20.x.1991. The spider-infested cavities beneath the bark also contained larvae of *Ctesias serra* (F.) and *Attagenus pellio* (L.), as well as an adult *Ptinus* sp. The history of this site is unclear, but the appearance of the old oaks suggests an old deer park.

My thanks to John Gorrod, Warden at Crickley Hill, for his encouragement to investigate the deadwood fauna of Short Wood.—K. N. A. Alexander, 22 Cecily Hill, Cirencester, Gloucestershire GL7 2EF.

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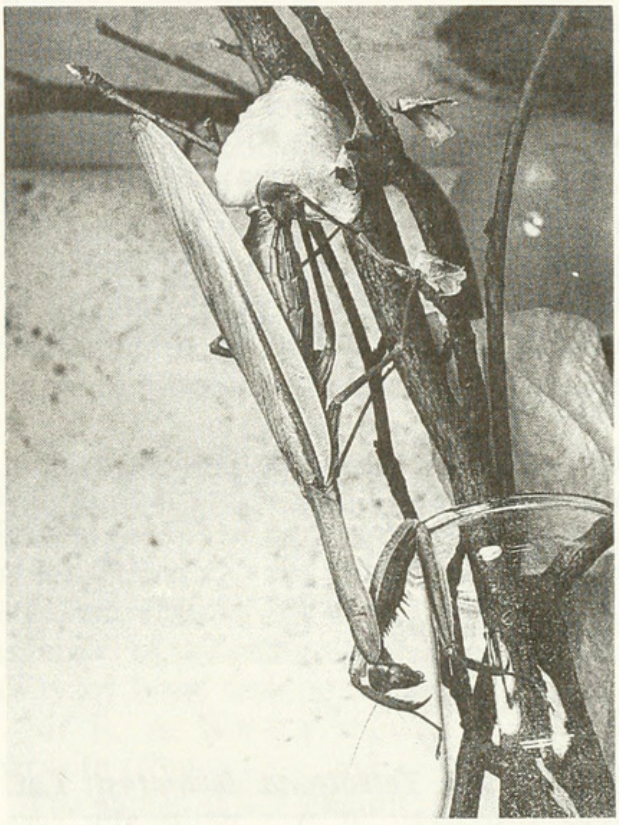

Figure 1. The mantid *Tenodora sinensis* in the process of egg-laying.

Oviposition and hatching in the mantid *Tenodora sinensis*.—While rearing large numbers of the mantid *Tenodora sinensis* for a research project, the opportunity was taken of photographing some of its activites. Figure 1 shows a female about half-way through the process of oviposition and the making of the ootheca. This she does by producing the froth, which later hardens, and swirling it around with her abdomen. From time to time she stops this activity and carefully inserts her ovipositor into the centre and is obviously then depositing a layer of eggs. In all cases observed the entire process, which lasts about an hour, took place 'upside-down' with the ootheca hanging from the twig to which it is attached and the mantid facing downwards.

When the nymphs hatch it appears that the last to be laid hatch fractionally before the first, which are of course at the 'bottom' of the ootheca and as they hatch they appear to be in a tangled pile clinging to each other, the last to hatch clambering over those just emerged. This is shown in Plate IV, Figure 2. They gradually disentangle themselves and one can be seen to the left in the figure, clear of its companions and making its way upwards; others fall off onto the foliage below, or onto the ground.—Brian O. C. Gardiner, 2, Highfield Avenue, Cambridge CB4 2AL.

Courtship display of a Central American tree cricket.—While visiting Costa Rica, Central America, in September 1991, I frequently came across a large brown tree cricket (*Oecanthus/Paroecanthus* sp.?, family Grillidae) under the bark of trees and palings and indoors in wardrobes and cupboards. At night it was common crawling on tree trunks (Figure 1) and on one occasion I was able to watch what I assume was part of its courtship behaviour.

A pair of crickets circled each other 10 cm apart (about the length of the antennae). First one, then the other would make a sidling movement. What I took to be the

Fig. 1. Female tree cricket crawling on tree trunk at night.

male (lacking the ovipositor visible in Figure 1) had inflated a glistening bulbous structure at the apex of its abdomen (Plate IV, Figure 3).

Unfortunately, in photographing this structure, my foot brushed against one of the buttress roots of the tree. The vibration was immediately sensed by both crickets which hurried out of sight up into the branches.

Courtship in some North American tree crickets involves the female nibbling a secretion from a gland in the male's back and this peculiar part of the cricket's anatomy might be an analogous organ.—Richard A. Jones, 13 Bellwood Road, Nunhead, London SE15 3DE.

The rearing of *Clusiodes verticalis* (Collin) (Diptera: Clusiidae).—At Sudbury Hill, Middx, in mid April 1982, a small oak branch lying on leaf litter in a copse was found to contain clusiid puparia. The branch measured 32 cm long and varied in diameter between 2.5 and 3.4 cm. It was extremely rotten but retained an intact cover of bark. The branch was placed in a seed propagator and kept indoors in a cool room.

Five *Clusiodes verticalis* emerged between early May and 30 May, comprising two males and three females (first and last specimens were females). This is of interest since large logs and stumps tend to yield *C. albimana* (Meig.) or *C. gentilis* (Collin). Thus *C. verticalis* may well be a specialist on small branches of the type described.

The same branch yielded two males of the mycetophilid *Symmerus annulatus* (Meig.) (15 and 21 May), eight of the tipulid *Austrolimnophila ochracea* (Meig.) (22 May–early June) and one specimen of the elaterid beetle *Denticollis linearis* (L.) (early June).—Alan E. Stubbs, 181 Broadway, Peterborough, Cambridgeshire PE1 4DS.

BOOK REVIEW

Stick insects of Britain, Europe and the Mediterranean, by Paul Brock. Fitzgerald Publishing, PO Box 804, London SE13 5JF. ISBN 0951093983. 50pp. Price £15 [or £10 post free from publisher].—This is a comprehensive work covering all the 17 known species of Phasmatodea from Europe and North Africa, including those New Zealand species which have become naturalized in the British Isles.

Many of these species are very alike and a lot of them are parthenogenetic so they are not easy to identify. All the species are illustrated including in some cases geographical variations. Maps of the known distributions are given and nearly all records are listed. The eggs are described and illustrated. It should be possible to name any given adult specimen with the aid of this book.

The food plants, life history and behaviour are given for the better known species. There are line drawings or black and white photographs of the food plants.

Advice on keeping and breeding stick insects in captivity is given. At this point I might mention a fact that is tacitly assumed in the book. The 1988 edition of the guide for importers issued by the Ministry of Agriculture, Fisheries and Food lists stick insects among the invertebrates which may be imported, kept, sold, exchanged or given away but MUST NOT BE RELEASED.

There is advice on finding stick insects and illustrations of likely types of habitat. Several of these are printed twice in different places which seems a bit wasteful. It is not—to me—an easy book to find one's way about in but I am not able to suggest how it could be improved.

The book has a spiral binding and hard covers. The paper is good and the print clear though a little on the small side.

It appears that everything which is currently known about these animals is to be found somewhere in the book. They are a rather neglected group. Anyone who has any interest in European stick insects will want to buy this work, even persons who, like me, only photograph stick insects and would like to name them.

F. M. MURPHY

CORRIGENDA & ADDENDA

Agassiz, D. 1992. Additions to the British Microlepidoptera. *Br. J. Ent. Nat. Hist.* **5**: 1–13.

page 2 for *S. roborella* (Staint.) substitute *S. roborella* (Johansson)

page 3 for *T. murariella* Staint. substitute *T. murariella* Staud.

page 4 for *Elachista eskoi* Kyrki & Karnomen substitute *Elachista eskoi* Kyrki & Karvonen

page 7 for *Scythris potentillea* (Zell.) substitute *Scythris potentillella* (Zell.)

page 7 for *Cydia medicaginis* (Zell.) substitute *Cydia medicaginis* (Kuznetzov)

page 8 for *Sclerocoma* substitute *Sclerocona*

page 9 before *Sceliodes laisalis* (Walker) insert:

Leucinodes orbonalis (Guen.)

R. Crawshaw reared one specimen from two larvae found in an aubergine of unknown origin purchased in Halifax in March 1981. The moth emerged 26.iv.1981. See Beaumont (1983).

page 10 line 5, *Coleophora granulatella* should be in italics.

page 10 before Bland, K. P. insert:

Beaumont, H. E. 1983. Exhibit at 1982 Annual Exhibition. *Proc. Trans. Br. Ent. Nat. Hist. Soc.* **16**: 100.

ACKNOWLEDGEMENT

I am grateful to John Robbins of Porlock for pointing out these errors.—David Agassiz, Glebe House, Takeley, Bishop's Stortford CM22 6QH.

ASSYMETRICAL ANTENNAE IN THE HAWTHORN SHIELDBUG *ACANTHOSOMA HAEMORRHOIDALE* (L.)

E. G. HANCOCK

Department of Natural History, Glasgow Museums and Galleries, Kelvingrove, Glasgow, Strathclyde G3 8AG.

A male specimen of the hawthorn shieldbug, *Acanthosoma haemorrhoidale* (L.), was sent from Ardrossan, Ayrshire, to Glasgow Museums as an enquiry in early January, 1992. There is a problem with this species in Scotland because the only readily available source of information (Southwood & Leston, 1959) is considerably out of date in details of distribution. This tends to be off-putting to those who get as far as identifying the animal correctly but tend not to believe the evidence of their own eyes in the light of the apparent fact that it does not occur north of Yorkshire.

Furthermore, this particular example is peculiar in that the left antenna has four joints while the right has five (Figure 1). The key to families uses the number of antennal joints as one of the couplets. It distinguishes the shieldbugs (five joints) from other families (four joints). Obviously following the wrong choice could result in an erroneous identification or plain bewilderment. The advisability of checking both halves of insects for bilateral variation in details of structure is thus reinforced.

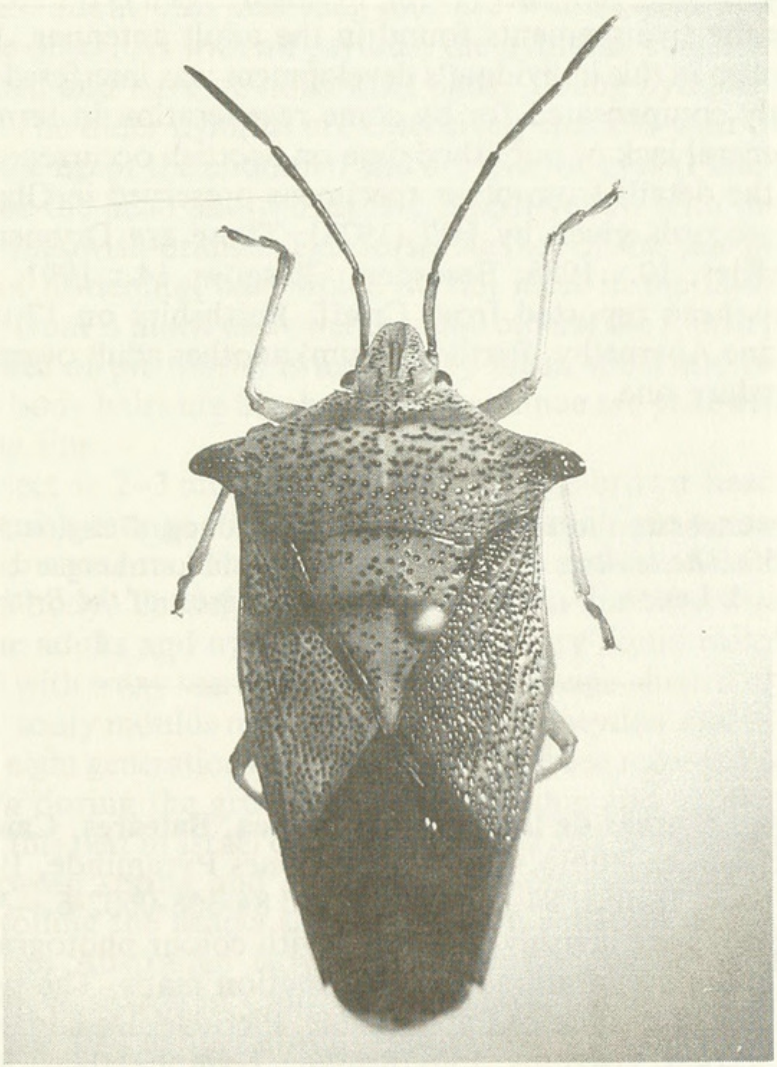

Fig. 1. *Acanthosoma haemorrhoidale* (L.), the hawthorn shieldbug showing assymetrical antennae.

Table 1. Relative antennal joint lengths.

Joint	Left	Right	
1	22	22	(20.6)
2	23	21	(20.2)
3	19	16	(15)
4	32	24	(22.8)
5	—	23	(21.2)
Total	96	106	(99.8)

The figures in parentheses are the average of both antennae of three normal male specimens from other Scottish localities. The figures are the readings from a micrometer eyepiece, not exactly equivalent to a whole millimetre. The actual antennal lengths of the 16.01-mm-long bug are: left 8.16 mm, right 9.01 mm.

Microscopic examination reveals the unequal antennae are not the result of immediate damage in the adult state because the joints are all perfectly formed, and with differing proportions as detailed in Table 1.

These measurements show that the left antenna has undergone allometric growth (that is when organs or parts of a body develop at a different rate from the rest). This may be to compensate for the loss of the joint. Nymphs of most heteropterans have four joints. According to Miller (1956), in shieldbugs it is the second joint which divides to provide the five segments found in the adult antennae. Presumably the controlling mechanism in this individual's development was interfered with. However, this has been partly compensated for by some regeneration in terms of length.

In light of the general lack of published data on Scottish occurrences of this insect, the following are the details from other specimens preserved in Glasgow Museums which add to the records given by Hill (1973). These are Drymen, Stirlingshire, 19.viii.1984; Dumfries, 10.v.1988; Bearsden, Glasgow, 14.x.1991. I have recently learnt that one has been reported from Crieff, Perthshire on 17.i.1992 (personal communcation, Anne Abernethy, Perth Museum) another adult overwintering record to add to this Ayrshire one.

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Hill, A. R. 1973. Invertebrate short notes: hawthorn shieldbug. *Glasgow Naturalist* **19**: 59.
Miller, N. C. E. 1956. *The biology of the Heteroptera*. London: Leonard Hill, pp. 162.
Southwood, T. R. E. & Leston, D. 1959. *Land and water bugs of the British Isles*. London: Warne, pp. 436.

BOOK NOTICE

Guia de mariposes diurnas de la Peninsula Iberica, Baleares, Canaries, Azores y Madeira, by F. Fernandez-Rubio, Madrid, Ediciones Pyraminde, 1991, 2 vols, 148 and 406 pp, paperback, ISBNs: 84-368-0601-8 and 84-368-0602-6.—Written entirely in Spanish, these books are lavishly illustrated with colour photographs of live and set specimens, genitalia preparations and distribution maps. The two volumes are not numbered, but the first contains Papilionidae, Pieridae, Danaidae, Satyridae and Hesperidae; the second contains Libytheidae, Nymphalidae, Riodinidae and Lycaenidae. Any lepidopterist, or in fact an entomologist, visiting these popular holiday destinations would be well armed with these two attractive books.

A PSYLLID PEST OF ACACIA NEW TO BRITAIN

A. J. HALSTEAD

The Royal Horticultural Society's Garden, Wisley, Woking, Surrey GU23 6QB.

In September 1990 a recently acquired single plant of *Acacia rivalis* Black, J. in a glasshouse at the Royal Horticultural Society's Garden at Wisley, Surrey, was found to be infested with eggs, nymphs and adults of a psyllid. Samples were sent to the Natural History Museum, London, and were identified as *Acizzia uncatoides* (Ferris & Klyver) (Hemiptera: Psyllidae). This originates from New Zealand and Australia but has spread to the USA (especially California), the Hawaiian Islands, France, Spain, Italy and Israel. In California it has been recorded on a wide range of wattles and mimosas, *Acacia* spp. and silk trees, *Albizia* spp. (Munro, 1965), some of which are grown in Britain. The plant at Wisley had come from a nursery at Loddon, Norfolk, where it had been raised from seed. The grower suspected that the psyllid may have been introduced with some plants of *Acacia retinoides* and *Albizia julibrissin* he had imported from the south of France. Infested plants at the nursery were destroyed and the plant at Wisley was treated with insecticide to eradicate the pest. There is a potential for further importations as acacias and albizias are becoming popular as conservatory plants.

The acacia sucker is a sap-feeding insect that forms dense colonies on the leaves and stems at the shoot tips. All stages in the life cycle can be found together. The elongate eggs are about 0.25 mm long and are whitish-yellow with one end more pointed than the other. As with all psyllids, the nymphal stages are distinctly dorso-ventrally flattened and have obvious wing pads. Young nymphs are creamy yellow with pink eyes. The older nymphs are extensively marked with black, especially on the wing pads, the tip of the abdomen and around the eyes (Plate IV, Figure 1). The ground colour of the head and thorax is greenish-yellow with the front part of the abdomen being yellowish-orange. The dorsal surface of the pale part of the abdomen has four pairs of horizontal bars which do not meet in the middle. The third pair of bars from the front is much narrower than the others; the fourth pair is the broadest. The dorsal surface of the thorax is marked by black spots and two pairs of vertical black bars. The body hairs are black and the antennae are yellowish green at the base and black at the tips.

The adult insect is 2–3 mm long with an orange-brown head and thorax. The abdomen is greenish-orange with a greyish-black band right across the tergites at the hind edge of the segments. The wings are hyaline and are held like a pitched roof over the insect's body. The legs have black tarsi but are otherwise coloured like the thorax. Both the adults and nymphs excrete a sugary liquid called honeydew which becomes coated with waxy secretions and forms sausage-shaped droplets of liquid on the plant. Black sooty moulds may develop in the honeydew and disfigure the foliage.

In Italy six to eight generations of the psyllid have been recorded on *Acacia longifolia* and *A. dealbata* during the growing season (Arzone and Vidano, 1985). Halperin (1986) recorded this pest in Israel on *Acacia ligulata* and noted that it produced several generations between spring and autumn and overwintered as adult insects. Some success in controlling the acacia sucker has been achieved in the Hawaiian Islands by introducing an Australian ladybird, *Harmonia conformis* (Boisd.) (Leeper & Beardsley, 1974). Research in California suggests that *Acizzia uncatoides* may not be able to tolerate high temperatures. Madubunyi & Koehler (1974) kept the insect at various constant temperatures between 15–45 °C. The optimal temperature range for development and reproduction was in the range 20–25 °C. At 30 °C, although

76.9% of the eggs hatched, none of the nymphs completed its development. In Britain *Acacia* and *Albizia* spp. are not fully hardy and they are generally grown as conservatory plants or in warm sheltered places, such as against a south-facing wall. Plants growing in protected situations could easily be exposed to temperatures in excess of 30 °C on sunny days and this may affect the sucker's survival.

ACKNOWLEDGEMENTS

My thanks are due to David Hollis of the Natural History Museum for identifying the psyllid and to the owner of the nursery for providing information about the infestation on his premises.

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Madubunyi, L. C. & Koehler, C. S. 1974. Development, survival and capacity for increase of the albizia psyllid at various constant temperatures. *Environmental Entomology* **3**: 1013–1016.

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BOOK NOTICE

The Hemiptera. By W. R. Dolling, Oxford University Press/Natural History Museum Publications, 1991, 274 pages, £40, hardback.—After a general introduction to their ecology, behaviour and structure, the Heteroptera, Auchenorrhyncha and Sternorhyncha are discussed family by family. The book is liberally dotted with delicate line figures by J. H. Martin and there are 8 colour plates. Keys enable determination of both adults and nymphs to family level. For more specific identification, the reader is referred to the books and articles listed in 17 pages of references. 1700 species of Hemiptera are recorded from Britain, their mainly herbivorous lifestyles making them a group of major importance, but still they are relegated to the less enthusiastically greeted end of the 'other orders'. Anyone reading this excellently produced book will find their interest and enthusiasm justifiably stimulated.

Plate IV.

1. A psyllid pest of acacia new to Britain. A. J. Halstead. 1992. *Br J. Ent. Nat. Hist.* **5**: 95–96. Nymph of *Acizzia uncatoides*.

2. Oviposition and hatching in the mantid *Tenodora sinensis*. B. O. C. Gardiner. 1992. *Br. J. Ent. Nat. Hist.* **5**: 90. Nymphs hatching from the ootheca. Photo B. O. C. Gardiner.

3. Courtship display of a Central American tree cricket. R. A. Jones. 1992. *Br. J. Ent. Nat. Hist.* **5**: 90–91. Tip of male abdomen showing the glistening inflated scent (?) organ. Photo R. A. Jones. Olympus OM1 with 50 mm f3.5 macro lens, 108 mm extension tubes and 10 dioptre supplementary lens. Taken at f22 using twin flashes, Kodachrome 64, La Pacifica, Costa Rica, 2.ix.1991.