify it. The wing margins were pale with frayed edges suggesting a genuine immigrant. My garden is approximately two miles from the sea. The specimen was not captured.

Grey dagger caterpillar

Scarce merveille du jour caterpillar

Drawings by Frank McCann (6291)

Abstract – A study of the biology and behaviour of *Odontognophos dumetata hibernica* living on *Rhamnus catharticus*

by Jerry Martin

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The Irish annulet (*Odontognophos dumetata hibernica*) is a moth which has only recently been added to the lists of fauna in the British Isles. It is a subspecies of moth, previously known only to exist in Mediterranean regions. As far as is currently known, its Irish distribution is limited to the Burren, in particular the inland regions. I was present with the late Peter Forder when he discovered this moth in the Mullagh Mor region in August 1991. For this reason I have had an interest in this moth and its life cycle for some time. Through carrying out this project, I hoped to learn about this moth's behaviour and life cycle.

In the investigation of this moth and its life cycle, I reared several larvae in captivity. These I monitored on a regular basis, until they underwent metamorphosis to become the adult moth. These adults then were paired and fertile ova were successfully obtained for the first time in captivity. In the field, I noticed the distribution of the larvae at a particular site and also how they competed with the larvae of another insect for foodplant. Adults were obtained in the wild using light traps.

The adult flies for two weeks at the end of August, continuing into September. It has a slate-grey colouring like that of the Burren rocks. The eggs are laid usually one or two nights after mating has taken place. They are laid in the soils and mosses surrounding the foodplant *Rhamnus catharticus,* and are usually inundated by rising waters during the winter. The larva emerges in late spring and feeds for one month on the foodplant. The larva reaches a final length of approximately 25-30mm. It then pupates in the mosses and soil at the end of July.

The moth exhibits a preference of a prostrate variety of the foodplant *Rhamnus*. This is more than likely due to the micro-climate in this region of the habitat. Chemicals in the plant do not play a role as chemical tests for differences between the two varieties proved negative. An investigation of the micro-climate on the various bushes is recommendable.

Grouping behaviour in overwintering 16-spot ladybirds (*Tytthaspis 16-punctata* L.)

by R. Revels[1] (3972) and M.E.N. Majerus[2] (4027)

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The 16-spot ladybird, *Tytthaspis 16-punctata*, is normally buff in colour and is patterned with black spots. It is a mildew feeding species and has the habit of forming large overwintering groups. These groups may comprise anything up to 30,000 individuals. They appear to form in two types of situation; either in exposed positions on rather plain surfaces (the bark of tree trunks, on the sides of dry stone walls, on fence posts, as in Plate 97O, Fig. 7), or in complex herbage such as tangles of dead grass stems (Plate 97O, Fig. 8) or gorse foliage. The reason why particular sites are chosen is intriguing, for very large overwintering groups may be found on one fence post or on one oak tree trunk or in one gorse bush, while other, apparently similar, fence posts, oak trunks or gorse bushes in the area are completely devoid of the ladybirds. This could simply be the result of the aggregating behaviour of the species, so that all individuals in an area are drawn together. However, the sites used seem to remain the same year after year. It is always the same particular post in a fence, or trunk in a group of oaks that plays host to an overwintering group. For example, we know of individual gorse bushes at three sites in Thetford Forest, Suffolk, that have played host to aggregations of this species every year for at least the last ten, when hundreds of apparently similar gorse bushes at these sites are devoid of 16-spots.

Four questions may be asked:

i. Why do 16-spots overwinter in groups?

ii. Why do 16-spots use two apparently quite different types of overwintering sites?

iii. Why do 16-spots use the same site year after year? and

iv. How does each new generation of adults choose the same site year after year when no 16-spot has ever been recorded living from one winter to the next?

Taking these questions in turn, the behaviour of 16-spots may be a consequence of the species' colour pattern. Most ladybirds are warningly coloured, their patterns of two or more strongly contrasting colours serving to advertise that they are distasteful. The buff and black of the 16-spot are certainly contrasting. It is, therefore, possible that in

grouping together these ladybirds create a much more impressive and memorable image to predators who have learnt, or may learn, of the 16-spots unpalatability. This scenario may also explain why some 16-spots group in exposed positions on plain surfaces, for then they are obvious and easily recognised. However, that being the case, an alternative hypothesis must be erected to explain why some 16-spot groups are formed in structurally complex situations such as in the foliage of a gorse bush. One possible explanation is that the warning coloration is an historical but still effective hang-over from evolutionary ancestry, but that an alternative and equally effective strategy has also evolved. In the complexity of herbage that some groups of 16-spot inhabit, the mixture of buff and black may act as an effective camouflage, the black patterning breaking up the body outline. If so, it may be as effective not to be seen by predators at all, as to be seen and recognised as unpalatable.

The third and fourth questions are obviously inter-related. The use of the same site year after year may be a consequence of a scent being laid down by the previous winter's successful inhabitants, *i.e.* those that survive the winter and leave the overwintering site alive. As the 16-spot is a fairly sedentary beetle, rarely being recorded to fly substantial distances, it is easy to see that a mechanism of this type could evolve. Those ladybirds which have the mechanisms to detect and respond to scents, and later lay down similar scents, will gain benefit themselves by choosing a safe overwintering site. Furthermore, they benefit their progeny by communicating a safe overwintering site to them by scent, assuming, of course, that the progeny are still in the vicinity of their parents' overwintering site.

One other point relating to Plate 97O, Fig. 7 is of note. The picture reveals that the group of 16-spots contains one fully melanic individual. This melanic form is referable to the name f. *poweri*. The inheritance of this form is not known. However, Majerus (1991) notes that the form is rare. If it is genetically controlled, it is likely that it arises as a rare mutation. Majerus suggests that the melanic form may be at a selective disadvantage in the winter because, being black, it will suffer greater fluctuations in temperature as a result of the greater thermal absorption and irradiance of dark compared to pale surfaces.

Reference

Majerus, M.E.N. (1991). A rare melanic form of the 16-spot ladybird (*Micraspis 16-punctata* Linn.). *Ent. Mon. Mag.* **127**: 176.

Notes on relaxing butterflies and moths

by Don McNamara (5537)

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One of the joys of winter, if you have the time, is going through your collection and doing a bit of curating, cleaning out, refurbishing – possibly checking your notes and getting your data-labels up to date, filling up the little cardboard pill-boxes with silica-gel or paradichlorbenzine crystals and generally mucking about with butterflies and moths.

Some cabinet specimens may have sprung and it is likely that you have many insects stashed away in papers, either bought from the trade fairs or the butterfly or moth fortuitously caught when you were not prepared for such an event. Often there is little time at the height of the season anyway, so insects are put away to be, hopefully, set during the "quiet" season.

The increasing habit of re-cycling old collections also means that butterflies and moths become available but are sometimes badly set, have corrosive pins or have wings out of alignment.

In October 1996 I was lucky enough to get a chance to do some research and collecting in South America – obviously voucher specimens had to be dried and put into papers because the circumstances were not favourable nor was there time nor space available to do the necessary setting on the spot. I have never been completely happy with relaxing and setting specimens after the event and in the past the results were at best, adequate, mistakes were often made and more likely than not I would put off the event, provided I had data written down somewhere, to some vague future date. As a result I often find neat little boxes with papered specimens dating back many years stored away in safe places. It was not until discussing the problem with colleagues from the Ecuador trip – and then carefully applying what I had learnt there during the Christmas period – that I am now satisfied that I have "cracked it".

Most butterfly books – certainly those printed after 1945 until recently, will have sections on setting and preserving so these can be a foundation upon which to build one's own technique. One book in particular, by Paul Smart, comes closest to describing what I would call the best technique and it is really what underpins my own (new, improved) method. Perhaps the following comments will be useful.

Firstly – all dry material must be handled with extreme care – antennae are a particular problem, especially moths.

(1) To minimise the possibility of damage, don't overpack papered material in the first place and take each paper containing an insect out of the container individually but *do not* take the insect out of the paper.

(2) The prepared relaxing container – the best are airtight snap-on polythene boxes. I put a layer of sterile cotton wool at the bottom. This is covered by a piece of thin plastic-type material, a rectangle cut from a bag of the type obtained from supermarkets. Then sprinkle some crystals of paradichlorbenzine (or crushed mothballs obtainable from most chemists) – to prevent mould.

On top of this place a rectangle of polystyrene upon which the papered specimens or pinned insects are laid – then pins can be inserted to keep the butterfly or moth safe from touching anything. Before putting the papers containing the dried insects into this container I pour boiling water, straight from the kettle down one corner making sure that only the cotton-wool becomes wet. *Do not* put in more specimens than you can cope with during a setting-session. Snap on the polythene lid – store in a safe area, preferably a warm room. The point of this is that if you take out specimens from the papers while they are dry you stand a chance of damaging the insect. I leave the relaxing box for 48 hours before taking out the insects.

(3) Obtain from the chemist two fine needled hypodermics (which you did earlier). Have a cupful of boiling water handy.

(4) Take off the lid and take out *one* papered insect *only,* replacing the lid. Carefully remove it from the paper. The specimen is partially relaxed, the antennae pliable, but still treat with extreme caution.

I hold the insect carefully and immerse the head and antennae just below the surface of the water in the cup, a tricky manoeuvre, try to avoid the wings coming into contact with the water. (If the antennae are not free of the wings or have slipped between the wings gently tease them forward with a pin so that they are so. As they are already fairly pliable there is little risk.) This allows the head to be movable and allows for a good setting position.

Then carefully inject the butterfly with boiling water (by now the water will have cooled somewhat but will still be hot). I inject from *two positions.* Firstly inject the thorax from above, using the spot

where you will eventually pin the insect, gently squirting the water into the thorax cavities. Secondly from below inject the thorax near to where the abdomen joins. This is sufficient to render the insect to a state of complete relaxation – but if in doubt repeat the process. It is a good idea to have tissues handy to soak up surplus water which will come out of various orifices. Depending on how long you take to set a specimen, it is possible that the cupful of water will lose heat so make sure that you top it up anew – the *heat is crucial.*

I am completely satisfied that, with practice, this method will provide the ideal circumstances for well-set specimens. However, re-setting pinned insects is more difficult. The following points may be of use.

(a) Only if it is absolutely necessary and only if the insect has been so badly pinned that re-setting is otherwise impossible – *do not* take out the pin and try to re-pin it.

(b) Basically the technique is the same but injections must be done both *verso* and *recto* as near to the entry and exit of the pin as possible.

(c) Obviously, the very position of the wings on a pinned insect will be different to one taken out of papers so instead of immersing the head and antennae into the water, use a fine-tip art paintbrush and brush the antennae with hot water to enhance pliability, I also put a small blob on the head.

The purpose of two hyperdermics is that you need a tiny needle for tiny insects and perhaps a bigger one for larger insects.

Reference

Smart, Paul (1975). *The Illustrated Encyclopedia of the Butterfly World.* Salamander Books Ltd.

A Dragonfly tip

by Jan Koryszko (6089)

For several years I have been feeding garden birds. Recently I put some dripping fat on a post and noticed a dragonfly land upon it. The dragonfly may have been attracted by the flies, which the fat also attracted, but it did appear to be consuming some of the fat. My friend Mr Derek Heath has also seen this happen and it may, therefore, be a method of attracting and recording dragonflies.

Butterfly paintings – identification requested

by John Tennent (7756)

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Some years ago, my wife obtained a small folio of insect and plant pictures which had apparently lain for many years in a trunk in an attic in Australia. Some were original paintings, whilst others were clearly copies, and all appeared to be the result of that deplorable practice of removing plates from old books for commercial purposes.

The staff in the entomology and botany libraries at The Natural History Museum, London have very kindly been able to identify the original published works in most cases, but three "plates" have defied identification.

The plates depict three northern European or British butterflies: *Pieris brassicae* (not shown), *Maniola jurtina* and *Ladoga camilla* and, within the context of 19th century butterfly books, they are professionally prepared. It is possible that they were never published; *brassicae* and *jurtina* are "complete", in that they depict male and female adults, plus underside, as well as a larva and a pupa, numbered 1-5. The *camilla* however, depicts only adult upperside and underside, neither of which are numbered and *brassicae* has a pen-line botanical outline on the reverse side.

Can anyone tell me if they are from a published work – and if not, can anyone identify the artist?

Fig. 1. A female stick-insect, *Lonchodes strumosus* (Brunner)
(Paul Brock – Magnificent Malaysian insects)

Fig. 2. A female *Acacus sarawacus* (Westwood)
(Paul Brock – Magnificent Malaysian insects)

Fig. 3. *Anarchodes* sp., described as a new species in my forthcoming book.
(Paul Brock – Magnificent Malaysian insects)

Fig. 4. Fraser's Hill, Malaysia
(Paul Brock – Magnificent Malaysian insects)

Fig. 5. A Rhinocerous beetle pictured at Fraser's Hill
(Paul Brock – Magnificent Malaysian insects)

Fig. 6. The "Man-faced beetle", *Catacanthus incarnatus*
(Paul Brock – Magnificent Malaysian insects)

(turn the photo upside down to spot the man!)

Fig. 7. An overwintering group of *Tytthaspis 16-punctata* on a gate post at Renhold, near Bedford. Note that the group contains one individual of the rare melanic form of *poweri,* at the top of the main group, slightly left to centre.

Fig. 8. A small part of a large overwintering group of *Tytthaspis 16-punctuata* on dead grass stems in The King's Forest, Suffolk.
(Both figures – R. Revels & M. Majerus, Grouping behaviour in overwintering. . .)

Fig. 9. The caterpillar known as "Minsendi" on *Acacia auriculiformis*.
(Paul Latham – The edible caterpillar programme, Bas Zaire)

Fig. 10. Another caterpillar delicacy – "Kwesu".
(Paul Latham – The edible caterpillar programme, Bas Zaire)

The Fridge – A Lepidopterist's Secret Weapon

by A.D. Dillion

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Today's Lepidopterist has many tools at his disposal – butterfly net, camera, breeding cage, setting boards etc, but is he making full use of his fridge? Probably not. Unless, of course, he has already come across the following five techniques which I have gleaned from a number of text books and successfully employed on more than one occasion.

Using cold to produce aberrational forms

For at least a century it has been known that temperature plays an important role in the development of a butterfly, and that the seasonal forms of many species are related to the environment in which the early stages develop. Indeed, anyone acquainted with the British Lepidoptera will have encountered the phenomenon of seasonal dimorphism many times, and will be familiar with those species which most readily demonstrate it. For instance the Speckled wood (*Parage aegeria*), Holly blue (*Celastrina argiolus*) and various common members of the Pieridae, amongst others.

As well as being the prime (although not exclusive) factor behind seasonal dimorphism, temperature can also be used to generate various aberrational forms in our butterfly fauna, and a number of eminent authors have written on this subject. For example, South (1906) reports that forms similar to ab. *belisaria* Oberthür (the so called "blind peacock") were produced by subjecting the pupae of the Peacock (*Inachis io*) to a very low temperature during a certain period of their development.

Similar examples are given by Ford (1945), who discusses the subject in some detail and provides a very good explanation of environmental variation and the various factors at work. In particular, he makes the very relevant point that extremes in temperature affect the various butterfly families differently. Hence cooler weather reduces the production of melanin in the Small white (*Pieris rapae,* family Pieridae), producing the lighter, less heavily-marked specimens which are characteristic of the spring generation. The exact reverse occurs in the Small tortoiseshell (*Aglais urticae,* family Nymphalidae), where a low temperature tends to increase melanin production resulting in generally darker specimens, and in some cases named varieties.

The basic technique is simple and involves subjecting the pupae of your chosen species to a very low temperature at certain periods in their development. A typical experiment would involve subjecting newly-formed pupae (about 12 hours old) to a temperature of 5°C over a period of 30 days or more. Unfortunately, when pupae are placed in this environment some losses do occur, and these can be heavy when the conditions are very extreme. It is important to begin such experiments when the pupae are young – there is apparently little chance of forcing an aberrational form once the wings have started to "colour-up" and emergence is only a few days away.

As far as my own experiments are concerned, I regret to say that I have had only modest success on the few occasions that I have attempted to force aberrational forms from captive-bred stock. I have, however, managed to rear two heavily-marked specimens of the Small tortoiseshell which are referable to ab. *strigata* Raynor. As specimens of this type have been advertised for sale (at £25 each) by a well known dealer, it would appear that a successful application of this technique could prove lucrative as well as instructive for the breeder of Lepidoptera!

Using cold to delay emergence

Butterflies don't always hatch from the pupa when most convenient to the Lepidopterist (especially those who work away from home!), and it may occasionally be necessary to delay emergence so that it occurs over a weekend or other scheduled holiday. Timing is clearly important if one wishes to document the act of emergence using photography or drawing, but also for other reasons. In particular, freshly-emerged specimens soon grow restless, and will quickly become damaged as they fly around their enclosures. If they emerge when you are absent, you may return only to find your prized specimens battering themselves remorselessly against the sides of their cage, and in something rather less than A1 condition. Needless to say, when perfect specimens are sought for the reference collection this situation should be avoided at all costs.

Fortunately, the emergence of a butterfly can usually be delayed by transferring the pupa to an artificially cold environment, for under these conditions the metabolic rate falls and normal development of the pupa proceeds more slowly. By way of example, a pupa which has begun to "colour-up" will normally hatch in two or three days, probably less, but if transferred to a fridge the pupal stage can usually be extended for

many weeks. Experience has shown that a delay of this type can be invaluable when seeking to "schedule" emergence of a butterfly, and I therefore regard this technique as a very useful weapon in the armoury of the butterfly breeder.

Using cold to preserve live specimens

The emergence of a large number of adults on the same day can sometimes present special difficulties for the lepidopterist. For example, imagines which are the result of a long series of experiments may need to be examined individually, before being released or retained as voucher specimens for future reference. While most butterflies will remain fairly quiet if kept in a darkened room, after about 24 hours the urge to find food, mate and/or disperse seems to become dominant, and the insects will become increasingly active within their cages. When many dozens of insects are involved, perhaps contained in only two or three flight cages, it becomes very difficult, if not impossible, to check each specimen before it becomes damaged or worn.

In order to prevent this happening, each specimen should be placed inside a pill-box immediately after its wings have dried, say after one or two hours. They should then be transferred to a fridge (still within their containers), where they can be kept alive and in pristine condition for a further 48 hours without any ill effects. The specimens can be removed at any time for examination, and those not required can be released none the worse for their short detention.

Using cold to immobilise a specimen

When specimens are to be killed this should usually be accomplished as quickly as possible, both for ethical reasons and in order to prevent unnecessary damage to the insect – particularly the wings. This is especially true of specimens destined for the reference collection, since most collectors would prefer to include perfect examples of each species, if at all possible.

Unfortunately, when a killing-jar is used a specimen sometimes becomes injured before it has been overcome by the killing agent employed. In order to minimise this risk, a captive insect (contained within a small pill-box) may be placed inside a fridge at around 5°C for at least 15 minutes, before being transferred to the killing-jar. As butterflies are "cold-blooded" creatures, the effect of the cold is to slow down the insect's metabolism and make rapid, co-ordinated movement much more difficult. As I have used this technique many times in the past I can highly recommend it.

Using cold as a killing method

Distasteful though it is, specimens destined for the reference collection (or required for some other purpose such as dissection, microscopy etc) must be killed before they can be put to their intended purpose. There are, in fact, many ways of doing this, and the traditional methods involving killing jars and "pinching" the thorax of a captured specimen are widely known. However, these methods are not completely satisfactory as *rigor mortis* soon sets in, and if the specimen is to be set, it must first be relaxed in order to make the wings supple. Relaxing specimens takes time, requires additional equipment and chemicals, which in turn costs money. The question is – is there a better way?

Well, there may be. Theory and practice suggests that most butterflies, and presumably moths, are killed relatively quickly if exposed to a temperature of -20°C for any length of time. My own experience indicates that around 30 minutes should be sufficient for most species. The advantage of this method is that, due to the extreme cold, the onset of *rigor mortis* is delayed and thus the specimen can be set almost immediately if this be desired – no relaxing stage is necessary.

Unfortunately, there is no guarantee that this method will work well with all species – some variation in temperature and duration of exposure may be necessary in certain cases. Experimentation and accumulated experience will help determine these factors. Moreover, those species which are sometimes difficult to set following the traditional killing methods (*ie.* the Hesperiidae, hawkmoths, eggars etc) may prove just as awkward after using the freezing technique. Nevertheless, I have had good results with several common species (*eg.* Small tortoiseshell, Peacock), and in these cases it would appear to be a viable alternative to the popular killing-jar and relaxing box combination.

Conclusions

I hope that this short paper has provided food for thought, and that other members through their interest in the Lepidoptera will be encouraged to experiment with these techniques, and perhaps refine them further. At the moment I am particularly interested in temperature experiments, and I would welcome amy advice or correspondence from those who have been successful in forcing aberrational forms using methods similar to that outlined in this article.

References

South, R. (1906). *The Butterflies of the British Isles*. Frederick Warne & Co., London.

Ford, E.B. (1945). *Butterflies*. Collins, London.

Mystery of the 4-fold net unfolds

by Leigh Plester (2968)

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Jet-lagged and a candidate for a casket, I returned from a four-week sojourn in northern Thailand on 11 January 1997 to face a culture shock of re-entering the EC. Yet again in the tropics I had been obliged to use my unwieldy kite net, only to discover, as I dragged my bags over our frozen threshold, that three AES members had meanwhile written to me giving vital information on the whereabouts of the elusive 4-fold butterfly net.

This – may I once again reiterate – most useful means of catching insects on the wing – is obtainable (aver the three staunch musketeers) from Marris House Nets (54 Richmond Park Avenue, Queen's Park, Bournemouth BH8 9DR. Tel: 01202 515238, Fax: 01202 510303) which specialises in producing nets for entomologists, collectors, research workers, agriculturalists and naturalists. Bob George, who has run Marris House Nets for almost two decades, is a net connoisseur who sells his nets in three parts – it is best to request a catalogue before ordering. D.J. and D. Henshaw of 34 Rounton Road, Waltham Abbey, Essex EN9 3AR (Fax and answerphone 01992 717663) also supply Marris House Nets, in addition to a wide variety of other useful entomological paraphernalia. Watkins and Doncaster Ltd – a byword of the older entomologists – also supply a folding spring steel net. Their address is: Four Throws, Hawkhurst, Kent; ask about "Item E671".

I should like to thank members Mike Dawson (9130), R.S. (Bob) George (1402) and C.L. Nissen (7002) for their much appreciated response to my appeal. Meanwhile, in the spirit of my initial plea, as Long John Silver-Y might have said, "I'll 'ave one in me 'and afore the snow melts, me mateys, and thankee kindly!"

Hornet Observation

by Jan Koryszko (6089)

On 2nd October 1996, I visited the Wyre Forest, Worcestershire. The weather was misty at first but eventually became a dry sunny day. I observed several Speckled woods (*Pararge aegeria*) and few Red admirals (*Vanessa atalanta*). Then suddenly a hornet (*Vespa crabro*) appeared and landed on a tree for a minute before taking off and flying along the path. It was almost thirty years since I had seen this species and it was a rare sight in this area.

Edible Caterpillar Programme, Bas Zaire

by Paul Latham

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In 1980 I was involved in starting a small beekeeping trial based at Mbanza Nzunda, in the Bas Zaire region of Zaire (between Kinshasa and the port of Matadi). A youth camp, belonging the the Salvation Army, which was at that time little used, together with surrounding forest, provided a good site for the development of this activity. A succession of Peace Corps volunteers who came to work on the programme demonstrated that beekeeping was a viable activity and, working closely with the local villagers, introduced modified "Top Bar" hives. There are now over one thousand beekeepers involved in the programme, a cooperative has been formed and last season over seven tonnes of honey were produced and sold, mainly in Kinshasa.

Because of the aggressiveness of the African bee, *Apis mellifera adansonii,* and the need for shade, hives are kept in patches of forest. They are placed at some distance from each other to avoid disturbing bees in neighbouring hives during harvest. A winding path leads to the hive so that bees are less likely to follow the beekeeper back to his village after the hive is inspected or when the honey crop is taken. The areas of forest either already exist or are allowed and encouraged to develop and are carefully protected from felling or fire. Though sometimes hives are placed in exotic tree plantations (eg. *Acacia auriculiformis*), indigenous forest is preferred, as there is generally insufficient undergrowth present in such exotic plantations for the beekeeper to be able to get away from the hives without being followed by the bees. It is not uncommon to find 10-15 hives occupying an area of forest, and thus, most importantly, providing protection for it.

Edible caterpillars are an important traditional source of protein in Bas Zaire (Plate 97P, figs. 9 & 10). In 1961 it was estimated that caterpillars provided 10% of the 48,000 metric tonnes of animal protein produced in Zaire. Malaisse and Parent identified 35 species of caterpillar in Shaba Region. Caterpillars can provide from 13-22gms protein per 114gm serving. Most families in Bas Zaire find it increasingly difficult to get animal protein. Fish and meat is generally too expensive for the majority to be able to buy. Hunting has cleared out most of the larger animals from the countryside, and even many of the smaller animals such as the aulocade (cane rat) too. Even caterpillars have declined in recent years mainly through the loss of

"Mvinsu" on *Petersianthus macrocarpus*

suitable host plants, by cutting for charcoal or firewood, or through burning of the savanna during the dry season. Over-collection of caterpillars has also resulted in certain species becoming rare in some areas.

Building on the success of the existing beekeeping programme the aim of the edible caterpillar programme is to increase the availability of these caterpillars in Bas Zaire. This is being done by:

1. Reintroducing those host plants which have become scarce.
   Trials to determine the best methods for propagating the host trees of the less common species are being carried out. An initial trial has indicated that a number of species can be successfully propagated by cuttings, seed or wildlings. Working through the 45 village associations already set up by the beekeeping programme, these species will be introduced to farmers for underplanting in cassava to enrich the normal "bush fallow" period that follows the crop. Traditionally some trees, such as *Ricinodendron heudelottii* used to be planted or preserved in the villages so that when the *Mvinsu* caterpillars descended to the base of the trunk they belonged to the family who owned the tree.

2. Identifying the larvae and moths of the region.
   At present the following species have been identified but I have the Kicongo names of 40-odd species which are at present known to be edible: *Imbrasia dione* Fabricius; *Bunaea alcinoe* Stoll; *Cirina forda* Westwood; *Elaphrodes lactea* Gaede and *Antheua insignata* Gaede. A collection of slides and photographs of the final larval stadium of these is being built up and I am also arranging for many to be reared to pupation in Zaire so that the moths will eventually be photographed or can be available for identification.

3. Safeguarding those species of moths which are particularly valued.
   This is being done by establishing suitable areas of forest at villages where the eggs or larvae can be introduced, surveyed and multiplied. Often these areas will already have beehives and will be suitable for those species feeding on the forest flora. However, for the savanna species eg. *Cirina forda* Westwood, areas will need to be protected with well-maintained fire breaks. Villagers are being encouraged to plant fruit trees in blocks in savanna areas so that the fruit trees are integrated with existing host plants such as *Crossopteryx febrifuga*.

I would be most interested to hear from any member involved with a similar programme or with experience of rearing and identifying the African moths of the following families in particular: *Attacidae, Noctuidae, Sphingidae, Arctiidae* and *Notodontidae*.

I close with a Kicongo proverb which indicates the enthusiasm with which edible caterpillars are sought in Bas Zaire: *Kaba kafurilanga mu nsasa yani kibeni kagetanga va ntota*. [The death of the "Kaba" (a species of edible caterpillar) is caused by its own droppings.] In order to find out where the large green caterpillar is feeding one has to find its droppings on the ground underneath.

Co-operation and conflict during the colony-founding stage of *Lasius niger*

by Matthew Gale (9422)

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Colonies of *Lasius niger* are initiated by newly-mated queen ants either singly or in small groups. They over-winter, sustained solely on their fat reserves and their metabolised flight muscles, using this meagre supply of nutrients to produce eggs and feed the first batch of larvae which will become the first worker ants. There are advantages for those queens which congregate to start colonies, since they can pool their resources to produce the first few vital daughters. However, there are risks associated with co-operating with other queens. Whilst multiple queens are common in mature colonies, *L. niger* workers rarely tolerate multiple queens during the early stages of colony foundation; generally killing all but one of the queens present.

As drastic and brutal as this may seem to us, there are very good reasons for this slaughter. Many of the interactions within an ant colony are based on what may appear to us as sound economic principles; *L. Niger* queens are large compared to their daughter workers and one queen is more than capable of producing large quantities of eggs. It therefore makes very little sense for the workers to support more queens than they need to produce more worker ants.

So, how do worker ants "decide" which queens to execute? If the workers kill all but one of the queens in a colony founded by multiple queens, there is a possibility that some of them may kill their own mother. It is a common misconception that worker ants are simply slaves for their queen; life in an ant colony is much more complex than this. It is true that worker ants generally give up their reproductive potentials to help their mother raise more daughters; however, this is because they have a vested genetic interest in rearing sisters rather than daughters. All members of order Hymenoptera (ants, bees and wasps) share an unusual mode of sex determination called haplodiploidy. Males are produced from unfertilised (haploid) eggs and therefore pass on their entire genome to their daughters (produced from fertilised, diploid eggs). Therefore, sisters share three-quarters of their genes as opposed to the half they would share with their daughters (Hamilton 1964). Since all organisms are driven to ensure that as much of their genome is passed on to the next generation, there is a strong evolutionary basis for what falsely appears to be altruistic behaviour

exhibited by non-reproductive females. It would therefore be a disastrous mistake for worker ants to commit matricide since their mother is their only opportunity to participate in reproduction and thereby the survival of their genes.

All of this poses some interesting questions:

1. Exactly what are the advantages for queens who co-operate in the founding of a colony? If monogyny is the norm in new *L. niger* colonies (after a number of workers have been produced), then two queens co-operating in colony foundation appear to both face a 50% chance of being killed as the colony progresses. This seems an unnecessary risk since I know from experience of culturing single queens throughout my life, that most do succeed in starting new colonies.
2. How do workers "decide" which queens to eliminate in a multi-queen colony? Is there evidence to suggest that they can recognise their mother?

My initial experiment attempted to ascertain the sequence of events which are likely to occur in nature. Ten newly-mated *L. niger* queens were placed in a purpose-built formicarium filled with soil. Within the first 24 hours, the queens had settled into cells which they had excavated themselves; three queens chose to found colonies alone, there were two pairings and one group of three. Over the following months before the first workers eclosed, I observed that the egg piles of the multiple queen groups were not two or three times larger, respectively, than the egg piles of the solitary queens. However, the queens in groups retained plump abdomens, whereas solitary queens experienced some wasting. Although egg piles were initially quite similar in size in all cases, solitary queens eventually ended up with only a few larvae, fewer pupae and only one or two workers. All multi-queen groups fared much better, producing and maintaining more brood throughout and resulting in between four and five workers from their first broods. It would make sense that solitary queens, having a smaller relative pool of resources (nutrients) have to consume a large portion of their brood in order to survive and ensure the survival of at least one offspring. Parenthetically, one solitary queen consumed her entire brood and then started again – putting her months behind the other queens.

I had expected conflicts to arise as soon as the first workers from each colony encountered each other on their foraging expeditions. However, inter-colony conflicts did not arise until several weeks later as

the second generation of brood was well underway. Unfortunately, I did not observe the initial stages of aggression, however, the three queen grouping and two of the solitary queens were killed. It is hard to say whether the brood was consumed, and I only observed two dead workers; also found were five queen corpses.

Contrary to expectations, it was a pair of queens, rather than the group of three, which produced the largest number of workers, initially, and ultimately, it seems, destroyed all competition within the formicarium. Co-operation in colony-founding queens is obviously advantageous, however, by the time the surviving colony included approximately 20 workers, one of the two queens was discovered dead in the feeding chamber. The workers had obviously made their decision.

Co-operation in the form of multi-queen grouping does appear to be a more successful strategy, initially, not only because of the increased success rate in producing the all important first workers to gather food, but also because the colonies which are able to build a workforce quickly can eliminate the intra-species competition in the immediate area. Single founding queens and their broods are more vulnerable to attack by other colonies which appears to explain why the queens would be likely to co-operate.

Attempting to show whether or not worker ants can recognise their mother in a group of co-founder queens poses some problems since it would be almost impossible to differentiate the eggs laid by one queen from another. I therefore decided that the most effective method of ascertaining whether *L. niger* worker ants can identify their mothers was to set up a control group of five queens, isolated together and allowed to start a colony and also isolate another group of five queens with 25 pupae removed from a mature *L. niger* colony. In the latter case it would be imperative that the pupae originate from a colony which could not have been the mother colony from which any of the five queens originated (pupae were removed from a colony almost 100 miles away). Both cultures were maintained in identical conditions, in small petri dishes with access to feeding chambers.

After eight days, all of the workers had emerged from the stolen pupae and at this point, three of the five queens were killed. The whole process was fascinating, albeit gruesome and protracted, since it took more than five hours for the workers to kill the queens. The hapless queens were held down by workers grasping their antennae and legs, while other workers tore holes in their abdomens and

consummed their internal organs. When these queen ants managed to temporarily break away from their attackers, they tended to attack each other rather than the workers. During the execution process, the two unmolested queens huddled over the brood and received a good deal more attention (grooming and trophlaxis) than was usual. Less than a week later, the fourth queen was found dead. Many months later, I observed a very similar course of events in the control colony, although the slaughter was not so immediate with queens being dispatched individually. The end result was the same, with only one queen surviving.

If the workers were able to discern a genetic relationship between themselves and the queens present and remove queens which were not related to (presumably) the majority of the workers, then one would have expected all queens to have been discarded in the test colony since there was no possibility that the workers were related to any of the queens. The similarity between the results of the two colonies suggests that workers use other means to decide which queen to preserve. Sudd and Franks (1987) suggest that multiple queens in a colony might not contribute equally to the production of eggs (and thus workers) and therefore, if workers could discern which queen was most productive, they would be preserving the individual which had produced the largest number of workers present.

This is persuasive if one considers that whilst several queens might co-operate in colony foundation, they might also compete with each other for reproductive dominance. Throughout all of my observations of *L. niger* queens, I have observed subtle forms of interaction which suggest a rudimentary dominance hierarchy. Queens were observed standing above (indeed, on top of) other queens with mantibles gaping and after hours watching these interactions it was possible to recognise that in any given group, there was always one or even two queens who always remained near the egg piles and always acted "aggressively" toward other queens. On two occasions I witnessed a presumably subordinate queen laying an egg, adding it to the egg pile and a dominant queen removing the newly-laid egg and eating it. Wilson (1974) documented that *Leptothorax curvispinosus* queens recognise their own eggs and will eat the eggs of other queens resulting in different reproductive rates of queens in a colony. Holldobler and Carlin (1985) assert that dominant females are associated with greater egg production and that in some species may also be able to inhibit the reproduction of subordinate queens. Dominance and certainly the inhibition of reproduction are likely to be associated with the

production of pheromones by dominant queens which in turn would be an excellent method for workers to distinguish which queens held dominance and therefore had produced the most eggs. Also, by cheating on her co-founders and consuming some of their eggs, a dominant queen would have the nutritional resources available to be able to maintain the continuous production of her own eggs.

It is apparent that the social interactions within ant colonies are complex. Dominance hierarchies, conflicting interests and at the root of it all, a compelling drive to ensure the survival and proliferation of one's genes effectively dispels any notion of altruism. When individuals in an ant colony co-operate, they do so for selfish reasons and seem to have no qualms about "cheating" if it serves to ensure their survival and the survival of their genes.

References

Hamilton, W.D. (1964). The genetical evolution of social behaviour I, II. *Journal of Theoretical Biology* **7**: 1-52.

Holldobler, B. and Carlin, N.F. (1985). Colony founding, queen dominance and oligogyny in the Australian meat ant *Iridomyrmex purpureus*. *Behavioural Ecology and Sociology*. **18**:45-58.

Sudd, J.H. and Franks, N.R. (1987). *The Behavioural Ecology of Ants*. Blackie & Son Ltd, London.

Wilson, E.O. (1974). Aversive behaviour and competition within colonies of the ant *Leptothorax curvispinosus*. *Annual Entomological Society of America* **67**: 777-780.

Book Reviews

Butterflies on British and Irish Offshore Islands

by Roger Dennis and Tim Shreeve, 1996. xii + 131 pages, 11 text figures. ISBN 0 906802 06 7. Gem Publishing Company, Brightwell, Wallingford, Oxfordshire. £16 paperback.

Roger Dennis often makes me think of D.H. Lawrence's short story *The man who liked islands,* though I am sure he would find more rewarding ways of occupying himself on them than did Lawrence's character. The island theme has appeared briefly several times in his earlier work, notably chapter one of his *The Ecology of Butterflies in*

Britain (1992); now we have a whole paperback book devoted to a detailed analysis of island butterfly faunas and the factors underlying their origin and establishment, coupled with his collaborator Tim Shreeve's favourite theme of butterfly mobility.

With today's accent on butterfly study in a European, or global, context, in contrast to the insular attitude which used to prevail among British lepidopterists, perhaps there is a tendency to overlook small islands as insignificant. Apart from Wight with 42 species and Jersey with 36, no British offshore island has more than 30 resident butterfly species and most have many less. Our islands are not the places which first come to mind as "good" for butterflies, in the sense of species-richness or numbers of individuals. Hopefully this book will go some way towards promoting the concept that the butterflies of any site are worth studying and the fact that there are only a few species, and that these few are widespread and in greater abundance elsewhere, does not make them, or their habitat, any less interesting – indeed the reverse.

In common with most of Dennis's work, the emphasis is on statistics, and the book is not a light read. His earlier work on the islands in the "zoogeography" chapter in his 1977 book *The British Butterflies – their Origin and Establishment* has been re-evaluated and greatly expanded in the light of further data on variables including island area, isolation, number of species at nearest mainland source (whether Britain or continental Europe), number of plant species, and latitude; the reader is presented with a cladistic analysis of the "linkage distances" of all the resident butterfly species based on the similarities of their incidences on 73 islands, then the authors provide a fascinating table predicting the number of species on a further 139 islands for which no complete surveys are as yet available. Further chapters discuss migration records, the ecological basis for island butterflies and variation of butterflies on islands.

The book concludes with a plea for more records of island butterflies. Looking through the list of references – there are 75 from J.W. Heslop Harrison alone, from the period 1937 to 1958 – I get the strong impression that the authors have had to rely far more than they really wanted to on old records and would very much have welcomed more up-to-date ones. Many of the islands are regularly visited by bird-watchers and several have bird observatories; it saddens me that so often naturalists regard butterflies as the poor relation compared to birds. Particularly astounding is the total absence of any butterfly records from Walney, a very well-covered island ornithologically.

The text is well laid out and typographical errors are very few. There are unfortunately one or two such as in the "list of butterflies on British and Irish islands" (pp.87-101) which imply, for instance, that the Irish subspecies of the Holly blue occurs on islands off England, Wales and Scotland.

Although the Appendix 2A, giving instructions for future recording of island butterflies, appears to be aimed at members of the general public, the book as a whole is likely to appeal to a more restricted readership. Like most of the authors' earlier work, it is a book for scientists. Nevertheless, it is a welcome new approach, and I hope it will arouse much interest for further work on our offshore islands.

Peter B. Hardy

Aquatic insects of north Europe: a taxonomic handbook

Edited by Anders Nilsson *Volume 1, Ephemeroptera, Plecoptera, Heteroptera, Neuroptera, Megaloptera, Coleoptera, Trichoptera, Lepidoptera*. A4 pp274 including many full-page line illustrations. ISBN 87-88757-09-9. Apollo Books, Kirkeby Sand, DK-5771 Stenstrup, Denmark 1996. Price DK 400.00 + postage (approx. £50). If ordered with Volume 2, to be published this year, the price for the two is only DK 700.00

This is the first of two volumes, the second will cover the far more extensive Orders of the Odonata and Diptera. By chance as I handled the book it fell open at the page illustrating *Nepa cinerea, Ranatra linearis* and *Notonecta glauca,* the three bugs which had so fascinated me in my early days as an entomologist and which induced me to construct my first aquarium in which to keep them. Now "pond-dipping" is an activity still enjoyed by youngsters today and is also an activity often illustrated in natural history books designed to teach the subject to both teachers and their pupils that were published in the late Victorian era up to at least the 1940s. So any book which can help with that activity is to be encouraged.

This book, together with Volume 2 to follow, brings together in one source keys to both the early stages and the adults of all Orders of insects which have aquatic representatives, but unfortunately the UK is not really "north Europe" and the keys must be used with caution and

preferably in conjunction with one or other of the British keys (scattered over a wide circle of publication, but particularly those published by the Freshwater Biological Association) for while many of the insects recorded in this book are present in the UK others are not or are replaced here by other species. Nevertheless there is an enormous amount of information here not to be found collated together elsewhere on the biology, habitats, ecology and rearing of these creatures. For this information alone the book is worth having. For the "pond-dipper" and would-be rearer of these insects I found the information to be particularly useful and was intrigued by a method new to me of catching Hydrophiliodea beetles, which is to pour water on the banks of the ponds where the vegetation is sparse which causes the beetles resting there to be washed into the pond from whence they then scramble back and can be easily seen and collected.

As with many multi-author works the treatment varies somewhat although in some articles this is due to lack of information readily available for another group. In only one case, however, the aquatic weevils, of which there are 19 species alone in the genus *Bagous*, has it proved not to be possible to construct a key to their larvae. However, it is pointed out that differing species have different host plants and feeding methods and a Table is provided of these from which it should be possible to have a good idea which species is before one.

Each chapter deals with either an Order, when species are few, such as the Lepidoptera and Plecoptera, or a Family where there are a large number as in the Coleoptera which have ten chapters devoted to them. The book opens with a general introduction to the aim of the subject and has a table listing the families dealt with giving their colloquial names in the Scandinavian languages and English. My surprise here was to see that the Finns have a name for almost every family while apart from the Heteroptera and Diptera there are English names for all the Orders, but very few family names are differentiated.

In spite of the title stating "a taxonomic handbook" there is an enormous amount of information on biology. While the heading and information varies from chapter to chapter, most contain the following: Introduction; lifecycle and phenology; habitats; eggs; nymphs; morphology; trophic relationships; adults; methods of collecting and rearing. Then of course the identification keys, which are done for both nymphs larvae and adults and are to both families and genera but only taken down to the species level when the comparatively few numbers present permit. This includes all Orders except the Trichoptera and most of the very numerous beetle Families where they are only keyed

to genera. Finally for each chapter there is a list of the north European species and of course, references. These are subdivided in most cases under separate headings: Classification; Faunistics; Larvae; Adults; Natural history; Identification. Perhaps it is an indication that they have been very extensively studied, but the 19 species of Gerromorpha have 99 references attributed to them! The book ends with an extensive but perhaps a bit complicated index, as species are given three versions so that one can refer to the page where nymphs, or adults are keyed, or where the name appears in the text or list of species.

The book is very well illustrated with large-scale diagrams, there being over 300 illustrating salient points of some of the beetle families. They are grouped so as to occupy entire pages and in the case of the adult Megaloptera, the adults are differentiated by these diagrams in place of textual keys. One criticism here is to ask if it was really necessary to devote two pages to five very well-known and better illustrated in numerous other books adult Pyralidae. The English is at times somewhat stilted or quaint but perfectly understandable. One peculiarity in this volume is that all the references are printed entirely in Roman type without the usual convention of *italic* script for the names of insects or of journals. All other books I have seen published by Apollo Books have used the standard *italic* convention.

Brian Gardiner (225)

[This review is reprinted by permission of the editor from the April number of the Royal Entomological Society journal *The Entomologist*.]

Tortrix moth in Glasgow

by Frank McCann (6291)

3 Langbar Path, Easterhouse, Glasgow G33 4HY.

Last December I came across a privet hedge which I noticed had some leaves spun together. I collected some of these leaves and when I opened one, the larva inside was identified as being Lepidopteran. I sent the larva to John L. Gregory who identified it as the Tortrix moth, *Cacoecimorpha pronubana*.

Diary Dates

To make the diary effective contributions are needed from members. Any relevant items should be sent to the *Bulletin* Editor. No charge is made for entries. Please allow three months advance notice.

SEPTEMBER

10th-12th ***Entomology '97.***
University of Newcastle, UK. First National Meeting of the Royal Entomological Society to run concurrently with the Society's Symposium on Population Ecology.
Further information available from: The Registrar, Royal Entomological Society, 41 Queen's Gate, London SW1 5HR, UK. Tel: +44 171 584 8361. Fax: +44 171 581 8505. e-mail: reg@royensoc.demon.co. uk

14th ***LCES Field Meeting***
At Whitegate Way (Leaf miners). 11.00am start (but will not be returning to cars for lunch) at Whitegate Station Car Park (SJ 617678).
I: Mike Hull Tel: 01928 722274/Bill Hardwick Tel: 01606 594778.

21st ***Nightwalk at the Thornley Woodlands Centre***
7pm – late. A walk in the twilight world when everything in the woods take on new shapes and sounds. You will have the chance to see and hear owls and bats. There will be a mercury vapour moth trap running and there will be a display of specimens previously collected in the Derwent Walk Country Park. All identification guides will be available on the night.
Meet: OS Map ref. NZ 178 604. Thornley Woodlands Centre, two miles south of Swalwell roundabout on the A694 Swalwell to Consett road.
I: Wayne Clynes. Tel: 01207 545212 (Thornley Woodlands Centre).

OCTOBER

4th ***AES Annual Exhibition***
Kempton Park Racecourse. 11am - 5pm. Entrance free to members on production of pass or £!.50 Adults, 50p Children. All AES members are welcometo bring along an exhibit for display during the day.
Information on booking trade or exhibit space and all other queries to Wayne Jarvis at usual PO Box address or phone 0976 828142.

Published 25th August 1997 by the Amateur Entomologists' Society
(Registered Charity No. 267430), from PO Box 8774, London SW7 5ZG.

Midlands Entomological Fair

Sunday 7th December 1997

IMPORTANT NOTICE

New venue for all future fairs

With the closure of the Granby Halls in Leicester, the home of the Midlands Entomological Fair for the last twenty years, a new venue has been selected for all future fairs, commencing with the Christmas Entomological Fair on Sunday 7th December 1997.

THE KETTERING LEISURE VILLAGE ARENA

is situated on the southern outskirts of Kettering, Northants, on a green site with easy and direct access to the motorway system. It is larger than the Granby Halls and is very new and up-to-date. One single square hall of over 2000 square metres will accommodate all regular visitors and allow for some people on the waiting list to come in as well. The Centre has bars, cafeteria, lounges, swimming, boating and many other facilities, but most important for us, it has round-the-hall parking for many hundreds of cars, with a dedicated area for exhibitors to load and unload.

Access from the North:

Very direct. Use M1 southbound to Junction 19 then take A14 all the way. Exit A14 at Junction 8. "Leisure Village" signs to centre a few hundred yards away.

Access from the South:

Take M1 northbound, exit at Junction 15 direction Northampton. Take Ring Road eastbound, join with A23 to Kettering. Road joins A14 at Junction 8 as above.

Access from the West:

M5 and M6 motorways join M1 at Junction 19. Then as from North.

Access from the East:

Use A14 all the way, exit Junction 8.

The Fair will open at 10.30 and close at 4.30 and all the regular exhibitors will be in attendance, featuring: Livestock, set and papered specimens, collecting and breeding equipment, books and papers, all kinds of invertebrates, large reptile and amphibian section, affinity groups and conservation societies.

ADMISSION:

Adults £2 • Children 5-16 £1 • Seniors £1 • Children under 5 years free

Any enquiries and table bookings ring Jack Harris 01455 846310

Diary Note: *1998 Fairs – Spring, 22nd March; Christmas, 6th December*

THE AMATEUR ENTOMOLOGISTS' SOCIETY

ANNUAL EXHIBITION, 1997

Saturday, 4th October

11 a.m. to 5 p.m.

KEMPTON PARK RACECOURSE,
STAINES ROAD, SUNBURY, MIDDX.

ACCESSIBILITY: The Racecourse is easy to reach by road and rail, and there is adequate free car parking. The M25 is very near and is linked to Kempton Park by the M3, which is less than a mile away. Sunbury Railway Station with trains from Waterloo, is a short walk away. The site is served by two bus routes, Green Line No. 290, and Red bus No. 216. Both these buses stop right outside.

ADMISSION: *Members free* on production of pass to be issued with the August Bulletin.

PARKING: in the free car parks *only*. NOT outside the Grandstand. Keep all entrances clear.

EXHIBITORS AND DEALERS ONLY will be admitted between 8 am and 11 am.

TROLLEYS are not provided and provision should be made for heavy loads.

ENTOMOLOGICAL DEALERS are attending.

REFRESHMENTS: Full facilities are available. All food and drink to be consumed in the Refreshment Area.

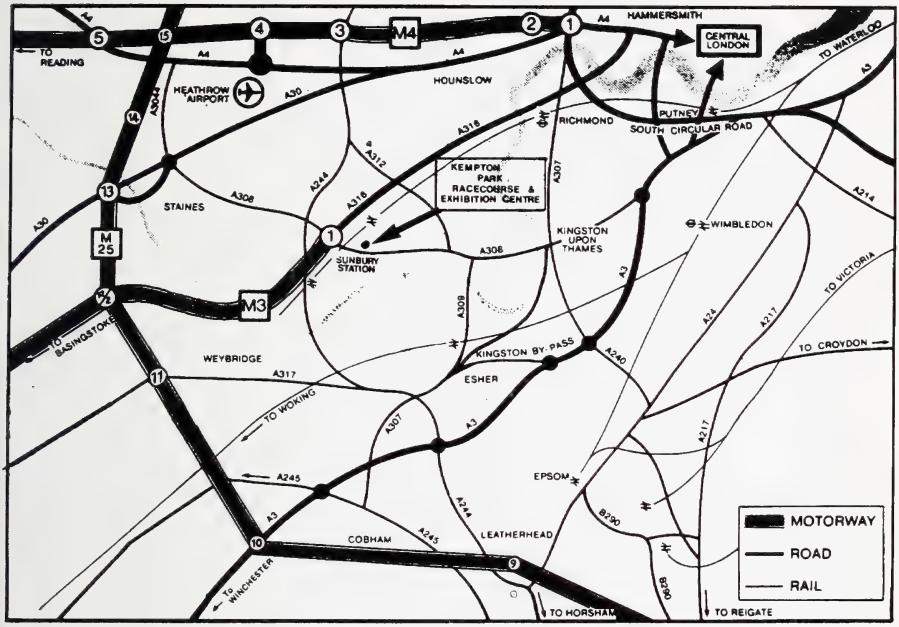
SURPLUS MATERIAL: will be welcome for sale on behalf of the Society's funds.

ANSORGE BEQUEST: Cash prizes and certificates to Junior Members for exhibits at the Exhibition.

LIVESTOCK: It is the duty of both dealers and buyers to ensure that all livestock is kept in containers which are roomy, hygienic and secure against any possible escape.

EXHIBITS which show long series of wild-caught, rare or endangered species will not be allowed.

ALL ENQUIRIES:
The AES, PO Box 8774, London SW7 5ZG.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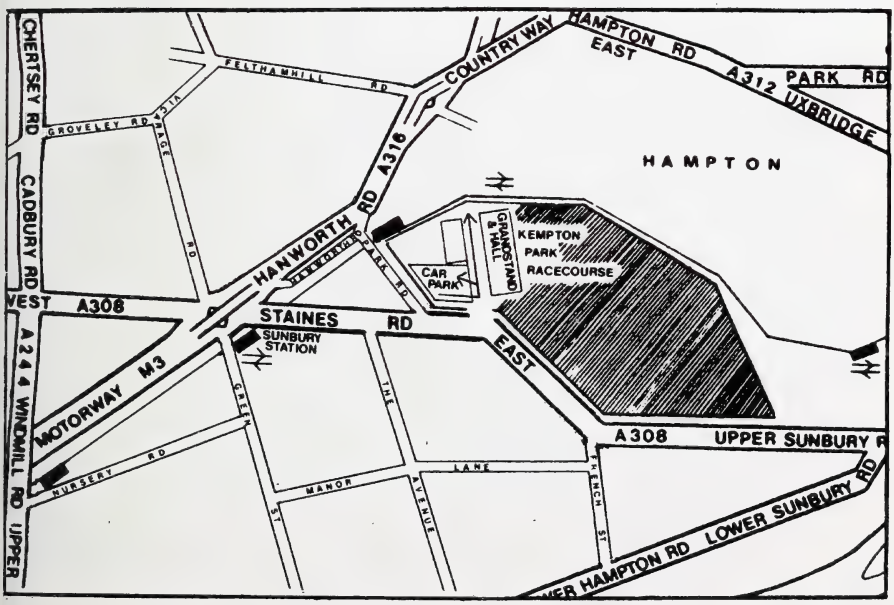
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The Bulletin
of the Amateur Entomologists' Society

Volume 56 • Number 413 August 1997

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The Bulletin

of the Amateur Entomologists' Society

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The Amateur Entomologists' Society

Founded in 1935

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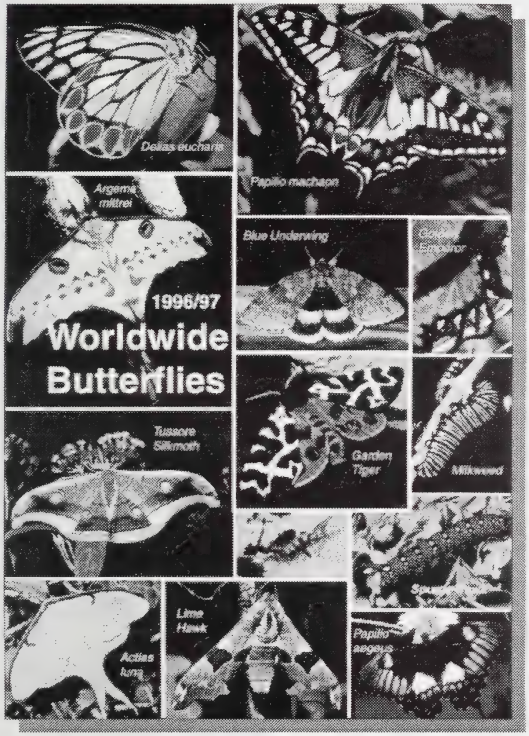

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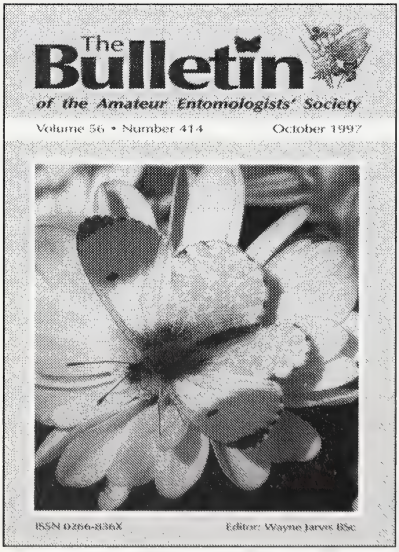


The cover of this issue of the Bulletin features a male Orange tip, *Anthocharis cardamines*.

Photo: Ian MacFadyen.

The Bulletin
of the Amateur Entomologists' Society

Volume 56 • Number 414 October 1997

Editorial

The 1997 Exhibition at Kempton Park racecourse proved to be highly successful. The "new-look" venue was warmly received by all, despite still not having been fully finished, and despite a few problems, notably the non-existence of a tannoy system, the day ran smoothly. We are looking forward to next year, when we are promised a better venue still (at an increased price of course!). Thanks are due to all concerned with the organisation, setting up and breaking down of the event and to those who exhibited and traded at the show.

On a totally different matter, you should find a subscription renewal form along with this issue of the *Bulletin*. We have been forced to increase subscriptions for 1998 to £12.50 for Ordinary members and £7 for Juniors mainly due to the increasing costs of printing and posting our journals to members. We are currently subsidising all members by continuing to publish six issues of the *Bulletin* a year by around £2, and as we are a Registered Charity we are committed to manage our finances on a sound basis. There were alternatives to increasing the subscription rates, notably, reducing the number of issues to four per year or by taking all colour from the publication. Council decided (and in my opinion wisely) to continue to produce six issues in a similar format. One way to maintain (or reduce) subscriptions of course is to increase membership, which we are starting to achieve, but we still need members' help. We can not afford to spend too much money on marketing and promoting ourselves and rely largely on recommendations. So, once again, if you know someone or an institution that could be interested in joining us, please put them in touch.

Wayne

Lepidoptera at mercury vapour light, 1996

by Richard Beaumont (7331)

6 Moore Cottage Close, Netherton, Huddersfield, West Yorkshire HD7 7LF.

The following notes are of observations that have been of interest to me.

The following migrant Lepidoptera were noted at mercury vapour light during 1996 at my home in Huddersfield, West Yorkshire.

The first week of June was good locally for migrant Lepidoptera. Large numbers of *Plutella xylostella* and Silver Y (*Autographa gamma*).

20.6.96	Small mottled willow	Only the second I have caught in Huddersfield.
20.6.96	Red admiral	Found in the moth trap in the morning.
1.7.96	Pearly underwing	
8.8.96	Painted lady	This flew into the trap at about 22.30hrs. It was a disappointment to me at the time, I thought it was a moth. I have had a Wall brown butterfly in the trap in a previous year.
8.8.96	*Udea ferrugalis* (Hübner)	
16.8.96	Shuttle shaped dart	
15.8.96	*Nomophila noctuella* (D.&S.)	
16.6.96	Lime hawk	
9.7.96	Small elephant hawk	
9.7.96	Broad barred white	
4.8.96	Purple thorn	First personal record. Female, fertile eggs were laid.
19.8.96	Red underwing	
2.10.96	Red-green carpet	First personal record
4.10.96	Blair's shoulder knot	First personal record

Lepidoptera noticed in other parts of the local area included a female Emperor moth in Huddersfield bus station on 29.5.96.

Large numbers of Green hairstreak butterflies flying about the bilberry bushes over Holmfirth on 13.6.96.

Breeding *Parnassius apollo* L. (Lep.: Papilionidae)

by Xavier Richard

3 avenue du Nord, 78310 Maurepas, France.

The Apollo (*Parnassius apollo* L.) is a butterfly belonging to the family *Papilionidae* (*Parnassiinae*).

In France it occurs on mountains from 600 metres.

There are about 25 French sub-species of this fairly hardy butterfly, three of which are protected by law (Act dated 10th July 1976).

This species is fully protected, and may not be caught, killed or sold, in accordance with the Bern International Convention, ratified by France in December 1989.

In France, breeding *Parnassius apollo* for scientific purposes may only be carried out legally after authorisation has been granted by the Ministry of the Environment (address: Direction de la Protection de la Nature, Ministère de l'Environnement, 14 Boulevard du Général Leclerc, 92524 Neuilly sur Seine Cédex, France).

I bred the sub-species *P. apollo rhodopensis* on *Sedum album*.

Breeding conditions

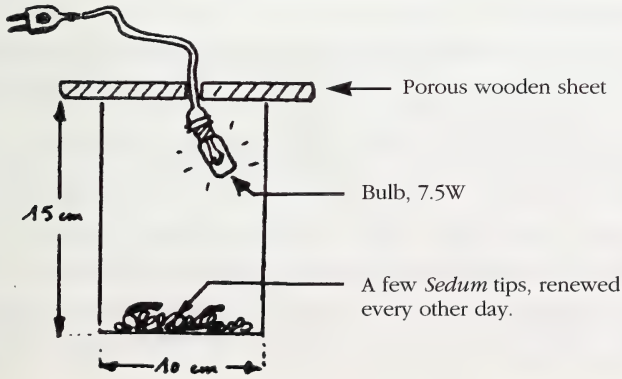
Temperatures: 24°C by day and 20°C by night.

Water was sprayed every five days to provide humidity.

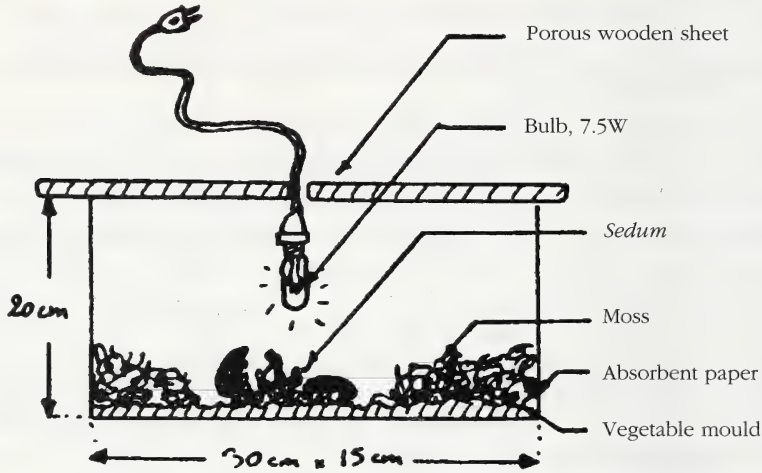
The cage was heated and lit 12 hours per day, using a 7.5 Watt bulb.

Breeding cages

During the first three instars, I used a cylindrical plastic box containing five larvae.



During the last two instars, the five larvae were reared in a vivarium.



Breeding

Egg

The eggs, which are slightly flattened towards the edges, measure about 1mm in diameter and are white in colour. Five larvae hatched after three months' hibernation.

Larva

The larvae reach maturity after about 25 days, when in their fifth instar.

First instar: The newly-hatched larva measures 2mm; it is black for the first five days.

Second instar: The appearance of the larva changes. There are now bands of yellow spots on each side; these markings remain unchanged during the following instars.

At first, the larva measures 8mm; this stadium lasts four days.

Third instar: Four days. At first, the larva measures 12mm.

Fourth instar: Three days. At first, the larva measures 18mm.

Fifth instar: Five days. At first, the larva measures 30mm.

On reaching maturity, the larva measures about 40mm. From the second instar, the larvae are very active and consume large amounts of food during the last two instars.

Chrysalis
The larvae stopped feeding one day before pupating. They became more active, and were probably searching for a suitable pupation site.

The larva spins a very rudimentary cocoon, consisting of a few strands of shiny silk; it pupates on the ground, under any kind of cover.

Three days after spinning the cocoon, the larva changes to a fine dark chrysalis, covered with a white bloom. It is about 20mm long and I only managed to obtain one chrysalis. It was kept under the same conditions as the larvae, with 12 hours of light per day.

Imago
Twenty-three days after pupation a fine imago emerged from my single chrysalis.

Translated from *Imago* **45**(4): 13-14 and reproduced with permission from the author and OPIE.

Unusual beetle in Grantham

by Alexander D. Norman (10637J)

2 Granary Court, Main Street, Wilsford, nr. Grantham, Lincolnshire NG32 3NP.

On the 7th July 1997, my father was fitting a new garage door when he caught sight of an unusual beetle. Knowing of my interest in entomology, he caught this specimen in an empty jar to show me when I returned from school that afternoon.

When I arrived home, I knew immediately it was a longhorn beetle. However, I could not find a British longhorn species of the same description in the *Oxford Book of Insects,* my main reference guide. However, I eventually found a picture of the beetle in the *Collins Gem Guide to Insects.* It was labelled as *Monochamus sartor,* but the book then went on to say that it is found in southern and central Europe, but not in Britain.

How this insect came here can be safely deduced. It lives primarily in felled conifers. Presumably it was in wood that was cut into timber and imported to England. Here, it eventually ended up in a B&Q warehouse near some garage doors, in which it may have sought refuge for any number of reasons.

Captive Breeding of Mantids

by Matthew Gale (9422)

Median Lodge, Pipers Yard, Acre End Street, Eynsham, Oxon OX8 1PE.

Subsequent to the article that appeared in Vol. **51** of the *AES Bulletin,* which suggests methods of avoiding cannibalism during mating in mantids, I felt that general cultural considerations should be addressed.

Mantids are exopterygotes which means that they hatch from eggs and progress through nymphal stages, rather than distinct larval and a pupal stage, resembling the mature form from the first nymphal instar onward, and requiring the same sort of food (only smaller).

The following highlights some of the problems involved in rearing mantids from egg to adult with some methods I have found effective in avoiding these problems.

Oothecae

Mantid eggs are enclosed in an ootheca, the structure and shape of which can vary considerably between species. Whilst many of the more commonly available species produce buff-coloured, ovoid oothecae, they can be long and thin, possess a variety of protuberances and come in a variety of colours. Oothecae are produced by a gland above the females' sub-genital plate as a viscous fluid which is whisked into a froth by the cerci; with the eggs being laid directly into the centre in rows. Oothecae play a protective role by preventing dessication, trapping sufficient moisture (whilst repelling excess water) and acting as a barrier to most predators (excepting certain species of parasitic wasps). For the most part, oothecae require very little attention; I generally suspend them within a sweet jar, ensuring that the scale-like openings are not blocked by the sides of the container. The only problem I have encountered has been maintaining the correct humidity levels.

Oothecae originating from Africa, Europe and North America are susceptible to mould if humidity levels are high. It is therefore important to ensure that any moisture provided through spraying can evaporate quickly. Indeed, it is generally best to direct water droplets toward the paper lining the base of the container, rather than spray the ootheca. In this way it should be possible to provide the essential local humidity, whilst avoiding the build-up of moisture likely to cause the ootheca to moulder. Using fine netting, paper towel, or cloth as a make-shift lid will facilitate evaporation better than plastic or metal lids.

In culturing any organism, it is always important to consider the conditions likely to be experienced in its natural environment. Winter can be stimulated by several months in a fridge (NOT freezer), drought by simply suspending the normal spraying routine for a month or two. The life cycles of many organisms require resting phases in order to prepare the dormant stage for the resumption of growth, triggered by the end of a cold or dry period. Indeed, growth may not progress without this stimulation. Tropical species rarely need any rest period at all.

Nymphs

The nymphs of most species emerge from the ootheca at the same time, however, there are species which exhibit a protracted hatching process, spanning several months. Species such as *Tenodera aridifolia sinensis*. and many of the larger *Sphodromantis* spp. produce phenomenal numbers of nymphs from each ootheca. Providing enough food is a daunting task, and although it may sound ruthless, I generally allow a certain amount of cannibalism to weed out the weaker individuals and to simply reduce the number to a manageable level. I have not observed cannibalistic behaviour during the first three instars of flower-mimicking mantids, and some species do not exhibit this behaviour at all (*Sibylla pretiosa*); nevertheless, it is wise to start separating the nymphs as soon as possible.

Most mantids appreciate some humidity, particularly if moulting their exoskeletons, however, beware of poor air circulation and very high levels of moisture. Young nymphs can get trapped and drown in droplets of condensation. I have observed *T. aridifolia sinensis* nymphs experience difficulty moulting in high humidity and I once made the mistake of keeping nymphs of *Orthodera ministralis* very humid – this appeared to allow fungus to invade their bodies, killing them all.

With regard to diet, it is important to provide as varied a diet as possible. Prey items should be fed nutritious diets since they will pass on these nutrients to the mantids which feed upon them. Nymphs and mature females will eat prodigiously, however, do not be concerned if adult males do not appear to eat very much.

Captive breeding programmes

The most serious problem facing the culture of mantids, and the most difficult to overcome, is common to any effort to culture an organism in captivity. Captive breeding programmes, if they are to be successful, are

primarily concerned with maintaining genetic diversity and avoiding the deleterious effects of inbreeding. Even species of insects which mate with a succession of different partners will inevitably experience a reduction in genetic variation unless stock from other sources are introduced to inject new gene combinations. Mantid females only mate once, so all of the offspring they produce are full brothers/sisters. Since any group of siblings will share, on average, about half of their genes in common; there is a serious risk that deleterious, recessive genes will be expressed. I have noticed a reduction in vigour throughout successive generations of mantids, resulting in the eventual loss of all cultures. Some species appear to deal with inbreeding better than others, but eventually succumb.

The only way to overcome the inevitable demise of a culture of mantids is to exchange some individuals (breeding males, for instance) with another mantid enthusiast who cultures the same species and derived the culture from a different source. The Mantid Study Group is therefore highly recommended to serious mantid enthusiasts, since contact between group members can facilitate an effective exchange programme.

For more information concerning The Mantid Study Group, contact the Membership Secretary: Paul Taylor, 24 Forge Road, Shustoke, Coleshill, Birmingham B46 2AU.

Glasgow moth larvae

by Frank McCann (6291)

Knot-grass caterpillar

Scarce dagger caterpillar

The general ecology of the Winter moth, *Operophtera brumata.*

by Jenni Johnstone (9214)

10 Ruthrieston Circle, Aberbeen AB10 7JX.

The Winter moth, *Operophtera brumata* (Lepidoptera: Geometridae), is common and widespread throughout much of Britain and Europe and also Canada where it was introduced earlier this century. The larvae are polyphagous and are defoliators of a range of broad-leaved tree species including birch, hazel and oak. More recently it has been found on heather, *Calluna vulgaris,* and sitka spruce but its primary hostplant remains to be oak.

This moth is a single brooded species with the adults emerging in November and December. Adult females possess only vestigial wings and are flightless while the males have a wingspan of around 20mm and will fly as long as the temperature is above 6°C. Once the females have emerged from their pupal case they tend to climb back up the same tree that was fed on as a caterpillar. Both sexes may be found after dark sitting on stems and trunks of trees and the male is readily attracted to light. Mating and oviposition take place during November and December and around 150 eggs per female are laid in the bark of branches in the crowns of trees or other host species.

The larvae hatch in April and May and feed until June passing through five instars in about two to three weeks. On oak they feed in loosely rolled leaves before spinning a length of silk to support themselves as they drop to the ground to pupate. Pupation occurs a short distance below the soil surface. Larvae are able to emigrate also by spinning silk which acts as a parachute. They can then be wind-dispersed to another tree. This can result in high mortality as the caterpillar is reliant on the wind blowing it to, and the silk thread catching on, another hostplant. However, it does allow the larvae to be able to disperse if food shortages should occur. The pupae remain in the ground during summer and autumn until November when the adults will emerge and the cycle will begin again.

Winter moth larvae have only a limited timespan in which to feed and therefore the time at which they hatch is crucial to their survival. Caterpillars feeding on oak in particular must hatch from the egg stage at just the right time to ensure that there is an adequate supply of leaves on the trees but that these leaves are still young. This is directly related to the weather. A delay of as little as two weeks in hatching can

have a disastrous effort on pupal weight which is related to adult weight and therefore egg production (Roland & Myers, 1987). Larvae which hatch too early or too late either starve or must disperse. The high mortality that results from this is offset by a considerable advantage in terms of leaf quality.

Young oak leaves as well as many of the other species used as food are highly nutritious and high in protein and nitrogen. It is known that hostplant quality affects larval development of the Winter moth especially in the early instars. There is a seasonal decline in nitrogen availability, an increase in leaf toughness and an increase in tannin content. Feeney (1968, 1970) stated that "development on oak is inhibited by leaf toughness and tannin" while Wint (1983) thought that "levels of available leaf protein in a range of broad-leaved host species correlated significantly with indices of larval performance".

Leaves contain extremely low levels of tannins at the beginning of the season and increase to around 2.4% fresh weight by September. It has been shown that the presence of as little as 1% tannin in the diet significantly reduces the larval growth rate and subsequent pupal weight and survival (Feeny, 1968, 1970). Larvae develop into heavier pupae when fed on young oak leaves. There are therefore considerable benefits to hatching and feeding while the leaves are still young but timing is all important because if the caterpillars hatch too early before the leaves are present they will most likely starve.

The timing of hatching affects mortality but other factors are important. The Winter moth has a highly fluctuating population with numbers varying greatly from year to year. If there has been high numbers of caterpillars one year and many trees have been defoliated then there will most likely be fewer leaves and reduced numbers of caterpillars the following year. About two hundred other species of insects feed on oak and therefore there is likely to be some competition between these insects and the Winter moth. Here though, the Winter moth is at some advantage in that it can disperse to other hostplants if levels of competition, be that interspecific or intraspecific, become too high. Some mortality does occur in these wind-borne dispersed larvae through failure to find food.

The highest mortality tends to occur in November to December and April to May when larvae and adults are preyed upon by birds, flies, small mammals and other insects. They can also be attacked by viral and bacterial infections. Two important parasitoids are the tachinid *Cyzenis albicans* (Diptera: Tachinidae) and the ichneumon wasp

Agrypon flaveolatum (Hymenoptera: Ichneumonidae). Female *A. flaveolatum* oviposit directly into the Winter moth larvae while *C. albicans* oviposits at the margins of damaged oak leaves and these are then ingested and paralyse the host larva.

Pupal predation and parasitism seem to be the most important elements of Winter moth population dynamics. Current work in this field suggests that density-dependent predation in the soil by beetles seems to regulate populations whereas parasitoids such as *C. albicans* are less important. Birds too are unimportant in actually regulating numbers as Feeny found at Wytham Wood in Oxfordshire in 1948 where only 2.5% Winter moth caterpillars were taken by birds. In contrast 60% of pupal predation can be attributed to beetles (Pearsall & Walde, 1994). Carabid and staphylinid beetle larvae are thought to be key culprits possibly including species such as *Carabus nemoralis, Harpalus rufipens* and *Pterostichus coracina* (Coleoptera).

Studies have found that different regulatory factors operate in different areas and there is also some dispute between authors over which factors are responsible. Studying and monitoring of Winter moth populations is extremely important as in some areas their numbers have increased to such an extent as to reach pest status. This is even more important in view of recent findings of Winter moths on heather and sitka spruce in Scotland. Studies of Winter moth populations have in fact formed the empirical basis for much of our understanding of biological control.

Winter moths were introduced into Canada in the 1930s (Nova Scotia) and 1970s (British Columbia). They rapidly became pests of not only broad-leaved trees but also apple orchards. Parasitoids were released into the area and Winter moth populations have subsequently declined. The population in Nova Scotia began to decline in 1961 and this was attributed to the two introduced parasitoids *C. albicans* and *A. flaveolatum*. Winter moth populations now persist only at low levels, as do their parasitoids.

In Britain it is generally agreed that pupal predation by beetles plays the major role in regulating populations while parasitism plays a minor role. This has been concluded by studies carried out at Wytham Wood in Oxfordshire. In Nova Scotia and British Columbia predatory beetles are also thought to be the main cause of mortality (Roland, 1995) although Bonsall & Hassell (1995) disagree, claiming it to be egg and larval mortality by parasitoids. This view is shared by Speight & Wainhouse (1989) who see the two parasitoids *C. albicans* and *A. flaveolatum* causing density-dependent mortality of the Winter moth.

Recently there has been widespread outbreaks of Winter moths on heather moorlands in north-east Scotland. This causes some worry in that *Calluna*-dominated heathland represents a rare and diminishing habitat type (Ratcliffe & Thompson, 1988). After *Calluna* is defoliated by the Winter moth larvae other species, mainly grasses, invade the area.

Outbreaks of Winter moths on *C. vulgaris* were first recorded in Orkney in 1980 and have subsequently become more widespread, typically occurring on exposed sites at high altitudes of around 600 metres. At these altitudes two potential hostplants are available: *C. vulgaris* and *Vaccinium myrtillus*. Outbreaks result in the severe defoliation of both these species. Larval growth and survival is generally poor on both species but in particular on *C. vulgaris*. This leads to lower pupal weight as mentioned earlier. These plants are low in nutrition and high in tannins yet the outbreak areas must offer some benefit to the Winter moth larvae.

The answer is parasitism. While Winter moths in broad-leaved woodlands are commonly subject to significantly high levels of parasitism, heathland offers the opportunity to escape from parasites – "enemy-free space". This may be because climatic conditions are too harsh for the parasites or simply because they have not yet colonised these areas. Whatever the reason the situation presents some concern as does the recent findings of Winter moth larvae on sitka spruce. This is a commercially important tree which is poor in nutrition but elevates the problem of early hatching in that the caterpillars can begin to feed on the buds before they have burst. This leads to stunted and deformed growth in the tree's case. So far the Winter moth has not reached pest status but careful monitoring must continue. With so many outbreaks occurring in the last fifteen years or so the cause may be due to changing climatic conditions but this is a theory yet to be developed.

As a pest of oak, heather and the possibilityof it becoming so on sitka spruce, many attempts have been made to control this insect using both chemical and biological methods. In Czechoslovakia sub-lethal doses of pyrethroids were mixed with the insect bacterium *Bacillus thuringiensis* to control Winter moths on oak whereas in southern Scotland organophosphates have been applied to sitka spruce plantations. This however must be timed correctly in order to catch the larvae before they tunnel into the buds. In addition pheromone traps have been used in Scotland to attract the males while the females were killed in sticky bands applied around the trunks of trees.

By far the most successful control has been that in Canada. Several parasitoids were introduced with two species becoming established: *C. albicans* and *V. flaveolatum*. Being species specific these acted only on the Winter moth caterpillars and not on native species. Winter moth populations in Canada are now at reasonable levels while those of the parasitoids also remain at relatively low levels. More work still needs to done on this species, at home and abroad, to increase our knowledge and reduce the risk of potential future outbreaks.

References

Begon, M., Harper, J.L. & Townsend, C.R. (1995). *Ecology; Individuals, Populations and Communities*. Blackwell Science.

Bonsall, M.B. & Hassell, M.P. (1995). Identifying density dependent processes: a comment on the regulation of the Winter moth. *Journal of Animal Ecology*. **64**: 781-784.

Feeny, P.P. (1968). Effect of oak leaf tannins on larval growth of the Winter moth *Operophtera brumata*. *Journal of Insect Physiology*. **14**: 805-817.

– , (1970). Seasonal changes in oak leaf tannins and nutrients as a cause of spring feeding by Winter moth caterpillars. *Ecology*. **50**: (4) 563-581.

Kerslake, J.E., Kruuk, L.E.B., Hartley, S.E. & Woodin, S.J. (1996). Winter moth (*Operophtera brumata* (Lepidoptera: Geometridae)) outbreaks on Scottish heather moorlands: effects of host plant and parasitoids on larval survival and development. *Bulletin of Entomological Research* **86**: 155-164.

Pearsal, I.A. & Walde, S.J. (1994). Parasitism and predation as agents of mortality of Winter moth populations in neglected apple orchards in Nova Scotia. *Ecological Entomology* **19**: 190-198.

Roland, J. (1988). Decline in Winter moth populations in North America: direct versus indirect effect of introduced parasites. *Journal of Animal Ecology*. **57**: 523-531.

– , (1995). Response to Bonsall & Hassell "Identifying density-dependent processes: a comment on the regulation of Winter moth". *Journal of Animal Ecology*. **64**: 785-786.

Skinner, B. (1984). *Moths of the British Isles*. Viking.

Speight, M.R. & Wainhouse, D. (1989). *Ecology and Management of Forest Insects*. Oxford University Press.

Diary Date

To make the diary effective contributions are needed from members. Any relevant items should be sent to the *Bulletin* Editor. No charge is made for entries. Please allow three months advance notice.

NOVEMBER

10th ***Derbyshire Entomological Society Annual Exhibiton***
Broomfield College, Morley, near Derby. 11.30am to 4.30pm. Entrance free. AES members are welcome to bring an exhibit – booking/details from: **Ian Viles 0115 949 0651.**

Book Review

Photographic Catalogue of the Genus Carabus

by Danielle Ghiretti. Available from Pemberley Books, price £110.

For those members who may not have seen this book and wish to make the genus *Carabus* the focal point of their collection it is a valuable tool for the identification of this group of beetles. The catalogue contains nearly 2400 colour photographs in 404 pages of all known species and subspecies. Each plate shows a set specimen with legs folded under the body, nine plates to each page, with the beetle illustration approximately 65mm = 2½ inches. All photographs with the exception of about two, which are dark, are good. Some have a very small blur at the left-hand side which is the out of focus pinhead but it does not detract from the quality of the photographs or identification. For an example, it lists five species of *Glabratus, Glabratus glabratus* Paykull, *Glabratus latior* Born, *Glabratus lapponicus* Born, *Glabratus extensus* Kraatz and *Glabratus gibbosus* Heyden. Under each plate there is a small (7mm) coloured beetle: a red beetle indicates Species, a green beetle indicates well characterised Subspecies (*sensu* Deuve, 1994), a yellow beetle indicates less characterised Subspecies (*sensu* Deuve, 1994), and a T, the illustrated specimen belongs to the type series (holotype, paratype or other primary type material). Although this book by Danielle Ghiretti is printed in Italy the four pages of text, Foreword, Introduction and all other notes are all in English. The lack of text in this book in no way diminishes the visual value for the identification of this group of beetles. The book is approximately 317mm = 12½ in x 215mm = 8½ in and although priced at £110 it is invaluable to members collecting the genus *Carabus*.

Keith C. Lewis

(3680)

Breeding the stick-insect *Phasma gigas* (L.) from Papua, New Guinea

by Paul D. Brock (4792)

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Introduction

There is a little piece of history surrounding *Phasma gigas*; as it is one of the first two stick-insect species ever described (as *Gryllus mantis gigas* – described by Linnaeus, 1758). The large size of this species and vivid yellow and black chequered wings must surely have delighted Linnaeus. Although reared from Ambon ("Amboina") stock by Foucher (1916), *gigas* has not been successfully cultured in Europe recently, despite previous importing of eggs. I recall being disappointed at rearing only adult males in 1991, using *Eucalyptus gunnii* and *Quercus* species as foodplants; however, I had few eggs. I have consulted Foucher's excellent illustrated study (1916) several times, with the expectation of eventually breeding *gigas* one year.

Still very common in many parts of Papua, New Guinea, Indonesia, Irian Jaya and possibly elsewhere (there are historic records from Sumatra and Borneo), *Phasma gigas* is often imported as deadstock and is consequently sometimes seen for sale at insect fairs. The latest import of eggs has resulted in a few breeders successfully rearing these eggs. I was given several nymphs in October 1996 and at the time of writing (May, 1997) have three adult males and five adult females.

Rearing conditions

These insects do well in humid conditions at 20°C (68°F)+ and my stock is being reared on *E. gunnii* and bramble *Rubus fruticosus*. A cage at least two-feet tall is absolutely vital to rear these giants, otherwise they will have difficulty moulting. Strong branches of the foodplants should be placed in a jar of water, as females are heavy when egg laying. During their development, nymphs of both sexes are readily distinguished, males are much more slender, with a characteristic "bump" beneath their abdomens.

Adults are often seen paired and a large, round pink and whitish spermatophore (a sperm package) is transferred from male to female (see plate 2). Females lay large, dark brown, sculptured eggs (Fig. 1) which take several months to hatch. I would expect several hundred eggs to be laid by each female; for detailed notes on culturing stick-insects see Brock (1992).

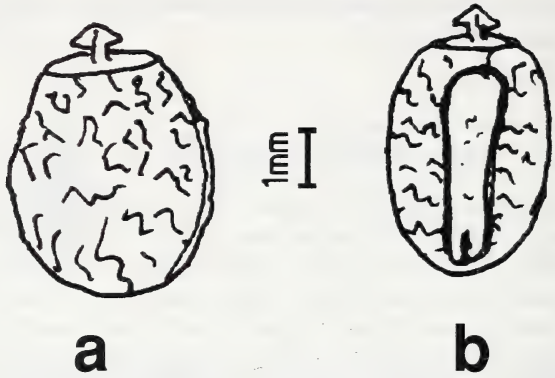


Fig. 1. Egg of *Phasma gigas*. (a) dorsal view; (b) lateral view.

Males can fly well; females are too heavily laden with eggs to fly, but they use a startle display, flapping open their vivid wings when disturbed and possibly rearing up menacingly. A swishing sound is made by their movements. Whilst collecting them in the wild, Allan Harman (personal discussion) was bitten, although I have not yet experienced this extreme reaction. Males are 100-125mm, females are up to 290mm long, hence the need for a large cage. Both sexes have a number of spines/tubercles on the thorax, all legs are spiny and the cerci are leaf-like. Females are brownish-green, males green. The females often have light-green or white patches on the forewings and pre-anal part of hindwings (the only part visible when the wings are folded). The hindwings are chequered black and yellow.

Foucher reared his culture in Paris on bramble leaves and noted that there are seven and eight moults on males and females, respectively. His comment that adult males live only three to four weeks compared to six to eight months in females is not always accurate, as males may survive much longer. Foucher also observed these insects mating for 12-14 hours, although 24 hours is not uncommon.

Despite being large, attractive insects, there has been little published on *Phasma* species. *Phasma reinwardtii* (de Haan) from Papua, New Guinea and parts of Indonesia is sometimes confused with *gigas*; however, the much larger and stouter spines on the thorax of *reinwardtii*, distinguish it from the *gigas* at a glance.

Acknowledgements

I would like to thank Stan Pack (Hassocks, W. Sussex) and Dave Rushen (The Living World, W. Sussex) for providing me with nymphs of *gigas* and also to George Beccaloni (London) for eggs sent from Wau, Papua, New Guinea in 1990, from which I only reared males. I also thank Terry and Annie Stephenson of Living Designs (20 Victoria Street, Wood Green, London N22 4XB), who supplied me with a large, reasonably priced, lightweight cage at the AES Exhibition 1996, which has proved ideal for rearing *gigas,* and undoubtedly would be suitable for all larger stick-insect species.

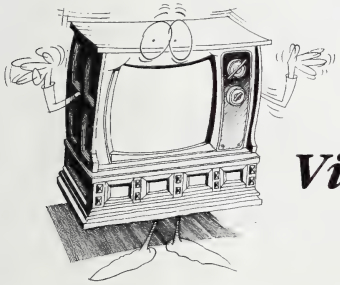
References

Brock, P.D. (1992. *Rearing and Studying Stick and Leaf-Insects*. The Amateur Entomologist. Vol. **22**.

Foucher, l'Abbé G. (1916). Etudes biologiques sur quelques orthoptères. *Cyphocrania gigas* Linnè, d'Amboine. *Bulletin de la Société nationale d'Acclimatation de France* **63**: 263-73; 328-42; 369-79; 414-25.

de Haan, W. de (1842). Bijragen tot de kennis ser Orthoptera. *In*: Temminck, C.L. *Verhandelingen over de natuurlijke Geschiedenis der Nederlandsche overzeesche Bezittingen* Vol. 2. Leiden pp. 45-208, pl. 10-23.

Linnaeus, C. (1758). *Systema Naturae per regna tria naturae secondum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. Ex. X (I), 823pp. Laurentii Salvii, Holmiae.



Video Review

A Beginner's Guide to Setting and Mounting Butterflies

Published by GK Video, Price £24.95 (Special price of £18.00 inc. p&p for AES members). Available from GK Video, PO Box 213, Grimsby DN36 5ZG. (The video only is available at the price of £10.99, special price of £6.50 inc. p&p for AES members.)

The review pack was the larger version, *Create Your Own Butterfly Picture,* containing the majority of the equipment required to make a wall case containing butterflies you set yourself. The kit includes papered butterflies (ten specimens in the review copy – all named, but

no other data) and an instructional video (available separately, see above) on setting butterflies and mounting them in the wall case provided.

The video lasts approximately 15 minutes and includes the usual Copyright warnings. The first one or two minutes includes a brief explanation of the contents of the whole kit. There follows a series of clear, straightforward steps on relaxing, pinning and setting the papered specimens, including the repair of damaged antennae. This is followed by details on mounting the specimens in the wall case included in the kit.

The idea behind the kit is sound, and the kit itself is well presented, being packed in polystyrene. Mine was delivered by post and the contents suffered no damage whatsoever. The kit is supposed to contain all the materials required to set the butterflies except water etc for relaxing them. The video describes the use of dressmaking pins for holding setting tapes to the setting board. There were 51 in the review set, though the video mentions that more may be required. Since this is presented as a kit with everything you need, perhaps it would have been better to provide 10-20 more. There were ten entomological pins, enough for one per specimen. In general, safety precautions and places where additional care is needed are pointed out. The one omission, I felt, was not advising on the extra care needed in order to avoid tearing the wings. Another, perhaps minor, point is not advising how many butterflies to relax at a time. The setting board provided is only 245mm long (enough for three or four specimens).

Despite these minor points, I feel that the video would be very helpful to someone just starting out in entomology (I wish such aids had been available when I started). The overall kit would make a good present for someone interested in insects, giving him/her the incentive necessary to start!

Nick Holford

A visit to Highgate Common, Staffordshire, and the Wyre Forest, Worcestershire

by Jan Koryszko (6089)

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After a talk on the evening of 13th August 1996 with the county Lepidoptera recorder, Mr R.G. Warren, who informed us of sightings of the White admiral (*Ladoga camilla*) at Highgate Common, Staffordshire, I decided to pay a visit the following day.

The Common lies in the south-west of the county, five miles west of Dudley. I arrived around midday and the weather was warm but overcast. The Painted lady (*Cynthia cardui*) and the Silver Y (*Autographa gamma*) were very common on the heather along with a number of Rush veneer (*Nomophila noctuella*), one of which I captured because the ground colour of the forewing seemed more variegated than the normal Rush veneer, but it was rather worn. Later, Mr Bernard Skinner confirmed by means of a genitalia examination that it was a Rush veneer, but he said there is a closely allied species named *Nomophila nearctica* which can only be separated from *noctuella* by examining the genitalia. *Nearctica* is a North American migratory species and is very rare in the British Isles with only a few records to date. Most lepidopterists rarely bother to examine any of the millions of *noctuella* that grace our shores every year – is *nearctica* being overlooked?

I moved on to the wooded area of the Common and saw quite a few common species, Speckled wood (*Pararge aegeria*), Gatekeeper (*Pyronia tithonus*), Red admiral (*Vanessa atalanta*) and Comma (*Polygonia c-album*). I captured a Ringlet (*Aphantopus hyperantus*), a locally rare species in Staffordshire, and then noticed a Dun-bar moth (*Cosmia trapezina*) on a flower head. Suddenly a Purple hairstreak (*Quercusia quercus*) landed on a flower close by.

I then met a Ranger who was most interested in my findings and told me of a sighting of a Marbled white (*Melanargia galathea*) a few days before in the area. This is another rare butterfly in Staffordshire. He then took me to the area where the White admirals had been reported. There was plenty of the foodplant, honeysuckle, in the area and I spent 90 minutes searching around but had no luck – the weather was still overcast. I saw one Emerald damselfly (*Lestes sponsa*).

I moved on to the Wyre Forest, Worcestershire arriving at around 6.30pm. The sun had finally broken through and I was greeted by a Silver-washed fritillary (*Argynnis paphia*) on a bramble flower – what a wonderful sight. I took a number of photographs as further Silver-washed fritillaries were seen along the footpaths. Probably the most notable sight was the number of Wood ant (*Formica rufa*) nests in the wooded areas. There must have been millions of these ants on the trees and footpaths collecting insects, leaves and even dead spiders to take back to their nests.

Plate 1. Mating pair of *Phasma gigas*.

Plate 2.
End of abdomens in mating pair of *Phasma gigas,* showing the spermatophore.

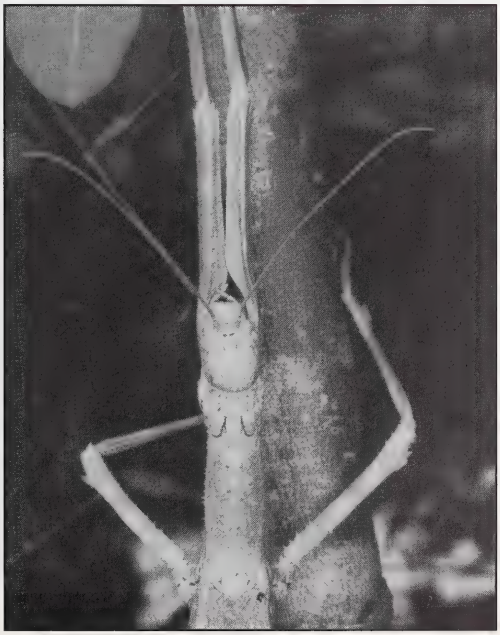

Plate 3.
Close-up of head and thorax in female *Phasma gigas*; note the typical, delicate black markings.

Plate 4. Female *Phasma gigas* feeding on *Eucalyptus gunnii*; note the typical, delicate black markings and spiny thorax.

Plate 5. A typical *formica rufa* nest. (Photo: D.E. Belverstone).

Plate 6. Area of sweet chestnut coppice where ants were collected, showing standards and new growth of sweet chestnut from stools. (Photo: D.E. Belverstone).

A study of the size variation of Wood ants, *Formica rufa,* in an ancient, mixed coppice woodland in south-east Essex

by Deborah Belverstone

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Introduction

The Wood ant, *Formica rufa,* is the largest British ant and belongs to the family Formicidae. It is found on heaths and in both deciduous and pine woodlands, where it builds nests of twigs, leaves and pine needles (Plate 5). These nests are usually about two metres across and one metre in depth, and at the height of the season a nest may contain up to 300,000 individuals (Brian, 1965).

These ants are mostly active on warm, dull, humid days, foraging for food. These foragers are the worker ants, which are non-breeding females, whose function is to collect food, build, clean and repair the nest and defend it against predators and rival ants. In the nest the queen lays eggs throughout the summer, so that at any one time there are larvae at all stages of development.

In the spring the ants emerge from hibernation and battles occur between ants from different nests, in order to establish their territories. The existence of territory in *F. rufa* was confirmed by Skinner (1980a) who estimated territory sizes to be between 272m^2 and 1616m^2, in a limestone woodland in north-west England. A territory consists of a network of permanent foraging trails which are formed around each nest, and need reinforcement each season (Skinner, 1980a). The trails are kept clear of obstructions, in order to bring back nest material and food, much of which will be for the queen and larvae in the nest. By forming these permanent foraging trackways other colonies can be effectively excluded, because tracks cannot intersect without fighting, which leads to avoidance and the need for spatial separation (Brian, 1965).

Skinner (1980b) found that *F. rufa* feed mainly on aphids, Diptera, Lepidoptera larvae and honeydew, and so limit much of their foraging to trees (Plate 6), because this is where the most abundant prey populations are likely to be found. About 80% of foragers were found to spend their time foraging up trees. There has, therefore, been much interest in the feeding habits of wood ants, because of their possible use as biological control agents of defoliating insects. Much work has

been carried out to determine the effect of Wood ant predation on the population of tree canopy herbivores and how this may, in turn, benefit the plants. These studies have mainly concentrated on the defoliators, using the ants as natural predators to manipulate them, and then observing the effect on the plants. For example, Warrington and Whittaker (1985a, b) studied the effect of *F. rufa* activity on sycamore and found that they prey upon caterpillars and some species of aphid, whilst other aphid species are tended by the ants for honeydew. This predation was used to show that herbivores significantly reduce tree growth (Warrington & Whittaker, 1985). However, much less is known about how the food obtained by the ants from the plants affects the physiology, growth and population structure of ant colonies (Beattie, 1985).

The purpose of this study, then, was to focus on the ants themselves and discover if foraging ants varied in size depending on the tree species they were foraging on; the distance of the tree from the nest; the day; and the time of day. *F. rufa* were investigated on oak (*Quercus petraea*), silver birch (*Betula pendula*) and sweet chestnut (*Castanea sativa*), in a deciduous woodland in south-east Essex.

Most studies on *F. rufa* have been carried out in the north of England and the trees concerned have mainly been oak, birch and sycamore. There has been no known work on the activities of wood ants on sweet chestnut.

Studies have shown that *F. rufa* utilise different species of tree at different times of the year, depending on the abundance of prey present, and that peak intake of herbivores is related to their peak of abundance on trees (Skinner 1980b). Variation in herbivore species on different trees and their abundance may affect the size of foraging ants found on these trees.

It is known that workers vary in size, sensitivity and activity, thus creating a useful mix of types in a colony. Work in the nest is light and intricate, whilst outdoor work is heavy and dangerous and requires sensitivity to environmental cues and intelligent flexibility. Foragers should, therefore, be older and larger than average and this is brought about by a variable rate of development, so that initially bigger individuals develop tough pigmented skins and an attraction to light, more quickly than smaller ones and so become foragers sooner (Brian, 1983).

The variation in size of the workers is not purely due to unequal food distribution, although reduced food supply does reduce mean

size. Food supply is a social and seasonal variable which interacts with genetic variation. This produces workers with a range of size, development rate and behaviour that covers the requirements of the society (Brian, 1983).

In *F. rufa,* the bigger foragers tend to hunt, whilst the smaller ones collect honeydew (Brian, 1979a, cited Brian, 1983). It is possible, then, that ants foraging on different trees will vary in size, depending on the type of food available to them.

The intensity of ant foraging is related to distance from the nest, so perhaps size is too. In northern England the fall-off in the flow rate on *F. rufa* trails is exponential, and usually reaches zero at about 60 metres from the nest (Whittaker 1991). Large ants are known to go further afield, wander off the trails more and become involved in special activities (Brian, 1979a, cited Brian, 1983), so, again, it would be interesting to see if ants are, indeed, larger on trees which are further away from a nest, compared to those on trees closer to a nest.

Study Site

This study was carried out at Norsey Wood (National Grid Reference TQ686 956), a 165 acre (66.8 ha) ancient, mixed coppice woodland near Billericay in south-east Essex. It is a Local Nature Reserve and from evidence found, it is thought to have been an individual component of the countryside for over 1000 years and all or part of it has been continuously wooded since Roman times or before (Cook, 1992).

Norsey is composed of plateaux of sandy and gravelly soils overlaying clays, producing four valleys into a principal valley. The valleys are marshy and support alder (*Alnus glutinosa*), ash (*Fraxinus excelsior*) and willow (*Salix fragilis*) coppice, with areas of pendulous sedge (*Carex pendula*), sphagum moss and buckler fern. The site for this study was on the higher plateau areas, which are relatively flat and well drained,with a soil pH of approximately five. They consist mainly of sweet chestnut (*Castanea sativa*) coppice with areas of hornbeam (*Carpinus betulus*) in the east and south and varying amounts of oak, birch, larch (*Larix decidua*), rowan (*Sorbus aucuparia*) and aspen (*Populus tremula*) (Cook, 1992).

The *F. rufa* nests studied were mainly within a 100m x 30m area of sweet chestnut, which had been coppiced between the end of 1993 and the beginning of 1994, leaving a few standard oaks and sweet chestnuts. In order to investigate *F. rufa* on birch, a nest approximately fifty metres away from this area was also studied.

Materials and methods

Ant collection

Four *f. rufa* nests were located and the trails from each of the nests were followed to find the trees being foraged by the ants and these were measured. The trail lengths and species of trees are shown in Fig. 1a. Only oaks and sweet chestnuts were being foraged by *F. rufa* in this area, so a nest, approximately fifty metres away, was also studied, because the ants here were foraging birch trees as well as oak (Fig. 1b).

Only the ants going up the trees were collected, because there may have been a difference in size between these ants and the ants coming down the trees, and the inclusion of this variable was not wanted. For each tree, fifty ants were collected going up the tree in the morning (between 10.30 and 12.00 hours) and fifty were collected, on the same day, in the afternoon (between 14.00 and 15.30 hours). On another day this was repeated so that a total of 200 ants were collected from each tree. Ants from nest five, foraging the oak tree, were only collected during one day, 100 collected in the morning and 100 collected in the afternoon. All ants were collected between 19 July and 2 August 1994.

Collection of the ants from the trees involved choosing a mark on the tree trunk, at about eye level and collecting the first fifty ants to cross the line.

This was possible because *F. rufa* are only active on one side, not around the whole trunk. The ants were flicked off the tree, using a small paint brush, into a small bottle containing 70% alcohol to preserve them. The bottle was labelled with a number and records were made of the time and date of collection, tree species, nest from which the ants came and trail length.

Measurements

Before any measurements were made the ants were observed under a microscope, to ensure that they were members of the *F. rufa* species. Head width measurements were made because this was the most accurate method of determining the comparative sizes of the ants, since this only changes relative to the rest of the body, whereas the size of the abdomen would depend largely on what the ants had recently consumed.

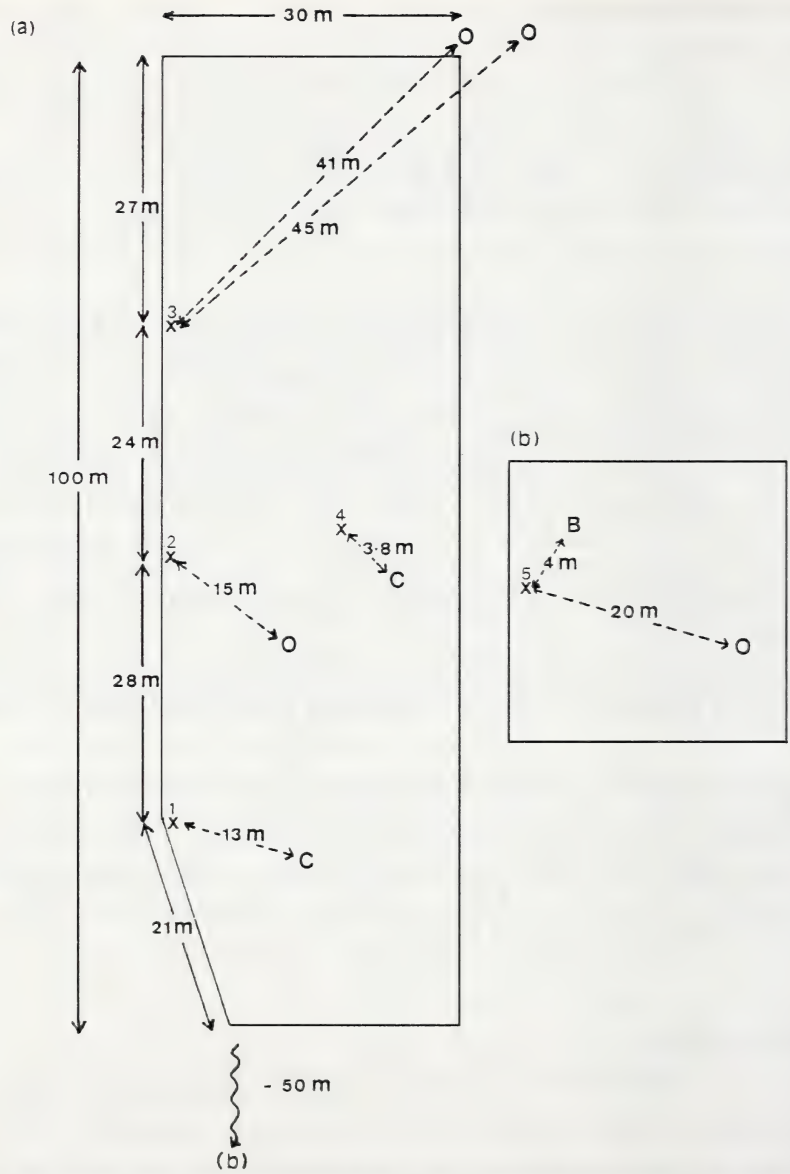

Fig. 1. The approximate location of *F. rufa* nests, trails and foraged trees, studied within an area of sweet chestnut coppice, Norsey Wood. (a) Coppiced 1993-1994; (b) Area of birch and oak. **X** = *f. rufa* nest; <- - - - > = *f. rufa* trail; **O** = standard oak; **C** = standard sweet chestnut; **B** = birch.

Each individual ant was placed, in turn, onto a piece of foam on a microscope slide, in a petri dish containing a small amount of 70% alcohol to keep them moist, as shown in Fig. 2. This was placed under a binocular microscope with a graduated eyepiece and x5 lens, so that the head of the ant was covered by almost all of the graticule, thus

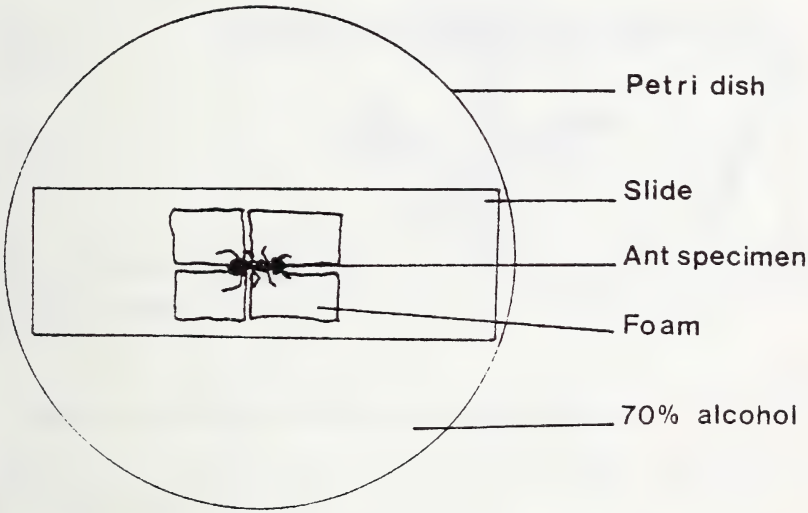

Fig. 2. Diagrams to show how head width measurements were made.

making the measurement as accurate as possible. The head of each ant was positioned such that the maximum head width (from eye to eye) could be measured (Fig. 3). These measurements were then calibrated, using a graduated slide, to give the head width in millimetres. Two of the samples of fifty ants were chosen at random and re-measured to ensure measurements were reliable.

Analysis

When all the measurements had been made, the mean, standard deviation and variance were calculated for each sample of fifty ants. T-tests determined any significant differences between the head widths of ants in the sample measured twice. Any significant difference between the sizes of ants collected from the same tree at (a) different times of the day *ie* morning and afternoon and (b) the same time but on different days, was calculated using t-tests on pairs of samples (n=50).

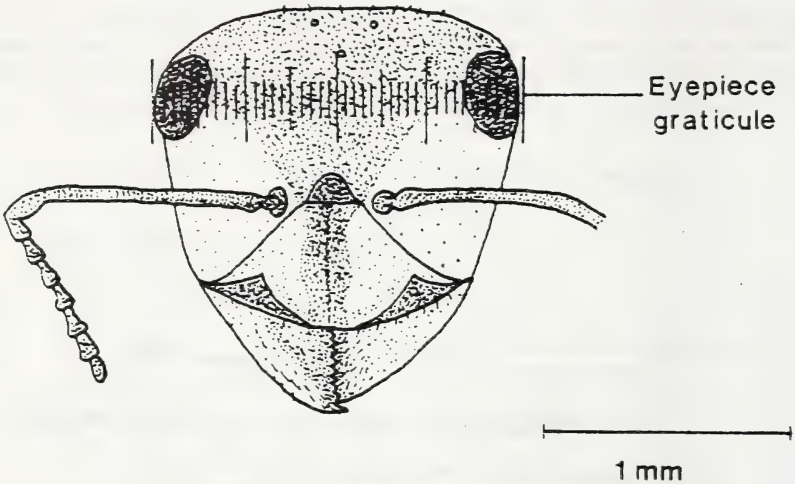

Fig. 3.
Drawing to show the position of maximum head width, as seen through a microscope.

When there was found to be no significant difference between these variables, the results of all four samples of ants collected from each individual tree were combined. Any significant difference between sizes of ants collected from (a) different tree species at similar distances from a nest and (b) the same tree species at different distances from a nest, was calculated using t-tests on pairs of samples (n=200).

It was not possible to test the results using an analysis of variance to find out if ant size variation was due to tree species or distance of the trees from a nest, because not enough trees were studied. For example, data was obtained from two sweet chestnut trees: one was 3.8 metres from a nest, and the other was 13 metres from a nest. Only one birch tree had been studied, four metres from a nest and although four oak trees had been studied, none was approximately four metres from a nest. This was unfortunate, but it was simply not possible to find different species of trees at the same distances from a nest being foraged by ants.

Results

Table 1. Mean head width (mm) ± S.D. of samples of *F. rufa* re-measured to test for accuracy (n=50).

Tree	Trail length (mm)	Nest	Day	Time	Measure 1	Measure 2
Chestnut	13	1	1	pm	1.42±0.13	1.44±0.14
					t=0.53; d.f.=98; P>0.05	
Oak	45	3	2	am	1.66±0.13	1.68±0.13
					t=0.55; d.f.=98; P>0.05	

Table 1 shows the mean head widths of two samples of fifty ants, which were picked randomly and re-measured to ensure accuracy of measurements. The measurements were not significantly different at the 5% level.

Table 2. Mean head width (mm) ± S.D. of samples of *F. rufa* collected from foraged trees, (n=50, except * where n=100).

			Day 1				Day 2			
			a.m.		p.m.		a.m.		p.m.	
Tree	Trail length (m)	Nest	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Birch	4.0	5	1.40	0.14	1.38	0.16	1.40	0.16	1.37	0.13
Chestnut	3.8	4	1.36	0.13	1.33	0.14	1.39	0.16	1.33	0.13
Chestnut	13	1	1.44	0.13	1.39	0.14	1.41	0.15	1.42	0.13
Oak	15	2	1.61	0.14	1.63	0.18	1.59	0.16	1.60	0.15
Oak	20	5	1.54	0.14*	1.52	0.13*	———		———	
Oak	41	3	1.67	0.18	1.69	0.14	1.70	0.12	1.65	0.16
Oak	45	3	1.67	0.12	1.65	0.14	1.66	0.13	1.67	0.14

(N.B. Day 1 and Day 2 are not the same for each tree species.)

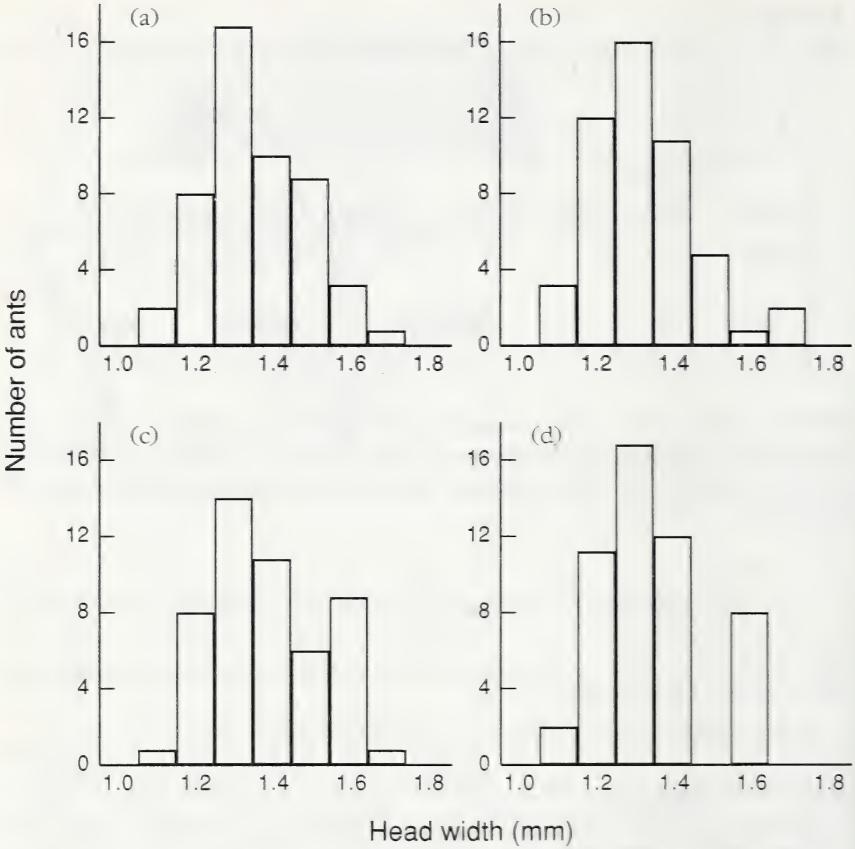

Fig. 4. Distribution of head widths of ants foraging sweet chestnut, 3.8m from nest four. (a) Day 1, am; (b) Day 1, pm; (c) Day 2, am; (d) Day 2, pm.

Fig. 5.

F. rufa foraging a birch tree (*Betula pendula*), with the trail leading off at the bottom corner.

(Photo: D.E. Belverstone)

Table 3.

Comparison of mean head widths (mm) of *F. rufa* collected from foraged trees at different times of the day and on two different days (n=50, except * where n=100).

		Day 1		Day 2		
	Time	Mean	S.D.	Mean	S.D.	
Birch	a.m.	1.40	0.14	1.40	0.16	t=0.24; d.f.=98; P>0.05
4m from nest 5	p.m.	1.38	0.16	1.37	0.13	t=0.07; d.f.=98; P>0.05
		t=0.92; d.f.=98; P>0.05		t=0.80; d.f.=98; P>0.05		
Sweet chestnut	a.m.	1.36	0.13	1.39	0.16	t=1.08; d.f.=98; P>0.05
3.8m from nest 4	p.m.	1.33	0.14	1.33	0.13	t=0.18; d.f.=98; P>0.05
		t=1.10; d.f.=98; P>0.05		t=1.94; d.f.=98; P>0.05		
Sweet chestnut	a.m.	1.44	0.13	1.41	0.15	t=1.05; d.f.=98; P>0.05
13m from nest 1	p.m.	1.39	0.14	1.42	0.13	t=1.24; d.f.=98; P>0.05
		t=1.89; d.f.=98; P>0.05		t=0.43; d.f.=98; P>0.05		
Oak	a.m.	1.61	0.14	1.59	0.16	t=0.37; d.f.=98; P>0.05
15m from nest 2	p.m.	1.63	0.18	1.60	0.15	t=0.83; d.f.=98; P>0.05
		t=0.81; d.f.=98; P>0.05		t=0.33; d.f.=98; P>0.05		
Oak	a.m.	1.54*	0.14	———		
20m from nest 2	p.m.	1.52*	0.13	———		
		t=0.73; d.f.=198; P>0.05				
Oak	a.m.	1.67	0.18	1.70	0.12	t=1.13; d.f.=98; P>0.05
41m from nest 3	p.m.	1.69	0.14	1.65	0.16	t=1.34; d.f.=98; P>0.05
		t=0.68; d.f.=98; P>0.05		t=1.87; d.f.=98; P>0.05		
Oak	a.m.	1.67	0.12	1.66	0.13	t=0.08; d.f.=98; P>0.05
45m from nest 3	p.m.	1.65	0.14	1.67	0.14	t=0.77; d.f.=98; P>0.05
		t=0.62; d.f.=98; P>0.05		t=0.26; d.f.=98; P>0.05		

(N.B. Day 1 and Day 2 were not the same for each tree species.)

The results of the t-tests, calculated to show any significant differences between mean head width measurements of ants collected from the same tree at (a) different times of the day (a.m. and p.m.) and (b) the same time but on different days, are shown in Table 3.

These results show that there was no significant difference in mean head width, either at different times of the day, or at the same time but on different days, of the ants collected from any of the tree species.

It was, therefore, possible to combine the results of all four samples of ants collected from each individual tree (Table 4).

Table 4. Mean head width (mm) ± S.D. of *F. rufa* from foraged trees (n=200).

Tree	Trail length (m)	Nest	Mean	S.D.
Birch	4.0	5	1.39	0.15
Chestnut	3.8	4	1.35	0.14
Chestnut	13.0	1	1.42	0.14
Oak	15.0	2	1.61	0.16
Oak	20.0	5	1.53	0.13
Oak	41.0	3	1.67	0.15
Oak	45.0	3	1.66	0.13

From Table 4 it would appear that, in general, ants increased in mean size the further the foraged trees were from their nest. Table 5 shows the results of t-tests on selected pairs of results.

Table 5. Comparison of mean head widths (mm) of *F. rufa* collected from different tree species and at different distances from a nest (n=400).

Tree (trail length)	Mean	S.D.	VS	Tree (trail length)	Mean	S.D.
Birch (4.0m)	1.39	0.15		Chestnut (3.8m)	1.35	0.14
		t=2.48; d.f.=398; P<0.05				
Oak (15m)	1.61	0.16		Chestnut (13m)	1.42	0.14
		t=13.25; d.f.=398; P<0.01				
Oak (15m)	1.61	0.16		Oak (20m)	1.53	0.13
		t=5.31; d.f.=398; P<0.01				
Oak (41m)	1.67	0.15		Oak (45m)	1.66	0.13
		t=0.85; d.f.=398; P>0.05				
Chestnut (13m)	1.42	0.14		Chestnut (3.8m)	1.35	0.14
		t=4.72; d.f.=398; P<0.01				
Birch (41m)	1.67	0.15		Oak (15m)	1.61	0.16
		t=4.31; d.f.=398; P<0.01				
Oak (45m)	1.66	0.13		Oak (15m)	1.61	0.16
		t=3.77; d.f.=398; P<0.01				
Oak (41m)	1.67	0.15		Oak (20m)	1.53	0.13
		t=9.87; d.f.=398; P<0.01				
Oak (45m)	1.66	0.13		Oak (20m)	1.53	0.13
		t=9.76; d.f.=398; P<0.01				
Oak (20m)	1.53	0.13		Birch (4.0m)	1.39	0.15
		t=10.18; d.f.=398; P<0.01				

The only trees with no significant difference between the mean sizes of ants foraging them were the two oak trees associated with nest three. These were the only two trees, of the same species, at similar distances from a nest and being foraged by ants from the same nest and, consequently, it would be expected that the ants on these trees would not be of different sizes. These ants also had the largest mean head width of all those collected and had the furthest distance to cover (41 and 45 metres) to the trees they were foraging, suggesting that larger ants forage further from the nest. This is further supported by the fact that ants collected from the other oak trees (15 and 20 metres from their nests) had significantly smaller mean head widths than those of nest three. The differing distribution of head widths of ants from these trees can be seen in Fig. 7. Also, the ants that foraged the sweet chestnut, 13 metres from nest one, had significantly bigger mean head widths than those that foraged the sweet chestnut 3.8 metres from nest four (Fig. 6b and c).

It would appear, though, that ant size was not purely governed by distance of trees from a nest. Comparisons between the mean head widths of ants from oak and sweet chestnut, at similar distances from a nest (15 metres and 13 metres respectively), showed that the ants collected from the oak tree, had significantly larger mean head widths than those from the sweet chestnut (Figs. 7a and 6c). Ants collected from the birch tree, four metres from nest five, also had significantly larger mean head widths than those from the sweet chestnut, 3.8 metres from nest four, even though the trees were at very similar distances from a nest (Figs. 6a and 6b). This suggests that ant size is also affected by tree species.

However, ants that foraged the oak, 20 metres from nest five, are significantly smaller than those that foraged the oak, 15 metres from nest two. This cannot be accounted for, either by distance of the trees from the nest, since from the other results it would be expected that the larger ants would be found on the furthest tree from the nest, nor by a difference in tree species.

Figure 7 shows that the distribution of the ant head widths on all the oak trees are slightly skewed to the right, with the majority of ants being large. Figure 6a and 6b shows that on the sweet chestnut and birch trees, around four metres from a nest, distribution of ant heads widths is very slightly skewed to the left, with the majority of ants being small.

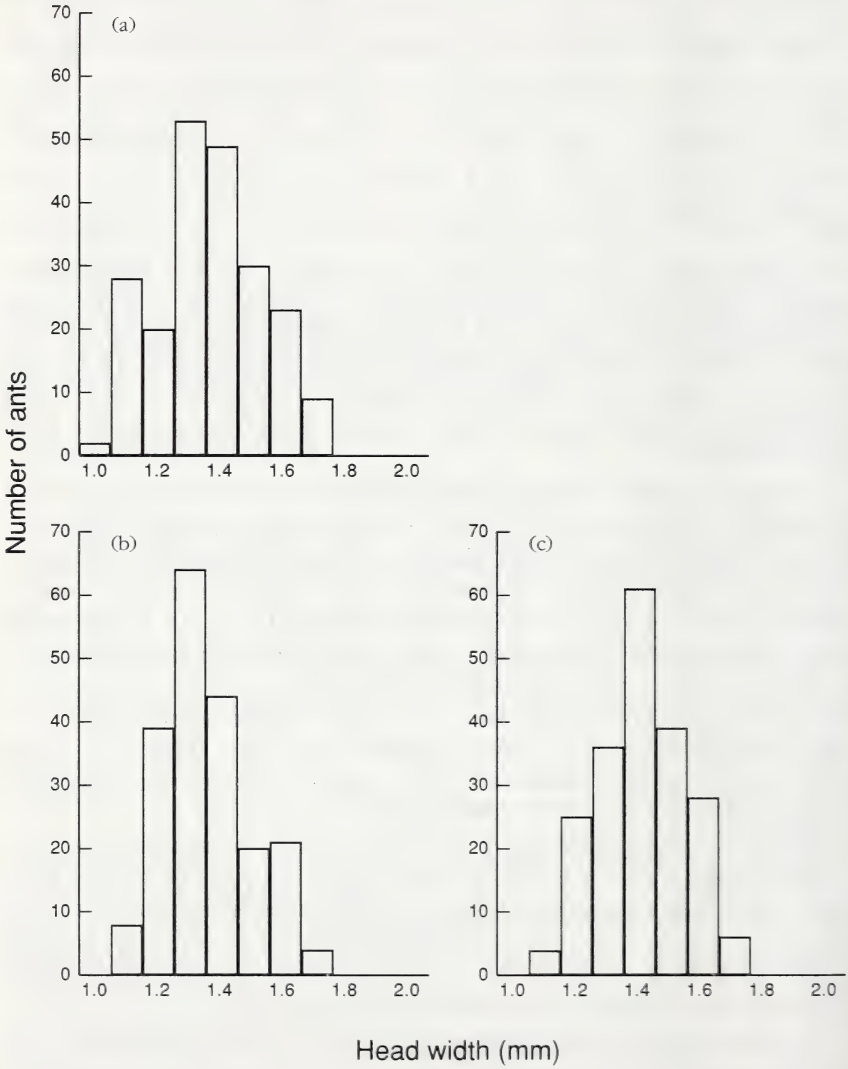

Fig. 6. Distribution of head widths of ants foraging (a) birch, 4.0m from nest five; (b) sweet chestnut, 3.8m from nest four; (c) sweet chestnut, 13m from nest one.

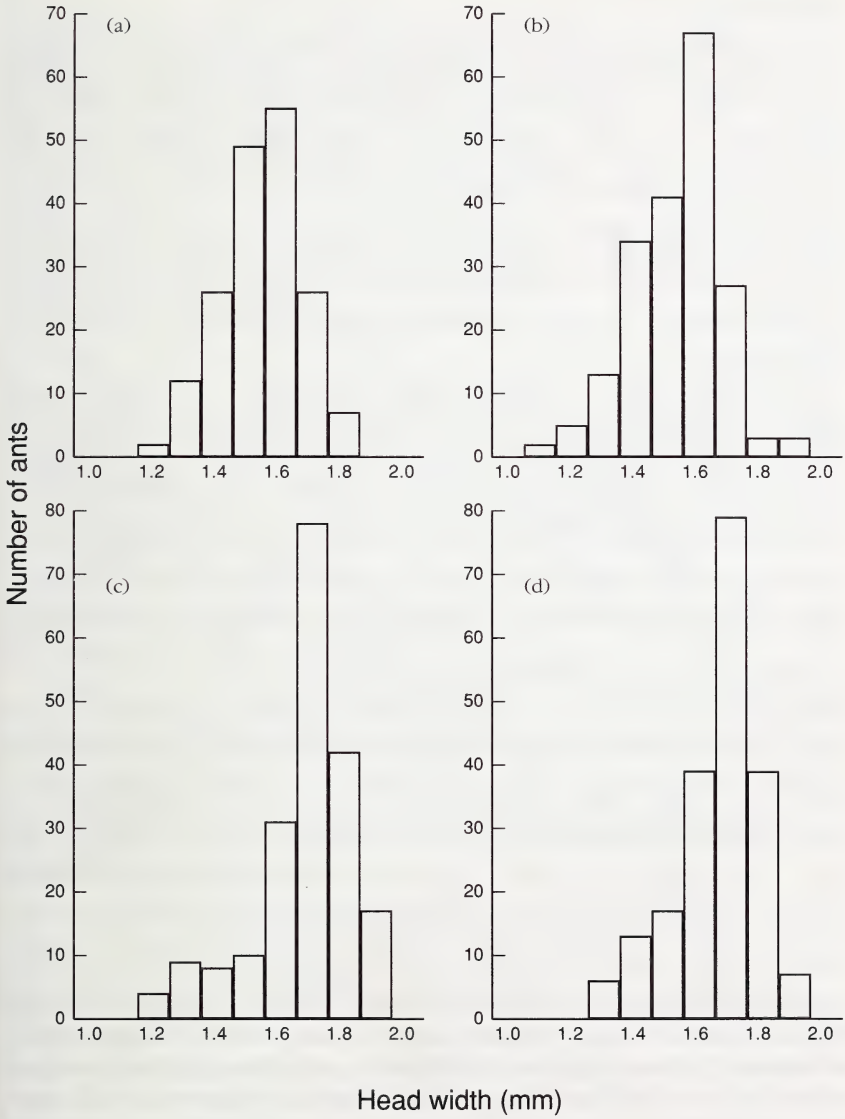

Fig. 7. Distribution of head widths of ants foraging (a) oak, 15m from nest two; (b) oak, 20m from nest five; (c) oak, 41m from nest three; (d) oak, 45m from nest three.

Discussion

Most previous work on the activities of *F. rufa* in deciduous woodlands has centred on the effects of their predation on defoliators and tending of aphids and how this, in turn, affects the growth of trees. Many of these studies have been carried out in the north of England and the trees concerned have mainly been oak, sycamore and birch. In this study, the field work was carried out in south-east England and *F. rufa* activity was investigated on oak, silver birch and sweet chestnut, this time focusing on the ants themselves and how and why the size of foraging ants may be influenced by the different tree species they forage; distances of these trees from their nests; time of day; and different days.

It is known that in *F. rufa* the bigger ants tend to go further afield than smaller ones (Brian, 1979a, cited Brian, 1983) and this appears to be the case in this study. The mean ant head width of those foraging the oak trees, 41 and 45 metres from nest three was distinctly greater than for those foraging the oak trees 15 metres from nest two and 20 metres from nest five. Likewise, the ants foraging the sweet chestnut, 13 metres from nest one, had a greater mean head width than those foraging the sweet chestnut 38 metres from nest four. It would seem likely that this is due to the work which requires increased strength for bringing back heavy prey from longer distances.

However, apart from the oaks 41 metres and 45 metres from nest three, the trees were foraged by ants from different nests. It may be possible, then, that mean ant head widths also vary from nest to nest. This could explain why ants foraging the oak 20 metres from nest five had a significantly smaller mean head width than those that foraged the oak 15 metres from nest two. The trees are of the same species and if distance was the only factor affecting ant size, the oak, 15 metres from nest two would be expected to be foraged by smaller ants.

The position of the two nests could explain these results. Nest two was situated in the area of sweet chestnut coppice and very few trees were available to forage. Indeed, ants from nest one were seen foraging an oak tree that was also being foraged by ants from another nest (not studied). Trees are rarely shared but if they are, ants from different colonies pass on opposite sides of the trunk and use different branches (Brian, 1965). Also, four or five trails are usually formed from a nest, but here there were mostly only two trails from each nest. It seems likely that fierce intraspecific competition would have occurred between nests one to four at the beginning of the season, in order for

the colonies to establish territories and form trails (Skinner, 1980a) to the most favourable trees. There may have been an advantage in being greater in size, with larger ants outcompeting smaller ones for the trees that were most attractive to them (in terms of food availability). Nest five, on the other hand, was situated within a well-wooded area of oak and birch trees and although there were other nests within sight, there would have been little need for such fierce competition and the ants may not have needed to be of such a great size. Ants from neighbouring nests would need to be studied at the beginning of the season to find out if larger ants do outcompete smaller ones.

There also appears to be a variation in mean sizes of ants on different tree species, although again, the data do not provide conclusive evidence for this. The birch and sweet chestnut trees, both approximately four metres from *F. rufa* nests, had significantly different mean sizes of ants foraging them, but the ants were from different nests and, again, this could be an important factor. Similarly, sweet chestnut and oak, both around 15 metres from a nest, had different mean sizes of ants foraging them, but, as before, the ants were from different nests.

Whether or not the differences in ant size are due to nest variability or are directly attributable to different tree species, it is most likely that food availability is the overriding cause.

Skinner (1980b) discovered that *F. rufa* utilised particular species of trees at different times of the year, this being related to the food availability of the trees. He found that the main food items of *F. rufa* in a deciduous wood in north-west England were aphids, Diptera, Lepidoptera larvae and honeydew farmed from aphids. The peak intake of these insects by *F. rufa* was found to be related to their peak of abundance on the trees.

Prey abundance must, therefore, affect the trees the ants choose to forage at Norsey Wood. In this study oak was clearly a popular choice of tree species to forage. It was noted, whilst field work was undertaken, that although the ants from nest three foraged oak trees 41 metres and 45 metres away, there were, in fact, two large standard sweet chestnuts a mere four and 15 metres approximately, from their nest. These trees remained unforaged even though the ants' trails to the oak trees passed directly by them and there were no other ants from nearby nests foraging them. From this it would seem that it was more worthwhile for the ants to expend energy on going 30 metres further to forage oak trees than to save energy by foraging the closer sweet chestnuts. This suggests that either the herbivores on the oak trees were

more favourable to the ants, or that the herbivore species present on oak were simply more abundant than those on sweet chestnut. The latter would perhaps be more likely, since ants from nest one and four were foraging sweet chestnuts and must therefore, have been finding some food.

Unfortunately, there are no known previous studies of *F. rufa* activity on sweet chestnut, so there is little indication as to what food items might be obtained by them. It is known that there are eleven species of insect herbivores associated with sweet chestnut, these being one Coleopteran species, one Homopteran (Aphidoidea) species and nine Lepidoptera (Kennedy & Southwood, 1984). There does seem to be some disagreement, with Winter (1983) listing nine of these as one Coleopteran species; two Hemiptera species and six Lepidoptera.

Oak (two *Quercus* spp.), in contrast with sweet chestnut, has 423 insect herbivore species associated with it and birch (two *Betula* spp.) has 334 (Kennedy & Southwood, 1984). Of course this does not imply that oak and birch would be more favourable to *F. rufa* than sweet chestnut simply because oak has more herbivore species associated with it, since not all of these herbivores are preyed upon by *F. rufa,* and it is abundance of the herbivores that is most important. However, if there were several species of herbivores providing food for *F. rufa* and were present in abundance on oak, while only one or two species were providing food for *F. rufa* and were present in abundance on sweet chestnut, it seems likely that oak trees would be preferred by the ants.

The ants on the four oak trees studied, had greater mean head widths than those on the birch and the two sweet chestnuts. In particular, the oak 15 metres from nest two, was foraged by ants with a greater mean head width than those foraging the sweet chestnut at a similar distance from a nest. This difference in size could be due to the type of food the ants were collecting from the different species of tree. Brian (1979a, cited Brian 1983) found that bigger foragers tended to hunt whilst the smaller ones collected honeydew. If this is true of the ants at Norsey Wood, then perhaps the ants foraging oak trees are collecting larger prey than those on the sweet chestnut and birch.

As previously mentioned, studies have shown that the main food items of *F. rufa* in north-west England are aphids, Diptera, Lepidoptera larvae and honeydew. Skinner (1980b) and Skinner and Whittaker (1981) found that caterpillars of the Winter moth, *Operophtera brumata* were an important food item on oak trees for *F. rufa* in north-west

England. If ants on the oak trees on Norsey Wood are collecting larger prey than those on sweet chestnut and birch, the most likely items will be caterpillars and flies.

Honeydew is derived by wood ants from particular species of aphids and so while some species are preyed upon, others are tended. Mahdi and Whittaker (1993) found seven aphid species feeding on *Betula pendula* in a wood in the north-west of England. Two of these were tended by *F. rufa* while the remaining five were preyed upon. *F. rufa* may, therefore, be tending aphids on the birch tree in this study. Skinner and Whittaker (1981) found that *F. rufa* tended eight species of aphids on several different plant species, so while there is no evidence for this, it may also be possible that *F. rufa* tend the aphid species on sweet chestnut (Kennedy & Southwood, 1984) and this could help to provide an explanation for their small mean sizes.

It is also likely that other food items are being obtained as well, but perhaps these are not so abundant. From Figure 9 it can be seen that the distribution of the ant head widths on all the oak trees are slightly skewed to the right, with the majority of ants being large. Figure 8 shows that on the sweet chestnut and birch trees around four metres from a nest, distribution of ant head widths is very slightly skewed to the left, with the majority of ants being small. This suggests that on oak, if large ants are collecting large prey, the remaining smaller ants are perhaps tending aphids or catching smaller prey, while on sweet chestnut and birch the majority of ants are small and may be collecting honeydew or small herbivores, with a few large ants collecting less, bigger prey. On sweet chestnut it is likely that some Lepidoptera larvae are being collected by *F. rufa,* as these make up at least six of the eleven species known to be associated with sweet chestnut (Winter, 1983).

The variation in size of workers is not purely due to unequal food distribution, but reduced food supply does reduce mean size (Brian, 1983), so shortage of prey could also be a reason for the small mean size of ants on sweet chestnut and birch.

This study showed that there was no variation in the mean size of wood ants at different times of the day on any of the tree species investigated. If different size ants collect different size prey, then it appears that all sizes are active throughout the day. This corresponds with Skinner's (1980b) study, in which he discovered that food income by *F. rufa* was much the same during a 24-hour period, even during the night, although the amounts brought in were generally less at night because of reduced activity.

In the short time that this study was carried out, there was also no variation in mean size of ants on different days. This factor was mainly tested to ensure that ants collected from different trees on different days could be reliably compared.

As previously mentioned, Skinner (1980b) found that particular species of tree were utilised by *F. rufa* at different times of the year depending on the food availability. A longer period of study would need to be carried out at Norsey Wood to find out if the ants so change their foraging activity on the trees present. It may be important to note that whilst birch and oak both flower early in the year (in April and May) sweet chestnut flowers later than most trees (in July) with the fruits ripening in October. This may affect the peak of abundance of the herbivores associated with sweet chestnut and. in turn, change the activity of the wood ants on these trees.

Definite conclusions have been hard to draw from the data obtained for many reasons. The time during which the ant collections were made was limited and longer investigations would be necessary to observe any long-term changes in *F. rufa* activity on different tree species. There have been no previous studies on the activities of *F. rufa* on sweet chestnut and while the herbivore species on sweet chestnut are known, their abundance is not. Collections of food items caught by the ants from sweet chestnut would be useful, as well as from oak and birch for comparisons of prey. Trees, from which the ants were collected, were selected because of their ant activity and it was not possible to investigate all tree species at the same distances from nests. This prevented the use of certain statistical analyses and, therefore, made interpretation of the result difficult.

The conclusions that can be drawn from this study are that mean sizes of *F. rufa* remain the same through the day and at least over a number of days. The distance of foraged trees from a nest seems to affect ant size, as does the difference in tree species. There may also be variability between nests and different tree species. These factors appear to interact with each other, thereby influencing ant sizes. Finally, this study has shown that wood ants are highly complex creatures, and there is still much to learn about them.

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References

Beattie, A.J. (1985). *The Evolutionary Ecology of Ant-plant Mutualisms*. Cambridge University Press.

Brian, M.V. (1965). *Social Insect Populations*. Academic Press, London.

– , (1979a). Caste differentiation and division of labour. *Social Insects I* (Ed. by H. Hermann), pp. 121-222. Academic Press, New York.

– , (1983). *Social Insects: Ecology and Behavioural Biology*. Chapman and Hall.

Cook, K.G. (1992). *The History of Norsey Wood*. Basildon District Council.

Kennedy, C.E.J. & Southwood, T.R.E. (1984). The number of insects associated with British trees: a re-analysis. *Journal of Animal Ecology*. **53**: 455-478.

Mahdi, T. & Whittaker, J.B. (1993). Do birch trees (*Betula pendula*) grow better if foraged by wood ants? *Journal of Animal Ecology*. **62**: 101-116.

Skinner, G.J. (1980a). Territory, trail structure and activity patterns in the wood ant *Formica rufa* (Hymenoptera: Formicidae) in limestone woodland in north-west England. *Journal of Animal Ecology*. **49**: 381-394.

– , (1980b). The feeding habits of the wood ant *Formica rufa* (Hymenoptera: Formicidae), in limestone woodland in north-west England. *Journal of Animal Ecology*. **49**: 417-433.

Skinner, G.J. & Whittaker, J.B. (1985a). An experimental field study of different levels of insect herbivory induced by *Formica rufa* predation on sycamore (*Acer pseudoplatanus*) I Lepidoptera larvae. *Journal of Applied Ecology*. **22**: 775-785.

Warrington, S. & Whittaker, J.B. (1985b). An experimental field study of different levels of insect herbivory induced by *Formica rufa* predation on sycamore (*Acer pseudoplatanus*) II. Aphidoidea. *Journal of Applied Ecology*. **22**: 787-796.

Whittaker, J.B. (1985). An experimental field study of different levels of insect herbivory induced by *Formica rufa* predation on sycamore (*Acer pseudoplatanus*) III. Aphidoidea. *Journal of Applied Ecology*. **22**: 797-811.

Whittaker, J.B. (1991). Effects of ants on temperate woodland trees. *Ant-plant Interactions* (Ed. by C.R. Huxley & D.F. Cutler), pp. 67-79. Oxford Science Publications, Oxford.

Winter, T.G. (1983). *A catalogue of phytophagous insects and mites on trees in Great Britain*. Forestry Commission Booklet.

Invertebrate Reference Collections

At De Montfort University we are building up a reference collection of named invertebrates to be used in the teaching of students. We are particularly seeking specimens of Insecta. Undated specimens are acceptable.

If you are able to help, please contact Dr K.M. Stewart, Department of Biological Sciences, De Montfort University, Scraptoft Campus, Leicester LE7 9SU. Tel: 01162 551551.

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Midlands Entomological Fair

Sunday 7th December 1997

IMPORTANT NOTICE

New venue for all future fairs

With the closure of the Granby Halls in Leicester, the home of the Midlands Entomological Fair for the last twenty years, a new venue has been selected for all future fairs, commencing with the Christmas Entomological Fair on Sunday 7th December 1997.

THE KETTERING LEISURE VILLAGE ARENA

is situated on the southern outskirts of Kettering, Northants, on a green site with easy and direct access to the motorway system. It is larger than the Granby Halls and is very new and up-to-date. One single square hall of over 2000 square metres will accommodate all regular visitors and allow for some people on the waiting list to come in as well. The Centre has bars, cafeteria, lounges, swimming, boating and many other facilities, but most important for us, it has round-the-hall parking for many hundreds of cars, with a dedicated area for exhibitors to load and unload.

Access from the North:

Very direct. Use M1 southbound to Junction 19 then take A14 all the way. Exit A14 at Junction 8. "Leisure Village" signs to centre a few hundred yards away.

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Take M1 northbound, exit at Junction 15 direction Northampton. Take Ring Road eastbound, join with A23 to Kettering. Road joins A14 at Junction 8 as above.

Access from the West:

M5 and M6 motorways join M1 at Junction 19. Then as from North.

Access from the East:

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The Fair will open at 10.30 and close at 4.30 and all the regular exhibitors will be in attendance, featuring: Livestock, set and papered specimens, collecting and breeding equipment, books and papers, all kinds of invertebrates, large reptile and amphibian section, affinity groups and conservation societies.

ADMISSION:

Adults £2 • Children 5-16 £1 • Seniors £1 • Children under 5 years free

Any enquiries and table bookings ring Jack Harris 01455 846310

Diary Note: *1998 Fairs – Spring, 22nd March; Christmas, 6th December*

The Bulletin
of the Amateur Entomologists' Society

Volume 56 • Number 414 October 1997

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The Bulletin

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The Bulletin
of the Amateur Entomologists' Society

Volume 56 • Number 415 December 1997

From the Registrar

Data Protection Act

In order to fulfil the requirements of this act I must advise members of the details held on computer database and the use made of them.

Currently the information we hold comprises – name, address, telephone number, e-mail address, date of birth, interests, payments made, and membership category. Additional information is held regarding mailing details. If any member objects to these details being held, would they please get in touch with me.

The information is used for the following purposes:

- To prepare mailing labels for the *Bulletin* and *Bug Club Newsletter* and labels for other mailings as required.
- For the preparation of statistics for use by the Council.
- The publication of Membership Lists. These will only include details of name, address and interests. Please note that telephone numbers and e-mail address are ONLY passed on to Council and Committee members when a specific request is made. Such details are not passed to other members. Individual members may request specific lists, such as names and addresses of members in a specific area, with or without interests included. A minimum charge of £1.50 is made to cover the additional costs of stationery and postage involved.

Change of address

The mailing labels are produced a month in advance in order to notify the printer how many of each publication needs to be printed and to allow sufficient time for the envelopes to be prepared. This can mean that if I am notified of the change of address AFTER the mailing labels are produced, then it will go to the previous address. It is therefore in members' interests to notify me as to the new address, and the date for which it becomes effective, as soon as possible after the member know it. Members may notify me directly to my home address,

if they wish – 5 Conifers Close, Horsham, West Sussex, RH12 4QH. In notifying change of address, please be certain to include your membership number, which is printed after the name on the mailing label. This makes finding the record much easier.

First names

I am trying to make communications more personal by using first names. This is already done for the Bug Club. Please try to remember to write it onto the renewal slip before sending it in.

Payment by cheque

When paying by cheque, if the member's family name is different from that on the cheque, please write the member's name on the back as this helps considerably when checking that payments have been entered correctly. It would be helpful if the membership number was written on the back as a matter of course. *Please* do not staple cheques to the form, these require a considerable amount of time to remove, and when dealing with about 1400 cheques in the space of two months, any saving in times is a great boon! Thank you.

Nick Holford

NOTICE TO ALL MEMBERS

Subscriptions are now due for 1998.

Please send your renewel notice
(distributed in the October *Bulletin*)
to the Registrar as soon as possible.

Eating habits of the Indian stick-insect

by Anastasia Korycinska (9577J)

17 Pitcullen Terrace, Perth, Scotland PH2 7EQ.

The Indian stick-insect, *Carausius morosus,* has two recommended foodplants: privet and ivy. Bramble is an all-purpose stick-insect food, which made a third plant for this study.

All three species of plant were kept in water, one species per jar, and all touched each other. The plants also all touched the lid and sides of the tank. This was to ensure the insects could move easily from one plant to the next. As a control, the position of the three plants was changed every twelve days to make sure some other factor, like light levels, was not affecting the insect's choice.

The Indian stick-insect is nocturnal, so to record the eating habits and not the resting habits of the insects they were left for at least half-an-hour in the dark before the survey. The numbers of insects on each plant was found by lifting each foodplant out and carefully examining it, then looking at the tank for any insects on it. For the purposes of this study, "tank" means any place other than the leaves or the stem of a foodplant.

All the insects used were nymphs, and as they continued to hatch throughout the survey period, the total number of insects changed from six at the start to seventeen at the end of the 36-day survey. This clearly affects the accuracy of the results, as there is a much larger sample of insects at the end. This means their choices as a group will be more valid than the choices of the six at the start.

For the time when the jars were in the first position (see figure 1) there was an average of eight nymphs. In the second position, there was an average of eleven nymphs, while in the third position there was an average of fifteen.

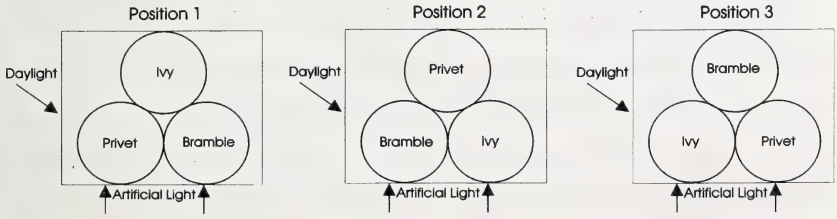

Fig. 1. Positions of foodplants. Tank 30 x 20 x 20cm. Peat base (with eggs).

To make the results more comparable, the average number of insects for each species of plant in each position was calculated, then the percentages worked out and rounded off.

Position	Privet	Bramble	Ivy	Tank
1	7%	63%	17%	13%
2	3%	74%	16%	7%
3	3%	85%	7%	5%

Table 1. The percentage of insects on each foodplant.

It can be seen immediately that bramble is chosen with about four times the frequency of the next most popular plant, ivy. Privet is the least popular plant of all, as more insects, on average, chose to rest on the tank than eat (or even rest) on it!

Some of the insects, at least did move from plant to plant. Individuals that could be distinguished by missing limbs were regularly found on different plants. If these were representative of the rest, most of the insects would have been eating all three of the plants on offer.

The position of the foodplants does not seem to have an obvious effect on the numbers of insects feeding on a plant. For example, ivy was least popular when it was in the same position that privet was most chosen, or the position in which privet was least chosen was also the position in which both ivy and bramble had the most insects, on average.

The bramble does not appear to have any short-term ill effects either, as none of the nymphs have died so far. No ill effects seem to occur from this diet in the long term, as the founder of the colony, given in mistake, was reared entirely on brambles until an adult.

The strong preference for bramble shown by this population of nymphs might be due to toxins present in both the ivy and the privet, making them more unpalatable. In the predator-free tank there is no advantage for the insects to eat plants whose toxins would make a predator more wary of eating the insect after a few tries.

Another reason might be that the larger leaves of the bramble provide the insects, particularly the larger, older ones with more shelter and protection from non-existent weather and/or predators. As there is a strong grouping instinct in them, many of the younger nymphs would join the groups of larger insects, and most of them might just have fed on whichever plant they were on.

Whatever the reasons, it would seem that privet, the traditional food of the Indiain stick-insect, is the one that this sample liked least. This is maybe something that other owners might like to bear in mind.

Relaxing insects

by Graham Best (7928)

12 Hortham Lane, Almondsbury, Bristol BS12 4JH.

I am sure the method for relaxing insects as described by Don McNamara is most effective but I am unaware of the mould preventative activities of paradichlorbenzine. I always understood that this is normally employed as a mite deterrent. It is now considered to be carcinogenic and old store boxes impregnated with it should be opened in a well ventilated atmosphere to let the initial concentration diminish.

Thymol has been used in this role in the past but I have found that a substance called Biphenyl (also called Diphenyl) may be more effective. I believe that the wrappers in which oranges were imported were impregnated with it to deter mould and was also used in artificial agar based foods for laboratory reared larvae for the same purpose.

I have used it dissolved in Industrial Spirit to very effectively kill off mould in set specimens by dipping them in it. As this contains no water the insect does not become relaxed.

Biphenyl was supplied to the laboratory in which I worked by Hopkins and Williams, Chadwell Heath, Essex and according to the label was supplied solely by them. As this was in the 1970s I cannot say if it is still available or if they continue to trade under this name.

Dining with death

by Chris Rawlings (9810)

81 Penn Lea Road, Weston, Bath BA1 3RQ.

I have two large greenhouses in which I grow my collection of insectivorous plants. In one, I grow mainly pitcher plants (*Sarracenia*). Pitcher plants have tube-like leaves with a hood at the top to keep out the rain. Inside the tube the surface is very slippery with downward pointing hairs to direct its victims to the base of the tube where the digestive glands secrete enzymes which break down the soft parts of the insect to be absorbed into the plant. On the hood and around the rim of the tube is a nectar which attracts insects, with the greatest supply being just inside the tube. Once a fly loses its footing and falls inside the tube there is no escape.

These greenhouses are regularly visited by butterflies, presumably following the scent of the nectar. They usually flutter around the roof before finding the open door to exit. Whilst working in the garden I noticed a Comma butterfly (*Polygonia c-album*) feeding from the hood of a pitcher plant. It had no difficulty finding the door of the greenhouse, and returned frequently over the following few days. Since this incident I have also seen a Peacock (*Inachis io*) and a Small tortoiseshell (*Aglais urticae*) nectaring on the *Sarracenias*. Thankfully, I have never found a butterfly trapped in the pitchers, so it seems that they only use the greenhouse as a restaurant, which is much more pleasant for them than the fate which befalls flies.

As a matter of interest, the usual prey of pitcher plants are flies, but also wasps, ants, woodlice and very occasionally, bees are caught. Where bees are concerned I have a soft spot, and throw them a safety line to climb up. All the species of *Sarracenia* are native to the south-eastern United States, but *Sarracenia purpurea purpurea* has been successfully introduced to acid bog areas of Great Britain. Perhaps *Sarracenia* could be utilised for feeding captive butterflies and moths during breeding programmes, but to be on the safe side with valuable stock, it would be advisable to block off the entrance to the tube with a piece of polystyrene cut to the correct size. *Sarracenia* produce nectar from late spring to well into the autumn, before going into dormancy during the winter months.

Insects for Christmas

by Leigh Plester

Biofilm Ltd, Ylä-Muuratjärvi, FIN-41800 Korpilahti, Finland.

If the title conjures up views of scintillating butterflies and gleaming tropical beetles hanging from the Christmas tree with your name on every one, then I'm sorry. Think again: isn't Christmas the time of over-eating and over-indulgence in heady beverages? Not to mention surprises?

On Christmas Day and Boxing Day in 1996 (or 2539, depending on one's religion) I happened to be in Sukhothai, doing a bit of a grand tour of northern Thailand by jeep with my wife and children, while surreptitiously working on the side. I had planned, while we waited for our spicy Thai food in the local, almost deserted, collection of eateries, to nip across the main street (at great risk, I might add, to life and limb) in order to bang off about twenty colour shots of the local vegetable market, a delightfully rowdy and pungent part of town. So I sank a couple of Singha beers just to press the film well down into the camera, so to speak, and with my bleary eye on a sinking sun, I then embarked on a hair-raising crossing of the main street it would take a whole page to tell you about.

On the way back down the relevant side street I collected the Temple Idiot (equivalent to his English Village counterpart) and, having shaken him off with many a nod and a smile – essential courtesy in Thailand – I was shoving my camera back into my shoulder bag with my stomach grumbling when I spotted them – the Christmas Insects, I mean.

With its usual tropical rapidity, the sun had by now sunk lower than a camel's spirits when it discovers the water hole is a Hollywood prop. Tugging wildly and much the worse for my sundowners in the heat, I extricated my camera and squinted into its viewfinder. There they blessed-well were in all their glory. I hastily took a couple of what my friend Nick (of Borneo, Tobago, Thailand, *etc.* fame) calls "snaps" and stood back to admire what I'd committed to film.

The roasted insects were piled high in four deep aluminium serving trays on the last stall between the market and all-hell-let-loose (Sukhothai's main street). The first tray held a shudder – some mole crickets of a disgustingly dark brown hue, spade-like forelegs held ready to deliver the coup-de-grace to your tonsils. Next there was a stack of sago worms, which in entomological parlance are the larvae of the large black and orange palm weevil, the grubs looking fat, forty and

blimp-like. In the third tray there were several hundred (thousand?) extended yellow maggot-like delicacies (Plate 1). But for the absence of a pin and data label, these canapes could have been blown and mounted grubs in a musty old collection – possibly your own. Last of all came a mountain of black, sexton-like dead-as-a-doornail diving beetles with a gloss like a greasy spiv.

Plate 1. Christmas Dinner?

A tropical sunset is something you can never really understand until you have actually experienced one, or to be more accurate, taken a couple of strong Asian beers on the brink of. Unscientific as it may sound, there is a brief moment when one seems to be in no world at all. The mounds of bloated, fried insect bodies before me suddenly seemed no different from the fish and meat and chicken slops one is served in canteens at TV broadcasting studios. Food – cheap and nasty. I belched Singha and delved into my spare change.

We were in our hotel room before I undid the elastic bands the Thai stall-keepers invariably wrap around the mouths of the plastic bags they pack your goodies in. Watched unblinkingly by my daughters, Far East travel veterans both, I nonchalantly popped a long roasted maggot from the third tray into my mouth, scrunched it up and reached for a diving beetle. Halfway there, I changed my mind and reached for a can of

Singha beer, conjuring up a sickly grin. When etiquette has to be reserved at all costs during tea at the vicar's an English gent may well say "Interesting" despite the urge to vomit. The flavour of the insect I'd consumed was, I told my daughters – well – "*Very* interesting".

I had received strict peeling instructions from the lady selling the insects to remove both the spiky ambulatory appendages and the elytra from the diving beetles, although she didn't quite put it that way. So I pinched off the armoured bits of diving beetle and popped its roasted guts, last supper and all, into my mouth. The things we shudder through for the AES.

Now, while my daughters are out of earshot, I'd like to urge all AES members when next time in the Far East to sample this delicious fry. After all, it's not every day you can experience a brand new flavour – such as the sawdust coverings from the big-top after the elephants have been led away, delicately interwoven with a basting of Queen Anne butter ("Queen Anne" in this case being not a brand name but the period in which the butter had obviously gone rancid). Delightfully . . . well, er, . . . interesting.

Why not ask Santa for a mound of roasted Thai insects to replace your next Christmas turkey? Might I suggest the sago worm saute with its delicate *je ne sais quoi* from the Queen Anne period . . .

The Natural History of Walney Island

by Neil Robinson (10002)

3 Abbey Drive, Natland, Kendal, Cumbria LA9 7QN.

In his review of *Butterflies on British and Irish Offshore Islands* by Roger Dennis and Tim Shreeve in *Bulletin* **56**, August 1997, Peter B. Hardy comments on the apparent absence of butterfly records for Walney, a very well-covered island ornithologically. Perhaps the authors were not aware of Tim Dean's book on *The Natural History of Walney Island* published in 1990 (ISBN 0 948558 04 0). In addition to an admittedly large section on birds, it contains detailed accounts of all other vertebrate groups, higher and lower plants, butterflies, moths and a wide range of other invertebrate groups, both terrestrial and marine. It is also possible that they may not have considered Walney to be an offshore island – as it is connected by bridge to Barrow-in-Furness.

Greece 1997

by M.J. Dawson (9130) and J.S. Hemmings (10628)

66 Tivoli Crescent, Brighton BN1 5ND.

There are four known species of Ascalaphid in Greece. It was hoped to obtain a few specimens for photography and examination of genitalia. The weather was extremely warm in the first fortnight of June, even above average for the area visited, the Peloponnese.

Ascalaphus macaronius: This is the most frequent Ascalaphid to be found in the Peloponnese and, in fact, in most parts of Greece (Plate 2). Although it may be found in most areas of dry grassland, it prefers the less dried-out terrain. One area of around twenty acres near Panagitsa had extremely high numbers. Standing in one spot, more than twenty of these insects could be seen at rest on the grass stems. Walking through this field produced a cloud of *macaronius,* fifty or more flying around one. The base of the wings is a bright golden colour, becoming more yellow towards the wing tips. The four dark spots on the forewings distinguish this species from any other. It was found up to around 1200 metres, although not in large numbers at that height.

Plate 2. Illustrated is *A. macaronius*. The other species were pictured in the AES *Bulletin* Vol. **55**: (405), April 1996 and Vol. **56**: (410), February 1997.

A. ottomanus: Possibly the most widespread Ascalaphid in Europe, it is found in France, Italy, Greece, Bulgaria, Albania and eastwards. The white variety is the usual, but a yellow form is said to exist in central Italy. It occurs in all landscapes, from sea-level to around 1700 metres (in the Taigetos Mountains, southern Greece), and from dry grassland to succulent meadows. It may be seen singly flying high in the air over any area, even over mountains studded with fir trees. It is more abundant over less dried-out areas, where a dozen or so may be seen over a small area. In Greece, *macaronius* and *ottomanus* may be distinguished in flight, the former showing yellow wings and the latter white.

A. rhomboideus: A scarcer species; we were unable to capture any. Four single specimens of Ascalaphid were seen in suitable, more wooded terrain but were too fast and too high to obtain. It would be suitable to point out here that the hoped-for ban on carrying nets in Great Britain, would prohibit any further study in a scientific way of entomology. Such societies as Butterfly Conservation cater only for persons wishing to protect "the little darlings". They have little scientific knowledge or interest in the science of entomology. It is most essential that insects, including butterflies, may be captured in small numbers for absolute recognition, taxonomy, distribution etc. This applies not only to *bona fide* scientists but to anyone whose interest is in these creatures.

Theleproctophylla australis: An extremely difficult Ascalaphid to see. Its wings are colourless and they are only seen when the sun glints upon them. Although at times they fly up to two metres high, usually when disturbed, their normal flight is near the ground. They are very delicate creatures and may be recognised as an Ascalaphid by their long antennae. They are found on stony ground and are more common than has been stipulated, due to the extreme difficulty of seeing them. They were found in most suitable stony areas in this wild part of Greece.

Further research is required on this species and similar Ascalaphids. Van Der Weele, in his monograph of these insects written in 1908, gives the distribution of *Th. variegata* as Spain, France and Cyprus. Another author gives the species in those countries as *Th. dusmeti,* with *variegata* occurring in the Far East.

Bog bush cricket (*Metrioptera brachyptera*) - A difficult little customer

by Andrew Jukes BSc

19 Rayleigh Road, Pennfields, Wolverhampton WV3 0AR.

On completing my degree from the University of Wolverhampton this summer I have continued in my study of a heathland – Highgate Common in south Staffordshire. My third-year dissertation focused on heathland management in respect to the locally scarce Bog bush cricket (*Metrioptera brachyptera*). Although I discovered a few interesting facts concerning its ecology during my time doing the dissertation (that may be of interest to anyone equally obsessed by this invertebrate) there are many gaps in the life cycle that I have to find out to complete this illusive jigsaw puzzle and evaluate the best method of management on Highgate Common for the bush cricket.

While studying on the Common I did discover that males (present from July to October or when the first frosts set in) occupy very defined territories which are vigorously defended. Also, despite what the name suggests the Bog bush crickets were not content on living solely on the wet heath dominated by *Molinia caerulea* (purple moor grass), *Calluna vulgaris* (ling) and *Erica tetralix* (cross-leaved heath) but were found to be stridulating (singing) merrily on dry, acid heath dominated by *Deschampsia flexuosa* (wavy hair grass) with intermittent stands of *C. vulgaris*. I suggested many reasons for this but without concrete evidence to support claims. They cannot be substantiated.

From assessing the vegetation on the heath I used Chi-square to try to find a relationship between *C. vulgaris* and the Bog bush crickets (the plant most widely distributed on the heath and a main constituent of wet heath). The results were encouraging when a very strong association was discovered between the *C. vulgaris* and the Bog bush crickets but this is where I fall on my face . . . what *is* the relationship?

I liberally peppered suggestions into my dissertation ranging from egg laying sites to foci for males as territory strongholds. The truth is at this moment in time, I just do not know!

Since my course has ended I have spent many a wet day (well, in June, did we have anything but?!) trying to find out more about the Bog bush cricket while they were still nymphs. I did observe a few nymphs eating the flowers of *Potentilla erecta* (Tormentil) and the

inflorescence of *M. caerulea* which is a break-through since all the literature I have found does not indicate precise species that constitute their diet or even if the cricket is a strict vegetarian or indulges itself with the occasional carnivorous snack. Interestingly enough no nymphs were located in the dry, acid heath but exclusively in the wet heath area. Possibly, the adult males develop a roaming nature to find territories and weak males are forced to venture out from the wet heath to less desirable areas where there are vacant areas in which to set up a stronghold.

I could go into more detail about my results and conclusions but I hope the condensed information is useful to anyone out there for either corroborating their observations or as reference to a difficult population that may be displaying unique characteristics which could indicate a regional variation.

I am appealing to any like-minded masochists studying this difficult little customer who may have information or would like more details on the Bog bush cricket to get in contact with me. Information concerning diet and oviposition sites are especially useful so I can then draw up a management plan for the maintenance of the heath which is currently under severe threat of succession by woodland, By creating a management plan for Highgate Common the local extinction of an intriguing insect that is locally rare could be prevented, the insect being found in only one other site in Staffordshire.

A visit to Llandudno, North Wales

by Jan Koryszko (6089)

3 Dudley Place, Meir, Stoke on Trent, Staffordshire ST3 7AY.

On 12th August 1996, in the company of Charles Byatt and Derek Heath, I visited Llandudno, Great Orme Head. We arrived at around midday, the weather was very warm and sunny. We hoped to find some Graylings (*Hipparchia semele*) to photograph, but unfortunately we had no luck.

We saw quite a few Gatekeepers (*Pyronia tithonus*), Red admirals (*Vanessa atalanta*), Peacocks (*Inachis io*), Small tortoiseshells (*Aglais urticae*) and Meadow browns (*Maniola jurtina*), but the most remarkable sight was the Painted ladies (*Cynthia cardui*) which were feeding on heather flowers along with clouds of Silver Y (*Autographa gamma*). I have never seen so many! I also disturbed two Rush veneers (*Nomophila noctuella*) when walking through the heather.

Cyprus holiday mysteries

by Hilary Bateman (10092)

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I have just returned from a fortnight's holiday in Cyprus. We stayed in a hillside village 600 metres above sea level, about five miles out of Paphos. We saw many butterflies and insects whilst there and the following is a list of the ones that I could positively identify:

Sand wasp – *Ammophila pubesceus*

Longhorn beetle – *Ergates fabar*

Click beetle – *Athous haemorrhoidalis*

Bee fly – *Bombylius major*

Ground bug – *Lygaeus saxatilis*

Hummingbird hawkmoth – *Macroglossum stellatarum*

Swallowtail – *Papilio machaon*

The main flowering plants were verbena, geranium, plumbago and lavender. There were several other creatures that I could not identify; either (a) they flew off too quickly or (b) perched too far away and flew off before I could see them. These were:

1. A large black bee with dark wings which appeared to sup nectar.
2. A large butterfly, uniformly dark in colour, definitely not a Peacock. Could it have been a Camberwell beauty?
3. Another large butterfly which flew haphazardly and landed on the hot pebbles. It stayed with its wings folded which were light and heavily veined. Could it have been a Two-tailed pasha?
4. Small blue butterflies also frequented the flowers but their fluttery, erratic flight made them impossible to identify.
5. A small green cricket/grasshopper about an inch long hiding on a sapling. The insect was totally green, a sort of "new leaf" green which looked furry, almost like velvet.

Can anyone hazard a guess at my mystery creatures?

This brings me to the question: how do I photograph fast flying or fluttering butterflies or insects properly? I have a 35mm SLR camera with a 50mm lens. I tried unsuccessfully to creep up on my "victim" or leap out of the pool but they never stayed still long enough! It was far too hot to sit out in the heat so I'm left with visions in my mind's eye and blurred photos. Any suggestions from the membership would be greatly appreciated.

Book Reviews

De sprinkhanen en krekels van Nederland (Orthoptera)

by R. Kleukers, E. van Nieukerken, B. Odé, L. Willemse, W. van Wingerden. 1997.

Nederlandse Fauna **1**. Leiden: National Natuurhistorisch Museum, KNNV Uitgeverij & EIS-Nederland. pp. 416+16p of plates. The book includes a CD of the songs: *De zingende sprinkhanen en krekels van de Benelux*. By B. Odé.

Available from: KNNV Uitgeverij, Oudegracht 237, 3511 NK Utrecht, Netherlands.

Good news – This book contains everything you might wish to know about the Orthoptera of the Netherlands (which includes all the species that occur in the UK).

Bad news – It is in Dutch.

Good news – It is lavishly illustrated with colour photographs of most species and maps, figures and diagrams and has a 4-page English summary with an explanation of the meaning of the main terms used in the figures and diagrams.

Not so bad news – It costs DFL 82.50 (Dutch Guilders), including the CD, plus DFL 25 for postage (a total of roughly £35) – not bad for a hardback book (235mm x 302mm) with 416 pages and 16 pages of colour plates, plus a CD.

The first 100 pages are an exhaustive introduction to the group and the recording scheme in the Netherlands, with chapters on History of Orthoptera research, Systematics and nomenclature, Biology, Song, Ecology, The Orthoptera Mapping Scheme and Identification (this chapter has well illustrated keys to species).

The next 200 pages are accounts of the individual species, each of which has a short English summary. These accounts contain a large line drawing of the species and sections on description, biology, identification, world distribution, occurrence in Netherlands, protection status, how to record the species, description of song. There are three maps for each species (Netherlands before 1980, Netherlands 1980-1993, European distribution), histograms of season of occurrence and main habitats and oscillograms of the song (for most species).

The final three sections cover nature conservation, regional Orthoptera and there is an extensive bibliography (including many references to important works published in other European countries) and an index. The 67-minute CD includes the songs of 45 species and has an explanatory leaflet with some English summaries.

There are only about a dozen species of the Netherlands Orthoptera fauna that do not occur in the UK, so that the book covers most of the northern European fauna, but only a few species of the much larger southern European fauna. Unlike the standard British guide (Marshall & Haes, 1988, *Grasshoppers and allied insects of Great Britain and Ireland*. Colchester: Harley) and the recent atlas (Haes & Harding, 1997, *Atlas of grasshoppers, crickets and allied insects in Britain and Ireland*. London: Stationery Office) this book covers only Orthoptera, and none of the allied orders.

The book is a compendium of knowledge and at about £35 including the CD must be the bargain of the decade – if you can read Dutch. However, there is much that anyone not able to read Dutch can get from this book (and CD) because it is well structured and illustrated. If you regard yourself to be a "serious" orthopterist, I thoroughly recommend it.

Paul T. Harding

An Introduction to Rearing Praying Mantids

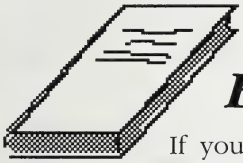
by Phil E. Bragg. A5 paperback, 16 pages, 10 figures. Recommended retail price £2.50. ISBN 0-9531195-0-5.

Praying mantids rarely attract the popularity they so richly deserve. At some time or other most people have kept stick insects but far fewer people have ever kept mantids. This is a shame because from experience I know they make excellent and educational pets. *An Introduction to Rearing Praying Mantids* by Phil E. Bragg is intended to provide a basic introduction on rearing these fascinating creatures.

The book briefly discusses the biology of mantids including the types of mantids and their body structure and then proceeds to suggest rearing methods from oothecae to adult. It recognises that everyone has different circumstances and means available and describes in a no-nonsense fashion effective but inexpensive rearing techniques. Breeding is covered in detail and diagrams are provided to aid in sexing of mantids. There are even contact details for a "Mantid Dating Service" for people having trouble finding a mate for their mantid. Notes on mantid preservation, identification characteristics and distribution (ever wanted to know how to post a mantid?) are also given in the same easy to follow manner. The author recommends species for beginners and also discusses the relative merits and pitfalls of buying mantids at each particular life stage. A comprehensive list of further information resources and individuals dealing in mantids are also given. The most closely related work is *Rearing and studying the praying mantids* by Heath & Cowgill (AES Publications), the latest edition of which is now some seven years old – it concentrates more on the biology and behaviour of mantids and offers less practical information on rearing techniques. However, considering the slightly different focus of each book and the fact that both are available for under three pounds then there is a place for both on everyone's bookshelf.

In conclusion *An Introduction to Rearing Praying Mantids* by Phil E. Bragg is an extremely competent yet inexpensive guide to rearing one of the best invertebrate pets available. The price, wide range of practical techniques covered and the writing style of the author make this publication accessible and invaluable to beginners and experts alike.

Kieren Pitts



Book Reviews

If you would like to see a particular book reviewed or want to send in a review of your own (it is advisable to check prior to submitting to ensure that the book has not been reviewed or is in the process of being reviewed), please contact the *Bulletin* Editor, stating the title, author, publisher, price and language (if not English) at the usual address.

Some observations of butterflies in Sikkim, India, 1995

by R.A. Hargreaves (3777)

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In November 1995 I attended a conference in New Dehli, India. My wife accompanied me and as we had never been to that part of the world, we decided to add a week's holiday to our stay. From a list of post-conference options supplied by the Indian travel organisers, we chose a tour of Sikkim, Darjeeling and the Himalayas, the main criterion of selection being that it offered the most equitable climate. I certainly wanted to make what observations I could of the butterflies of the area, but with all the preparation needed for the conference, I had little time to read up about the Sikkim area or to acquire any reference books on Indian Lepidoptera. I therefore considered myself fortunate to find in a New Dehli bookshop a copy of *The Butterflies of Sikkim Himalaya and their Natural History* by Meena Haribal. The colour plates and short descriptions provided the reference I needed, while the introductory sections indicated how highly diversified the region is biologically, giving rise to over 600 species.

The ten days of conference activity in New Dehli did not afford any time for entomological exploration other than to notice that *Danaus (Anosia) chrysippus*, called the Plain tiger in Haribal's book, was the most obvious butterfly, flitting around the hotel gardens and many planted areas.

After a last-minute alteration to our departure date from New Dehli, we flew a day earlier than expected to Bagdogra, about 800 miles due east. Everest could be seen to the north during the flight.

Bagdogra is in the Indian State of West Bengal which in turn provides the southern boundary to the State of Sikkim. To the west of Sikkim is Nepal, to the south-east is Bhutan and to the north and east is China/Tibet.

At Bagdogra we met our driver and guide with his car, one of the ubiquitous Hindustani Ambassadors. First stop was at Siliguri, a hot and busy little town swarming with bicycle rickshaws, cars and lorries for ever sounding their horns. Here we discovered that we needed a pass to enter Sikkim. A visit to the local photographer's provided the picture needed for the pass, which was duly signed and stamped in the Government office.

The next day's drive saw us climb steadily towards Kalimpong in the north of West Bengal. Lush wooded slopes covered deep river valleys. During a stop at Nandy Bridge by the Tista river, I noticed a large dark Swallowtail-shaped butterfly settling in a shallow culvert at the edge of the road, which proved to be a Red helen (*Princeps helenus helenus*) apparently feeding on the decaying material in the gutter. Also evident were the Grass yellows: the Common grass yellow (*Eurema hecabe contubernalis*) and the Three-spot grass yellow (*E. blanda silhetana*). The former is common throughout India, but the latter is restricted to altitudes below 1500 metres.

I would have liked to have stopped more often than at just the sightseeing spots, as there were so many butterfly-rich areas. But our schedule, the narrow winding roads and the fact that our Nepalese driver had difficulty understanding us, meant that many species only seen momentarily could not be identified with any certainty.

During the evening at Kalimpong it started to rain and it continued throughout the next day as we climbed steadily, crossing the Sikkim border at the Rangpo check-point. When we arrived at Gangtok, the capital of Sikkim, situated at 1547 metres (5000 feet), it was still raining. Over the whole of the day's drive, our driver never used his windscreen wipers once!

The next morning, the rain had stopped and the clouds partially cleared. We saw that Gangtok was situated on the side of a deep wooded valley, but when the clouds lifted completely the following day, the Himalayan peak of Kangchendzonga could be seen towering above the valley.

In a flower garden in Gangtok, looking very similar to gardens at an English seaside resort, complete with bandstand, I saw the Indian tortoiseshell (*Aglais cachmirensis aesis*), which is a darker looking version of the English Small tortoiseshell, the Indian Red admiral (*Vanessa indica indica*) basking in a wooded corner and the Common sailor (*Neptis hylas varmona*). Dark milkweed-looking butterflies were also seen here, but I only later identified them when visiting the Do-Drul Chorten, a Tibetan religious monument. Settled on nearby *Tagetes,* this same species was clearly a female Indian fritillary (*Argyreus hyperbius hyperbius*).

We moved on west from Gangtok and visited the Rumtek Monastery, built in 1975 by Tibetan Buddhists who had left China. Indian fritillaries (including males), Red helens and a number of blue butterflies were flying in the area. Our next night was spent in Martam at a "village resort". This was a group of thatched chalets in a terraced garden

belonging to a local Sikkimese farmer. The accommodation was first class and we had our meals in the farmhouse where we met the farmer's family. The farm was situated at the head of a long wide valley, terraced on one side to grow rice, together with ginger roots along parts of the valley floor. The other side of the valley was more wooded. The farmer's son took us on a walk across the valley and through the woods. The Great orange tip (*Hebomoia glaucippe glaucippe*) was seen flying fast and low across the valley. According to Meena Haribal, this would probably make it a male, as females do not generally fly low.

The next day we turned south to leave Sikkim via the Rangpo checkpoint – this time the weather was hot and sunny. The village of Rangpo, where we stopped for our driver to get passes and passports stamped, afforded some time to observe fairly closely a number of species flying round trees in the village street. Several "Swallowtail" types were flying. These may have included the Yellow helen (*Princeps nephelus chaon*), but more probably were the similar looking Common mormon (*P. polytes romulus*). An "all-black Swallowtail" was the Lesser batwing (*Atrophaneura aidoneus*).

It was a great pity that photography was forbidden at Rangpo, because it is a Government checkpoint. Identification of species would otherwise have been easier. Seeing my interest in the butterflies, however, a local policeman pointed out a large dark species, with purplish patches in the centre of each wing. This was a male Great eggfly (*Hypolimnas bolina*). Another largish dark brown butterfly, but with pale blue borders to the hindwings was the male Common earl (*Taneacia julii appiades*). The Straight-banded tree brown (*Neope verma sintica*) frequently settled on the bark of the trees. Several species of Sailor were in evidence.

After leaving Sikkim, we headed towards Darjeeling, the traditional British refuge from the heat of the plains. Few butterflies were seen in this bustling town packed on to the hillside at 7000 feet above sea level. In any case, my interest here was taken by the Darjeeling Railway and incredible little steam trains storming along the streets. Then there was the 4am trip up Tiger Hill to see the dawn break on Kangchendzonga and Everest. After that it was back to Bagdogra, Delhi and home. It was an unforgettable visit, this fleeting glimpse of India, Sikkim and Darjeeling.

Reference

Haribal, M. (1992). *The Butterflies of Sikkim Himalaya and their Natural History*. Sikkim Nature Conservation Foundation (SNCF), Gangtok, Sikkim.

A visit to Barleston Rough Close Common, Staffordshire

by Jan Koryszko (6089)

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On 17th August 1996, I visited Barleston Rough Close Common. The weather was fine, sunny and warm, with the most notable species in the area being the Painted lady (*Cynthia cardui*) and the Silver Y (*Autographa gamma*). Most of these species were seen on heather blossom and thistles. Other species recorded were the Small copper (*Lycaena phlaeas*), the Small heath (*Coenonympha pamphilus*), and the Gatekeeper (*Pyronia tithonus*) along with other common species. I also found quite a few larvae of the Cinnabar moth (*Tyria jacobaeae*) on ragwort.

I then moved on to the pond, where I observed quite a few dragonflies; a male and female Southern hawker (*Aeshna cyanea*), a fine male Ruddy darter (*Sympetrum sanguineum*) with clear blood-red coloration of the abdomen and the marked constriction of segments 3-5, and a female Brown hawker (*A. grandis*). This and the Ruddy darter were records new for Rough Close, although I had a possible sighting of the Brown hawker at the site during the hot summer of 1976. I have also noticed on many of my sugaring trips to the area at dusk and early morning that I have encountered hawker dragonflies on the wing well after dark. It is said that the Brown hawker has these habits.

At around 5pm I had my best sighting for the day and the first record for the area of a Purple hairstreak (*Quercusia quercus*). A male was chasing a female, and both landed on an oak leaf with their wings open before they dashed off again. The nearest sighting for this species is Hem Heath Wood, Trentham, some miles away. This species seems to be becoming more common these days, with more new records in the county.

Mile high *machaon*

by Graham Best (7928)

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While in Lucerne this summer I took a train ride up Mount Rigi overlooking the lake. Despite the altitude it was a very hot day and several specimens of *Papilio machaon* were flying freely at an altitude of one mile. This contrasts sharply with the lowland habits of our own *Papilion machaon brittanicus*.

Italian Brahmaeid stamp

by Don McNamara (5573)

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This lone European Brahmaeid moth, *Acanthobrahmaea europaea*, is featured on an Italian stamp, kindly sent by Sig. Berni, is found only in one location, a volcanic depression containing a lake, in Lucania, Italy.

Semi-aquatic cockroaches identified

by Phil Bragg (8737)

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The species of semi-aquatic cockroach which I illustrated in *Bull. Amat. Ent. Soc.* **56**: 117-121 is *Stictolampra lurida* (Burmeister, 1838). I identified these at Leiden Museum in early 1997 but forgot to ask the *Bulletin* editor to up-date my article. The other semi-aquatic species which I collected may have been *Rhabdoblatta circumdata* Hanitsch 1915; unfortunately this cannot be confirmed since the specimen had rotted before I was aware it had died.

Treading on the Giant's Foot

by Alan Cronin (4701)

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and

Don McNamara (5537)

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A useful antidote to the hot and sweaty weather of mid-August, 1997, was to get out on to the Downs and "do some natural history". There the cool breezes made the best of the welcome sunshine and thoughts of impending autumn and winter.

The Giant's Foot is a giant's-foot-shaped blind valley, cropped by the local authority to provide recreational space for the local population, about half a mile long and about 200 yards wide, bounded on three sides by the hills of the South Downs. It is close to Moulsecoomb which is north of Brighton, Sussex. The "foot" is flattish and manicured but as the land rises it becomes typical chalk-downland, cropped by the rabbits of the local rabbit population, and ablaze with wild flowers.

Butterfly-spotting, always a pleasure, was augmented by wildfower spotting – it's quite difficult to sort out closely-related plants, but pleasing to do and there is always the chance of seeing something rare.

The yellows of the hawkbits, hawkweeds and ragworts attracted plenty of hoverflies and bees while the purples of the thistles, knapweeds and self-heal encouraged plenty of butterfly visitors. Pinkish mallows and golden patches of St. John's wort added to the sunny mosaic. One has to resist the urge to dig it all up and transfer it to the back garden.

The major feature of the visit, on 13th August 1997, was the sight of three blues flying together: *Lysandra corridon,* the Chalkhill blue; *L. bellargus,* the Adonis blue; and *Polyommatus icarus,* the Common blue, the males splendid in their subtly different shades of blue and the females darkly attractive in their similar sombre browns. Added to this splendour was the brightly burnished appearance of the lycaenid, *Lycaena phlaeas,* the Small copper and the darker lycaenid, the brownish *Aricia agestis,* the Brown argus. In previous times *Cupido minimus,* the Small blue, has been seen in the area but has not been observed here recently.

Further up the slopes the open "rabbity" areas gradually give way to patches of woodland, some old oaks, much hawthorn and *Prunus*

entwined with *Clematis alba,* travellers-joy and much bramble. Here were seen several bright yellow *Opisthograptis luteola,* Brimstone moths. On the open slopes were patches of *Succisa pratensis,* devil's-bit scabious, and further up large areas given over to *Eupatorium cannabinum,* hemp agrimony and *Epilobium angustifolium,* rose-bay willowherb. It is interesting that both devil's-bit scabious and the hemp agrimony have very diverse habitats. Both are found on dry, well-drained soils, such as the chalk downland – but also on heavy, wet or marshy land.

There was also plenty of *Rumex* spp., sorrel and *Helianthemum nummularium,* rock rose. The hemp agrimony had its attendant Nymphalids, *Aglais urticae,* Small tortoiseshells, many quite fresh and obviously newly-hatched, a few *Inachis io,* Peacocks, who were a little dusty and single individuals – one *Vanessa atalanta,* Red admiral and one *Cynthia cardui,* Painted lady. Other butterflies seen on the day were:

Pararge aegeria – Speckled wood
Coenonympha pamphilus – Small heath
Maniola jurtina – Meadow brown

Polygonia c-album – Comma

Gonepteryx rhamni – Brimstone
Pieris brassicae – Large white
Artogeia rapae – Small white
A. napi – Green-veined white

Thymelicus sylvestris – Small skipper

Probably the highlight of the day was spotting an Adonis blue aberration – *obsoleta,* a male underside with all the spots missing (except for the central white markings).

References

Shauer, Thomas (1982). *A Field Guide to the Wild Flowers of Britain and Europe.* Collins.

Higgins, G. and Riley, N.D. (1980). *A Field Guide to the Butterflies of Britain and Europe.* Collins.

Cannibalism among ladybirds

by Michael E.N. Majerus (4027) and Tamsin M.O. Majerus

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Introduction

We were interested to read Roy Goff's description of larval and pre-pupal cannibalism by larvae of the 2-spot ladybird (*Adalia bipunctata* L.) (*Bull. amat. Ent. Soc.* **54**: 35). Cannibalism among ladybirds is a common phenomenon. It occurs in a variety of situations and is of interest because it appears to have had a considerable effect on the evolution of aphid eating ladybirds. In this article we describe the different types of cannibalism that occur in wild populations of ladybirds and discuss the possible influences of cannibalism on the evolution of life history traits of ladybirds.

Types of cannibalism

Cannibalism, in a biological sense, is formally defined as the killing and eating of an organism by another of the same species. This definition is specific and excludes the consumption of already dead con-specifics which must be considered scavenging. So, for example, reported cases of humans surviving in extreme conditions by eating the corpses of others of their party who have starved to death do not represent true cannibalism.

Cannibalism in ladybirds can most conveniently be divided into four categories: cannibalism of eggs by adults; of eggs, larvae, pre-pupae and pupae by unrelated larvae; of larvae, pre-pupae, pupae and adults by adults; and, perhaps most interestingly, of eggs by neonate sibling larvae. Each of these types of cannibalism occurs in different circumstances, and has different implications.

Cannibalism of eggs by adults

Observations of the cannibalism of eggs by adults fall into two types: instances of adult ladybirds eating clutches of eggs with no indication as to whether the adults were parent to the eggs consumed or not, and instances of eggs being eaten by females that have just laid them.

The consumption of eggs by unrelated adults is relatively scarce in the wild. The few records that have been made are all from the latter half of the summer. Cannibalism of unrelated eggs by adults has not yet been recorded during the main reproductive period (April-June) in Britain.

In order to understand why adult ladybirds do not appear to indulge in egg cannibalism in the early part of the summer, yet will resort to it in the latter part of the season, both the population dynamics of the prey of most ladybirds, aphids, and the interaction between ladybird oviposition strategies and aphids, must be considered. The normal progress of an aphid colony during the summer can fairly be described as one of boom and bust. The exceptional reproductive rate of aphids means that the numbers in a colony, which may be established by just a single female, initially increase exponentially. Typically, this rate of increase is eventually slowed down for one of three reasons: deterioration of the aphid colony's host plant due to extrinsic factors, such as drought or season; deterioration of the aphid colony's host plant due to activities of the colony; or high levels of aphid mortality due to the activities of aphid predators, parasitoids and parasites. Aphids have many enemies. In addition to ladybirds, aphids fall prey to lacewing adults and larvae, hoverfly larvae and a host of generalist insectivorous organisms, including many carabid and other beetles, flies, wasps, bugs, spiders, some smaller bird species and sometimes ants. They are also parasitised by fly and wasp parasitoids, and a variety of fungal, bacterial and viral pathogens. These enemies of aphids tend to build up during the summer so that the inroads made on the aphid colony increase, the greatest effect often coinciding with a reduction in the resources available to the colony because of the deterioration of the host plant. The result is that numbers in aphid colonies often crash dramatically, a colony sometimes declining from its zenith to virtual extinction within just two or three days.

Females of many species of aphidophagous ladybirds are cautious about where and when they lay their eggs. They oviposit close to aphid colonies which are increasing in number, have a high ratio of early instar nymphs compared to late instar nymphs or adult aphids, and lack significant attendance of ladybird larvae or other aphid predators (Hemptine and Dixon, 1991). As we shall see, some of this caution appears to have evolved in response to the cannibalistic tendencies of ladybird larvae. However, the strategy may also be a consequence of two other factors: the small size of newly hatched ladybird larvae, and the demography of aphid colonies. Because neonate larvae are so small when they first disperse from their egg clutches, it is important that they find aphid prey that are sufficiently small for them to subdue in a relatively short time (for the 2-spot ladybird this is about 24 hours at 20°C, Majerus, 1994). If only large aphids are available, these usuallyhave a sufficient armoury of defensive stratagems to avoid being

captured (kicking, spraying with an oily secretion, running away, dropping off the plant), and the ladybird larvae may starve to death. It is thus important for ovipositing female ladybirds to lay in proximity of aphid colonies containing reproducing females, so that small aphid nymphs are available.

The rapid decline in the numbers of aphids in a colony towards the end of the season is also likely to be important in shaping female oviposition behaviour. Progeny from females that lay eggs close to colonies that are nearing the end of their existence on a host may find that their normal prey disappears before they complete their larval and pupal development. As the timing of sudden declines in aphid colonies is somewhat unpredictable, the safest strategy for female ladybirds is to lay eggs close to colonies that are obviously in their early stages.

Early in the season, all female ladybirds will be reproductively mature, in the sense that they have over-wintered and are able to reproduce once they have fed sufficiently. Given that they will only oviposit if they find suitable situations close to food for their offspring, and the females may provision themselves by feeding on the same prey, these females are unlikely to have to resort to egg cannibalism. Conversely, by the second half of the summer, the adult population may consist of both adults that are still reproducing, and young adults of the next generation that are primarily concerned with feeding up for the winter. It is often at this time that aphid numbers decline rapidly. As the old females are close to death, but may still bear a significant egg load, they cannot afford the energy to seek out the diminishing optimal sites for oviposition. For these females, there is at least some possibility that eggs laid, even in unsuitable situations, may survive, while eggs that are never laid cannot contribute to the females' reproductive success. Consequently, they will oviposit close to any aphid colony, irrespective of its age, composition or health. If eggs are laid in proximity to newly eclosed adults, these young adults may resort to egg cannibalism if other food is scarce. The only real concern for the newly emerged ladybirds is to build up their fat reserves sufficiently to give them a high probability of surviving the rigours and deprivations of winter.

The cannibalism of eggs by their own parents is even rarer than cannibalism of eggs by unrelated adults, but it does occur. The circumstances for this type of cannibalism appear to be very precise. It only occurs in the wild early in the season, when a period of good weather in March and April is followed by a period of severe cold

weather. This set of circumstances may lead to an initial increase in aphid numbers which in turn initiates the maturation of ladybird ovaries, followed by a decline in aphid numbers.

The ensuing dearth of aphid prey may leave females with little in the way of energy reserves. One solution to this problem is to reconvert developing eggs into energy. Eggs which are only partially developed may be reabsorbed internally. However, those that are ready to be laid cannot be reabsorbed in this way. Instead the female will lay one egg and then immediately turn around and eat it. She may repeat this behaviour several times.

Cannibalism of pre-imaginal stages by unrelated larvae

The reasons underpinning the cannibalism of immature stages by unrelated larvae are the most easy to explain and understand. Such cannibalism occurs commonly whenever normal aphid prey is scarce, and, in some circumstances, even when they are not scarce.

Eggs, ecdysing larvae and pre-pupae are the most vulnerable to attacks by larvae. Ladybird eggs are heavily predated by small, con-specific larvae. The reasons for this are three-fold. First, as several females may oviposit in the vicinity of a suitable aphid colony, egg clutches are likely to be in the foraging range of larvae resulting from eggs laid just a day or two earlier. Second, con-specific eggs are a nutritious food source for young larvae, having been provisioned with just the nutrients essential for rapid early development. Third, at a time when larvae may find it difficult to subdue prey, because of their small size, con-specific eggs provide an easy meal that will not fight back or run away.

Egg cannibalism by older larvae also occurs, but more rarely. This is probably the result of females not ovipositing close to aphid colonies that are already being attacked by ladybird larvae. Indeed, it is likely that the strategy of laying eggs away from aphid colonies under attack from larvae has evolved primarily to reduce the risk of a female's eggs being cannibalised.

Of the other pre-imaginal stages, ecdysing larvae and pre-pupae are most at risk because, at these stages, the larvae are semi-static, being attached to the substrate at the posterior end of the abdomen, and because for a short time after moulting their cuticle is soft. They are thus less mobile and less able to fight back than active larvae, and their cuticle provides less protection than that of a fully formed and hardened pupa.

Larvae do attack other active larvae, and when this occurs it is generally the larger larva that wins the encounter and consumes its smaller opponent. Cannibalism of fully formed pupae is less common, and is generally confined to third and fourth instar larvae. This is in part due to the fact that as a result of the female oviposition strategy mentioned above, late instar larvae are more likely to occur with pupae than are young larvae. However, the hard cuticle of fully formed pupae also provides a reasonably good defence against first and second instar larvae which have difficulty in penetrating the pupa with their mandibles.

Cannibalism of these stages may occur at almost any time during the late spring or summer, but is most common in the mid- to late summer when crashes in aphid numbers leave partially developed larvae short of their normal prey.

Cannibalism of larvae, pre-pupae, pupae or adults by adults

Adult ladybirds rarely eat immature stages apart from eggs. This is largely because they generally do not occur together except in situations where suitable aphid prey are at high density. The reluctance of coccinellids to breed at sites where con-specific larvae are present, means that by the time larvae, pre-pupae and pupae are present at a site, reproducing adults will have already moved to other sites. It is only when the first of the new generation begin to eclose that adults are found at high density with immatures. Then, some cannibalism of larvae, pre-pupae and pupae, by the newly hatched adults may be observed if aphid prey is becoming scarce. As with the cannibalism of these immature stages by larvae, pre-pupae and pupae are most at risk because of their immobility. However, the level of cannibalism is rarely very great. This is because the newly emerged adults usually disperse away from such sites, in search of aphids, fairly soon after eclosion.

Cannibalism of adults by adults is also rare in most years. However, it becomes very common in years when ladybird numbers explode, either locally or on a wide-spread scale. In such years, the increase in ladybird numbers usually results in a significant decimation of aphid prey. In their searches for prey, ladybirds will then take to the air, sometimes in immense numbers (Majerus and Majerus. 1996). Swarms may them form. These are most usually recorded at the coast because the combination of on- and off-shore air currents here brings the ladybirds to ground. These "plagues" of ladybirds consist mainly of young adults which have to feed up for the winter. They are thus desperate to find food and will try almost anything (including humans)

to see if it is edible. These starving ladybirds will certainly consume con-specific ladybirds. Generally ladybirds that have already landed and folded away their wings are less vulnerable to attack than those just arriving. The pronotum, elytra and ventral abdominal plates do not provide much for other ladybirds to get hold off. However, if ladybirds can grab the wings of those coming in to land before these are folded away, they provide sufficient purchase and access to the softer dorsal surface of the abdomen.

During major population explosions, such as those in 1959 and 1976, the result of adult-adult cannibalism may leave a scene of absolute carnage, with millions of corpses littering the ground. That these corpses are the result of cannibalism is evidenced by the fact that the soft parts have been consumed, the corpses consisting of just the hard external parts.

Sibling egg cannibalism

Plate 4. Sibling egg consumption of 2-spot ladybird eggs.

The consumption of unhatched eggs in a clutch by larvae from the same clutch that have already hatched is common and has been well documented (Banks 1956, Dixon 1959, Mills 1982, Osawa 1989, Majerus 1994) (Plate 4). The eating of unhatched eggs by newly hatched larvae

of the same clutch is fascinating because of the implications such behaviour has on a number of evolutionary questions. First, it is pertinent to examine exactly which unhatched eggs neonate larvae eat. Then we may consider how and why neonate larvae evolved to eat unhatched eggs from their own clutch. Finally, the consequences of this behaviour will be discussed.

Sibling egg consumption includes cannibalism

It is important to examine the nature of the unhatched eggs that are consumed by neonate siblings, because the selective costs and benefits of egg eating will be different if neonates just eat infertile or dead eggs, rather than all unhatched eggs, including some that, given the chance, would hatch in the fullness of time. Of course, if neonates only eat infertile, or already dead eggs, such consumption is not cannibalism, because, by definition, cannibalism involves both the killing and consumption of con-specifics. Furthermore, such behaviour will invoke no cost in terms of the reproductive fitness of the neonates' parents. Indeed such behaviour would confer a fitness benefit, if the larvae, by consuming infertile and dead eggs, thereby retrieving some of the otherwise wasted resources on these eggs, increased their own chances of survival. Conversely, if some of the eggs consumed contained live embryos which were simply developing more slowly, the death of these might reduce the life-time reproductive fitness of the parents. It is correct to say only that the life-time reproductive success of the parents might be reduced by true sibling egg cannibalism because a reduction is not a foregone conclusion. In some cases there are benefits to the parents of larvae that consume living sibling eggs when considered in terms of the number of progeny that survive to adulthood. These benefits come in the form of a highly nutritious meal gained by the cannibalising offspring. If this cannibalism significantly increases the likelihood of survival of those larvae that do hatch, the fitness increment may be sufficient to off-set or exceed the fitness reduction that results from the loss of some eggs that otherwise would have hatched.

Observations of several species, including the 2-spot (*Adalia bipunctata*), the 10-spot (*Adalia 10-punctata* L.), the 7-spot (*Coccinella 7-punctata* L.) and an Asian species, *Harmonia axyridis* (Pallas), confirm that at least in laboratory cultures, some of the eggs consumed contain developing embryos (Banks 1956; Majerus *et al. in prep.* a.). Infertile and dead eggs are also consumed.

The evolution of sibling egg cannibalism

The question of why sibling egg cannibalism has evolved is in effect the same as that (as discussed above) relating to why small larvae eat unrelated con-specific eggs. Eggs are nutrient rich and provide an easy meal for neonate larvae at a time when other prey may be difficult to capture and subdue. In addition, in the case of sibling egg cannibalism, this easy meal is in reach as eggs are usually laid in close packed clutches with eggs touching their neighbours.

How then did sibling egg cannibalism evolve? Eating living eggs is probably an extension of the habit of newly hatched nymphs and larvae of many insect species eating their own egg shell. If extending this behaviour to any unhatched eggs results in increased chances of survival, the gene inducing this behaviour will spread as long as the benefit to this gene is not out-weighed by costs in the form of the loss of some living eggs which contain the gene. The level of cost will depend on the likelihood that other eggs in a clutch containing a cannibalising individual carry the cannibaliser gene, and the sex of the carrier. Let us assume this gene is genetically dominant to its non-cannibalism allele. In the early evolution of sibling egg cannibalism, when the cannibalism gene is rare, the population will consist mainly of individuals that carry two non-cannibalism alleles, with a few individuals carrying one cannibalism and one non-cannibalism allele. Most carriers of the cannibalism allele are thus likely to mate with non-carriers. If the carrier is female and heterozygous (carrying both a cannibalism and a non-cannibalism allele), then, on average, half the eggs in a clutch should receive the cannibalism gene. However, if the carrier is a heterozygous male, the proportion of eggs with the cannibalism gene may be lower. This is because female ladybirds are highly promiscuous, mating with many different males. In consequence the eggs in a clutch may not all have the same paternity. This is important for the dynamics of the initial spread of a cannibalism gene because the lower the likelihood that the eggs being eaten by a cannibaliser are also carrying this gene, the higher the chance of the cannibalism gene spreading. Perhaps the easiest way to envisage this is to consider the ratio between cannibalism and non-cannibalism alleles in clutches producing cannibalisers. When rare, only a quarter of the alleles in a clutch with cannibalisers are likely to be cannibalism alleles. However, as the gene spreads through the population, the chance that cannibalised eggs are carrying the gene increases as it becomes more likely that some individuals are homozygous for the gene, or that several of the males that a female mates with are carriers of the gene.

This means that the costs to the cannibalism resulting from its own expression will increase, and that the fitness advantage of sibling egg cannibalism will be negatively correlated with the frequency of the cannibalism gene.

If the cannibalism allele is recessive to the non-cannibalism allele, the situation is somewhat different, at least in the early stages of spread. By definition, only individuals homozygous for the cannibalism allele will express the trait. This means that when the allele is still rare, the only egg clutches on which sibling egg cannibalism will be seen will be those resulting from matings between two carriers of the cannibalism allele. Such matings will give rise to egg clutches in which a quarter of the progeny are cannibalisers, while two thirds of the remainder carry the allele. Here then, even in the early stages of spread, the proportion of the genes at risk that are cannibalism alleles will be high. Consequently, it is much more likely for a cannibalism-inducing allele to spread if it is genetically dominant than if it is recessive.

The evolutionary implications of sibling egg cannibalism

The evolutionary implications of sibling egg cannibalism are diverse. First, the habit may be, at least in part, responsible for the high level of mortality in dispersing neonate larvae. The rationale is simple. Slow developing embryos in a clutch may never get the chance to hatch, because they are eaten by individuals that have already hatched. There will therefore be strong selective advantages both to fast embryonic development and to hatching from the egg as soon as possible. These pressures will mean that ladybird larvae are likely to be as small as they can be while retaining a realistic chance of capturing prey. The result is a tenuous balance between being quick enough out of the egg not to be eaten by one's own siblings, and being large enough to capture and subdue aphids.

The need for rapid embryonic development may also be responsible for the high number of recessive lethal genes that appear to be carried by some species of ladybird (Lusis 1947). Such genes are often revealed in the form of severe inbreeding depression in laboratory cultures (Hodek 1973; O'Donald and Majerus 1985). They affect ladybirds in a number of ways at a variety of life stages. However, one of the commonest situations is when eggs appear to begin to develop normally, but then fail to hatch, even when sibling egg cannibalism is prevented. If selection has speeded up embryonic development to the maximum possible, the developmental systems will be under stress so

that mutations in the genes controlling early development may be detrimental because they overload these developmental systems.

It has been argued that sibling egg cannibalism may affect these recessive lethal genes in another way. If mutations in developmental genes slow down development, these, although not over-loading the developmental systems, will still be effectively lethal because embryos bearing them will be consumed by earlier hatching larvae that do not carry the mutation (Majerus 1994). The existence of abnormally high numbers of recessive lethal genes in some ladybirds is problematic from an evolutionary point of view, because selection should purge populations of such deleterious genes. However, sibling egg cannibalism may help to maintain genes of this type in populations (Werren 1987; Majerus 1993). Assume that the lethal genes are fully recessive, i.e. heterozygotes develop at the same rate and have the same fitness as the dominant homozygotes. To produce homozygote recessives (carrying two copies of the lethal allele), both parents must be heterozygous (they cannot be homozygous recessive or they would be dead). In a cross between two heterozygotes, one quarter of the progeny will be homozygous recessive and will thus develop slowly and be cannibalised by earlier hatching siblings. It has been shown that neonate larvae gain a substantial survival advantage if they consume one unhatched egg before dispersing from their egg clutch in search of aphids (Banks 1956; Ng 1986; Osawa 1989; Hurst and Majerus 1993; Majerus 1994; Majerus *et al in prep.* b). The normal larvae from a mating between two heterozygous carriers of one of these genes that slows embryonic development may thus gain a significant advantage because a quarter of their siblings will be late hatching and so be available to be eaten. As two-thirds of the normal larvae will be carriers of the deleterious gene, the advantage to these heterozygotes will be sufficient to maintain the deleterious gene in the population whenever their fitness is more than double that of a normal larva from a normal clutch. As the exact size of the advantage that is gained from sibling egg cannibalism is at least partly dependent on prey availability, the evolution and maintenance of these recessive genes will depend on aphid density (Majerus 1994).

Perhaps the most interesting evolutionary consequence of sibling egg cannibalism in the Coccinellidae is that it appears to provide a special set of conditions that favour the evolution of a range of bacteria that kill male, but not female hosts. These male-killing bacteria live inside the ladybirds, and can be transferred from one generation to the next in the cytoplasm of female gametes (sex cells). They cannot be transferred

from males to progeny because the sex cells of male ladybirds (sperm) have virtually no cytoplasm. Consequently, the health of male hosts is of no interest to the bacteria, because once they are in males, they cannot be passed on to other hosts and they will eventually die when the male host dies. However, the health and welfare of female hosts is crucially important to the bacteria, as it is on these that their continued existence depends. It is this disparity in the importance of male and female hosts to these intracellular parasites that has led to the evolution of their male-killing habit (L. Hurst 1991). Females that are infected with one of these bacteria produce eggs as uninfected ladybirds do. On average, approximately half the eggs are male and half are female. In clutches laid by normal females about 90% hatch, those that fail to hatch being infertile, slow developers which fall victim to the cannibalistic tendencies of their earlier hatching siblings, or die during development for some other reason. Typically, in clutches laid by infected females only around 50% of eggs hatch, the majority of those that do not being eggs containing male embryos that are killed by the bacteria (Hurst *et al.* 1992).

Male-killers have now been found in several different species of ladybird. The 2-spot ladybird has two different male-killers. Western European populations are infected by a rickettsia-like bacterium whose closest known relatives are vertebrate pathogens, such as the bacteria that cause scrub typhus in cattle and murine typhus in humans (Werren *et al.* 1994). Populations from central and eastern Europe, however, are infected by a group VI *Spiroplasma,* a bacterium that is quite unlike rickettsids (Hurst *et al. in prep.* a). The Japanese ladybird, *Harmonia axyridis* harbours another *Spiroplasma* in both Japanese (Sapporo) and Mongolian (Altai Mountains) populations (T. Majerus *et al. in prep.* a). Some Japanese populations are particularly interesting as more than half the females are infected, giving rise to a strongly female biased population sex ratio (T. Majerus *et al. in prep.* b). Adonis' ladybird (*Adonia variegata*) and the American ladybird *Coleomegilla maculata,* harbour male-killing bacteria that are related to *Blattabacteria,* the mutualistic gut bacteria of cockroaches and some termites (Hurst *et al. in prep.* b).

The question that must be asked is why has male-killing evolved in some of the intracellular parasites of these ladybirds. On first consideration this behaviour appears to be strongly maladaptive to the bacteria, because in killing their host they effectively commit suicide. However, closer consideration does give an explanation. The explanation comes in two parts, and both depend on the cannibalistic

attitude of neonate larvae towards unhatched eggs in their own clutch.

We have already noted that the existence of sibling egg cannibalism may have been partly responsible for the fact that neonate ladybird larvae are so small that they often have difficulty in finding an aphid that they can catch and eat (Wratten 1973, 1976). Many larvae starve to death because of this. However, as we also noted earlier, those larvae that have cannibalised an egg before dispersing from their egg clutch have a higher than average chance of survival. So consider a clutch laid by a female that is infected with a male-killer. Half of the eggs in such clutches do not hatch, so each of those that does, has on average, one unhatched egg to consume. From the point of view of the male-killer, if it is in a male egg, killing its host is a sensible strategy because on the one hand it cannot be transmitted to other hosts from a male, and on the other hand, by killing its host it provides a meal for its dead host's newly hatched sisters. Of course these sisters will also be infected with the male killer. Indeed, because bacteria reproduce asexually, dividing to give rise to two exact copies of themselves, the male-killers that are present in the sisters will be clonally identical copies of those that have killed the male eggs in that clutch. So the survival advantage of having on average one male egg to consume, goes specifically to female larvae that are infected with identical copies of the bacteria that have killed the male eggs.

The second part of the explanation is in addition to, rather than instead of, the first. It is simply that female eggs in a clutch laid by a female infected by a male-killer are less likely to be cannibalised than those in a normal clutch (Majerus and Hurst *in press,* Majerus *et al. in prep.* c). Given that some slow developing embryos may be cannibalised by early hatchers, imagine that a female embryo is slow developing in a clutch laid by an uninfected female. The chance of this female being eaten before she hatches will be high, both because there will be a large number of embryos that hatch before her, and because, towards the end of her development in her egg, there will be few unhatched eggs available for the early hatchers to eat. If we now transfer our slow developing female larva to a clutch laid by an infected female, her chances of being eaten are greatly reduced. This is partly because the number of early hatchers will be reduced by about half, due to the failure of the males to hatch, and partly because the number of unhatched eggs that are available to be eaten will increase substantially, because it will include all the dead male eggs. Our slow female embryo will thus be one of many rather than one of a few, and so will be more likely to hatch safely.

The evolution of sibling egg cannibalism may be an example of an evolutionary feedback loop. Once a cannibalism gene had arisen by mutation and begun to spread, a selection pressure to develop and hatch more quickly would arise. As a consequence, hatching larvae would be smaller and be less capable of catching and subduing aphids. The advantage of an additional meal in the form of a cannibalised egg, would consequently be increased, leading in turn, to an increase in the strength of cannibalistic behaviour.

Conclusion

Humans in many cultures have an antipathy towards cannibalism. The act of killing and eating other humans is considered anti-social. However, in the animal kingdom, such behaviour is common. Although we may intuitively feel that cannibalism should be detrimental to a species, this type of behaviour is likely to evolve whenever a fitness advantage accrues to the cannibaliser. In many species of predatory ladybirds cannibalism is common, even among kin. The advantage that accrues to cannibalising individuals, in the form of increased resources, has lead to cannibalism being the rule rather than the exception in these species that otherwise rely for food on an ephemeral and unpredictable prey, aphids. Once evolved, the cannibalistic habit, itself imposes a number of selective pressures upon ladybird populations which have been highly influential on the evolution of ladybirds.

References

Banks, C.J. (1956). Observations on the behaviour and early mortality of coccinellid larvae before dispersal from egg shells. *Proc. Roy. Ent. Soc. Lond. A* **31**: 56-61.

Dixon, A.G.H. (1959). An experimental study of the searching behaviour of the predatory coccinellid *Adalia decempunctata* (L.). *J. Anim. Ecol.* **39**: 739-751.

Goff, R. (1995). Cannibal ladybirds. *Bull. Amat. Ent. Soc.* **399**: 35.

Hemptinne, J.-L. & Dixon, A.F.G. (1991). Why ladybirds have generally been so ineffective in biological control? In *Behaviour and Impact of Aphidophaga,* (Eds. Polgar, L., Chambers, R.J., Dixon, A.F.G. and Hodek, I.). SPB Academic Publishing: The Hague.

Hodek, I. (1973). *Biology of Coccinellidae.* Junk: The Hague; Academia; Prague.

Hurst. G.D.D. & Majerus, M.E.N. (1973). Why do maternally inherited micro-organisms kill males? *Heredity* **71**: 81-85.

Hurst, G.D.D., Majerus, M.E.N. & Walker, L.E. (1992). Cytoplasmic killing elements in *Adalia bipunctata* (Linnaeus) (Coleoptera: Coccinellidae). *Heredity* **96**: 84-91.

Hurst, G.D.D., Hammarton, T.C., Obrycki, J.J., Majerus, T.M.O., Walker, L.E., Bertrand, D. & Majerus, M.E.N. (1996). Male killing bacterium in a fifth ladybird beetle, *Coleomegilla maculata* (Coleoptera: Coccinellidae). *Heredity* **77**: 177-185.

Hurst, G.D.D., Von dem Schulenberg, H.G., Majerus, T.M.O., Walters, R., Walker, L.E., Ashburner, M. & Majerus, M.E.N. (*in prep.* a). Group VI *Spiroplasma* associated with male-killing in Russian populations of *Adalia bipunctata* L.

Hurst, G.D.D., Hammarton, T.M., Bandi, C., Majerus, T.M.O. Bertrand, D. & Majerus, M.E.N. (*in prep.* b). Parasitism and mutualism as alternative strategies for inherited bacteria: the male-killing agent of the ladybird *Coleomegilla maculata* is related to *Blattabacterium* the beneficial symbiont of cockroaches.

Hurst, L.D. (1991). The incidences and evolution of cytoplasmic male killers. *Proc. R. Soc. Lond.* **B 244**: 91-99.

Lusis, J.J. (1947). Some rules of reproduction in populations of *Adalia bipunctata*: heterozygosity of lethal alleles in populations. *Dokl. Akad. Nauk SSSR* **57**: 25-828.

Majerus, M.E.N. (1993). Notes on the inheritance of a scarce form of the striped ladybird (*Myzia oblongoguttata* Linnaeus) (Coleoptera: Coccinellidae). *Ent. Rec. J. Var.* **105**: 271-278.

– . (1994). *Ladybirds. New Naturalist Series 81.* 368pp. Harper Collins, London.

Majerus, M.E.N. & Majerus, T.M.O. (1996). Ladybird population explosions. *Brit. J. Ent. Nat. Hist.* **9**: 65-76.

Majerus, M.E.N. & Hurst, G.D.D. (*in press*). Coccinellids as a model system for the study of male killing endosymbionts. *Entomophaga.*

Majerus, M.E.N., Majerus, T.M.O. & Hurst, G.D.D. (*in prep.* a). Sibling egg consumption in field populations of *Adalia bipunctata* (Coleoptera: Coccinellidae) does involve cannibalism.

Majerus, M.E.N., Majerus, T.M.O., Bourke, D., Elliot, R., Hudson, E., Irving, W., Nicholson, J., Pearson, M., Ransford, M.O., Sands, Z., Whitcomb, R., Walker, L.E. & Hurst, G.D.D. (*in prep.* b). Evidence for a resource advantage to the male-killing behaviour of an inherited micro-organism.

Majerus, M.E.N., Majerus, T.M. O. & Hurst, G.D.D. (*in prep.* c). The avoidance of cannibalism: a novel advantage to male-killing in two species of coccinellid.

Majerus, T.M.O., Hurst, G.D.D. & Majerus, M.E.N. (*in prep.* a). Male killing on *Harmonia axyridis* Pallas (Coleoptera: Coccinellidae) is associated with a group VI *Spiroplasma.*

Majerus, T.M.O., Majerus, M.E.N., Knowles, B., Wheeler, J., Betrand, D., Zakharov, I.A. & Hurst, G.D.D. (*in prep.* b). Variation in male killing behaviour on three populations of the ladybird *Harmonica axyridis* (Col.: Coccinellidae).

Mills, N.J. (1982). Voracity, cannibalism and coccinellid predation. *Ann. Appl. Biol.* **101**: 144-148.

Ng, S.M. (1986). Effects of first instar cannibalism on the first instar larvae of four species of aphidophagous Coccinellidae. In *Ecology of the Aphidophaga 2.* (Ed. Hodek, I.). Academia: Prague.

O'Donald, P. & Majerus, M.E.N. (1985). Sexual selection and the genetics of preferential mating in ladybirds. I. selection for high and low lines of female preference. *heredity* **55**: 401-412.

Osawa, N. (1989). Sibling and non-sibling cannibalism by the larvae of a lady beetle *Harmonia axyridis* Pallas (Coleoptera: Coccinellidae) in the field. *Res. Popul. Ecol.* **31**: 153-160.

Werren, J.H. (1987). The coevolution of autosomal and cytoplasmic sex ratio factors. *j. theor. Biol.* **124**: 317-334.

Werren, J.H., Hurst, G.D.D., Zhang, W., Breeuwer, J.A.J., Stouthamer, R. & Majerus, M.E.N. (1994). Rickettsial related male-killing in the ladybird beetle (*Adalia bipunctata*). *J. Bacteriol.* **176**: 388-394.

Wratten, S.D. (1973). The effectiveness of the coccinellid beetle, *A. bipunctata* (L.) as a predator of the lime aphid, *Eucallipterus tiliae* (L.). *J. Anim. Ecol.* **42**: 785-802.

Wratten, S.D. (1976). Searching by *Adalia bipunctata* (L.) (Coccinellidae) and escape behaviour of its aphid and ciccadellid prey on lime (*Tilia* x *vulgaris* Hayne). *Eco. Ent.* **1**: 139-142.

Moth holes

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The Parsnip moth (*Depressaria pastinacella*) has a problem – where to pupate. Entomologists have a problem too – how to distinguish between closely related species of *Depressaria*. Hence in the following article I cannot be *sure* that I haven't lumped together two or more species, but for the purpose of this article it almost certainly doesn't matter.

In Pembrokeshire, where these observations were made, these common, 15mm long, unimpressive, dull-brown moths have one distinguishing feature – a comb of short hairs at the base of their antennae. As they "hibernate" in houses, it is easy to verify this.

Although called Parsnip moths, named after *Pastinaca sativa,* the wild parsnip, in Pembrokeshire they mostly attack the flowers of hemlock water dropwort (*Oenanthe crocata*), which plant blankets huge areas of wetlands, although this may not always have been so, its abundance arising from the nutrient-rich water which drains off farmland. The 20mm long, dull-green larvae have black heads and black spots and look, for all the world, like sawfly larvae. After webbing the flower-heads together they feed and wriggle in relative safety with the umbels during June and July, but when it comes to pupation, in August, they have a problem as the foodplant springs from soggy ground or water, so that unlike most moths they cannot pupate in the ground. Instead they crawl down the hollow stem and bore a neat, visible hole into its interior.

Although quite a few of the larvae become mummified as a result of mould, the majority shrink to 10mm long, brown pupae which after a few weeks develop into over-wintering adult moths, which then crawl out to fly away. Needless to say, some of the larvae and pupae kept under observation produced ichneumon flies which for their size had long ovipositors for penetrating the thick-walled stems of the plant.

It was many years previously when I first noticed holes in the stems of cow parsnips (*Heracleum sphondylium*) and at the time I thought they had been made by insects intending to hibernate *inside* the hollow stems, which seems a sensible policy in the case of cow parsnip and wild parsnip which do not grow in marshes and whose dried out stems often remain more or less upright all winter. Another occasional foodplant is wild angelica (*Angelica sylvestris*) which grows in wet

ground in damp woods, grassland or marshes and like hemlock water dropwort its stems collapse onto the wet ground, so that *Depressaria*'s policy of over-wintering away from such wet habitats – not even in the stems – made sense.

Holed stems are not unique to the above umbellifers. They can be seen in false bulrush (*Typha latifolia*) and reed (*Phragmites australis*), where they are made by the Bulrush wainscot (*Nonagria typhae*) and Fen wainscot (*Arenostola phragmitidis*) respectively. The Bulrush wainscot actually feeds inside bulrush and pupates there, the hole being made when the adult exits, whilst the Fen wainscot, which also feeds inside, makes the hole when the larva exits to pupate in ground debris in June and July.

Hence it seems reasonable to speculate that the larval behaviour of *Depressaria* species evolved in the marsh-growing umbellifers, where at all costs the wet ground had to be avoided, and then continued where it was no longer necessary in cow- and wild parsnip.

Some interesting Dragonfly records from Staffordshire, 1996

by Jan Koryszko (6089)

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During May 1996, Mr Neil Collingwood undertaking a project on dragonflies at university came across my name in the references section of the Icole publication, *The Dragonflies of the Severn and Trent River catchments.*

He obtained one of my articles concerning the increasing incidence of the Southern hawker dragonfly (*Aeshna cyanea*) in Park Hall Country Park, Staffordshire. He asked me for records of dragonflies, because he had been requested by the City Museum to produce an atlas of the Odonata of Staffordshire and he, in turn, informed me of some interesting records for 1996. The Emperor dragonfly (*Anax imperator*), the Ruddy darter (*Sympetrum sanguineum*) and a male Black-tailed skimmer (*Orthetrum cancellatum*) were recorded in July.

If any members have any dragonfly or damselfly records, old or new, from Staffordshire then please contact Stoke-on-Trent City Museum and Art Gallery, Broad Street, Hanley, Staffordshire. I wish Neil the best of luck with his new Odonata atlas.

Dragonfly spotting

by Don McNamara (5573)

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In the Denham area on the 9th September 1987 it was a typical "quality" British summer's day – blue skies, fresh but warm, little wind, and plenty to look at. Denham has a series of waterways, the River Colne in particular, the Frays, Alderbourne, and Misbourne, lots of ponds and lakes – some natural and others the result of gravel extraction (which still goes on in parts), streams and drainage ditches. Even the Grand Union Canal contributes to the flora and fauna of the area, its sedentary flow being a much cleaned-up act compared to ten years ago. This is a splendid area for dragonflies.

The main problem with identification is the variability of adult insects and in particular the various colour stages they go through – new emergers being in some cases quite unlike older ones. Also there are similarities between close relatives. However, with a novice's luck and a good guide book, four species were identified with reasonable confidence: Banded demoiselle (*Calopteryx splendens*); Common blue damselfly (*Enallagma cyathigerum*); Migrant hawker (*Aeshna mixta*); Common darter (*Sympetrum striolatum*).

Apart from these, a bonus, in a small rough patch of ground near the canal at Denham Lock, several fresh Small coppers (*Lycaea phlaeas*) flew and basked in the sun.

Reference

McGeeney, A. (1986). *A Complete Guide to British Dragonflies*. Jonathan Cope.

Meadow brown observation

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On 18th July 1996, a warm and sunny day, I visited Park Hall Country Park, Staffordshire. I was sitting next to Boltan Gate Pool – a pool very popular with fishermen.

I noticed a Meadow brown (*Maniola jurtina*) flying across the pool. It touched the water several times causing a number of ripples on the surface. It then landed on a tree close by with its proboscis uncoiled and its antennae going up and down. Was the butterfly taking a drink on the wing? The water was too murky for it to see its own reflection and with the number of dead butterflies I have found on pools and ponds over the years, is it not likely that they would come to grief while drinking on the wing?

Obituary

Professor Colin Smith, 1927-1997

It is with great sadness that we must report the death of Professor Smith in February.

He was born in Brighton in 1927. He was a leading authority on Medieval Spanish literature, being Professor of Spanish at St. Catherine's College, Cambridge between 1975-1990. He wrote a number of texts, and was the Compiler for the Collins *Spanish/English Dictionary,* which is the best and most widely used one.

He joined the AES in the late 1960s, having an interest in both micro and macro moths, conservation and, not surprisingly, entomological literature. In 1990 he was the first person to record in Britain, in Sussex, the Noctuid *Agrochola haematidea*. Colin is responsible for its common name, "the Southern chestnut" (he personally ranked this find as one of his most worthwhile achievements). This moth is a scarce Mediterranean species known only from the Iberian peninsular and certain parts of south-west France. The colony turned out to be a well-established one, and is believed to have been there since the end of the last glaciation. At the time its life history was unknown, but Colin, with a close friend (Gerry Haggett of Caston in Norfolk, to whom I am much indebted for the information about the moth) managed to breed it and document its life history. They worked closely with English Nature to produce a conservation strategy. It has an unusual flight pattern in that it flies for about half-an-hour around dusk in late October. The foodplant is *Erica*. Details of the moth new to Britain were published in 1993, *Entomologists' Gazette,* **44**: 183-203 with line drawings and two coloured plates.

Colin worked with the Cambridge Wildlife Trust for many years and published a number of items, including *Nature in Cambridgeshire*, which details many of his finds in his garden at Girton. In recent years he spent much time on the moths of East Anglia, in collaboration with Rafe Eley. His extensive collection of microlepidoptera now lies in the Zoology Department at Cambridge. The bulk of his very extensive moth collection is now owned by an AES member.

He leaves a wife, Ruth, and three daughters to whom we extend our sympathy.

Nick Holford

(with much help from Colin's wife, Ruth, and friend Gerry Haggett)

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