Bulletin of the Royal Entomological Society Volume 39 (3) 2015

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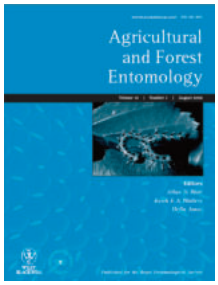
HUBER, THE BLIND BEE MAN

THE BUG FARM EMERGES



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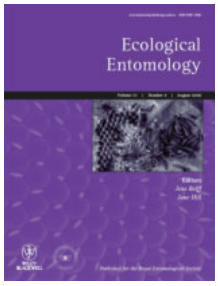

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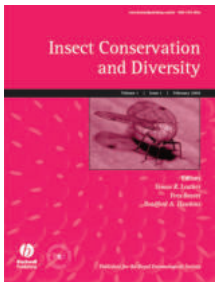

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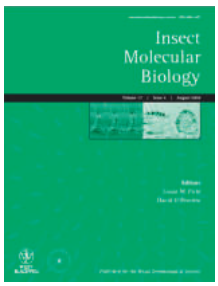

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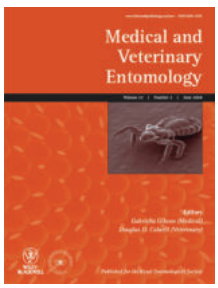

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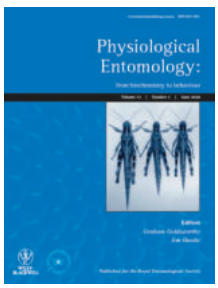

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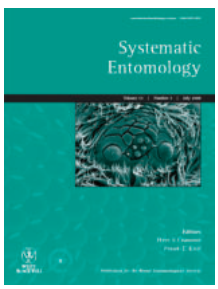

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Antenna (Bulletin of the Society). Free to Members/Fellows. Published quarterly at an annual subscription rate of £50 (Europe), £55 (outside Europe), $90 (United States). This journal contains entomological news, comments, reports, reviews and notice of forthcoming meetings and other events. While emphasising the Society's affairs, *Antenna* aims at providing entomologists in general with a forum for their views and news of what is going on in entomology. Subscriptions and advertising enquiries should be sent to the Business Manager at The Mansion House, Chiswell Green Lane, Chiswell Green, St. Albans, Hertfordshire AL2 3NS and any other enquiries to the Editors.

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COVER PICTURE

Detail from a plate in, Huber, P. 1802. Observations on several Species of the Genus *Apis*, known by the Name of Humble-bees, and called Bombinatrices by Linnaeus. Transactions of the Linnean Society of London 6: 214-298, pl. 25-27.

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EDITORIAL

Welcome to the third edition of 2015, we hope the English summer is still blazing when you receive your copy. In this issue we offer reviews of two of the latest Wild Guides and a comprehensive training manual for young entomologists to tempt you into the field, plus an entomological novel for those lazy afternoons. *Antenna* always tries to offer our readers a range of entomological surprises, and in this issue we have a biography of a blind entomologist who pioneered much of the early research on bees. We also offer an outline of the massive conservation and outreach project that is Dr Beynon's Bug Farm, a life's work that is just taking its first steps. We wish Dr Beynon well in this Herculean project. Another surprise is a fascinating note from Stuart Reynolds on an artist, John Bennett, who builds insects from discarded kitchenware, resulting in amazingly delicate sculptures. There is also an interview with Richard Jones, writer and explorer of the darker margins of entomology.

All of these articles have a common theme running through them – the desire to communicate to the wider world the authors' fascination with the insect world. Our blind entomologist, known at the time as 'Huber the Bee', illuminated the then unknown world of the bee and ant colony, revealing a complex and fascinating set of behaviours. Sarah Beynon's Bug Farm will operate over a landscape-wide horizon of entomological and conservational fields that will connect with an enormous cross section of society. Richard Jones books often explore the darker, more unsavoury (by conventional standards) fringes of invertebrate biology to reveal a suite of curious and intriguing lives, while John Bennett's sculptures amuse and enthrall, attracting the attention of people who would never dream of attending a natural history event. The Society is well aware of the importance of communicating with as wide an audience as possible, as evidenced by the hugely successful National Insect Week and the Insect Festival in York. The vital role that communicating our science to the public plays was clearly demonstrated at last year's ECE in York, where John Pickett recounted the details of how a public demonstration against the GM crops he was working on was dispersed following a detailed explanation of what was being undertaken. A misinformed press can often present science, and entomology in particular, in a bad light, the recent press hysteria regarding the false widow spiders is a classic example, so it is imperative that we as entomologists go the extra mile to ensure that the public have a good understanding of the work we are undertaking. As Simon Leather pointed out in his recent blog, many members of the public suffer from Entoalexia, a total lack of awareness of the insect world, so we have a long way to go. To paraphrase Tony Blair, the three most important activities for a modern entomologist are communication, communication and communication. An article in *Antenna* is a great way to start, thus ensuring that your research reaches a significantly wider audience.

We also have reports from the International conference on Ephemeroptera and the Annual conference of the Soil Ecology Society. There is also an update on the Society's Handbook series and all the usual Society news plus the diary.

Peter Smithers

Guidelines for submitting photographs

To maintain a high quality we suggest that submissions for *Antenna* be presented via e-mail or on CD. Files must be in a PC-compatible format preferably in MS Word.

Electronic images can be embedded in the Word document but we will also require separate electronic images. These images should be at least 300dpi at an image size that is either equal to, or greater than the expected final published size.

Please do not submit images that have been printed from a computer on a domestic inkjet or laser printer. Even if the camera is a good one and photo quality paper is used, the graininess is very hard to deal with. If plain paper is used, the prints are virtually unusable.

Photos taken on film should ideally be submitted as slides or as reasonable sized prints for us to scan or alternatively they can be scanned in by authors provided the scanner is capable of scanning at up to 1200dpi.

If an image is intended for the front cover then the photograph should be in portrait format (i.e. the shape of the final image) and will need to be quite a large file size (at least 5,000kb) or a good quality slide or print.

To give an idea as to what happens when the image is not of sufficient size, take a look at these two photographs. One is 300dpi and the other is 72dpi.

300dpi

72dpi

CORRESPONDENCE

Weaver Ants

Further to my item on collecting weaver ants for human consumption in Thailand (*Antenna* Vol. **39** (1)), while part of a swarm of Thais descending on a Thai food shop in Mikkeli, Finland, in June my wife purchased five cans of preserved Mountain Brand Asian weaver ant (*Oecophylla*) cocoons (described on the labels as "red ant eggs"). Although botanists may be obliged to scoff plants and ornithologists avian eggs, the wise entomologist, unaware of what ant larvae have been brought up on, will baulk at consuming whatever they have metamorphosed into. Thus, I offer no opinion as to the flavour and chewiness of ant pupae pickled in brine. Better to approach my entomophagous wife, whom you can also probe regarding how to turn the swim bladders of 20 fish and half a ton of red chilli into a culinary delight.

Leigh Plester
Finland

Torben Larsen: and a moment of History

It is hard to imagine Torben is no longer with us. From his working retreat in Brixton south of the river, he has been coming for a jovial but mainly serious lunch here in Kentish Town for many years, ever since he left Hanoi. There would always be an update on his latest project and advice generously offered on any entomological problem, especially on controversial topics such as the date of the origin of the butterflies.

Our friendship goes back to 1996 when I approached him for help over our planned trip to Ghana to film its butterflies. When we came back and were looking through our footage there occurred a unique moment in the history of entomology. Torben thought he saw on the screen a species new to science.

The butterfly became the first (and so far only) species ever to be formally described solely on the basis of film, and after appropriate consultation, especially with his friend and colleague Jaques Hecq in Brussels, he named it ***Bebearia banksi.***

In the species list of the Cinebutterflies film of this field trip "Ghana's other Gold" published as a video (in VHS) in 1998, the species appears with this footnote:

Bebearia banksi, *a new species, identified from this picture, and others filmed at the same moment, in Kakum National Park in December 1997: see Hecq and Larsen 1998 in Lambilionea XVlll, 3 Septembre 1998 p 359*

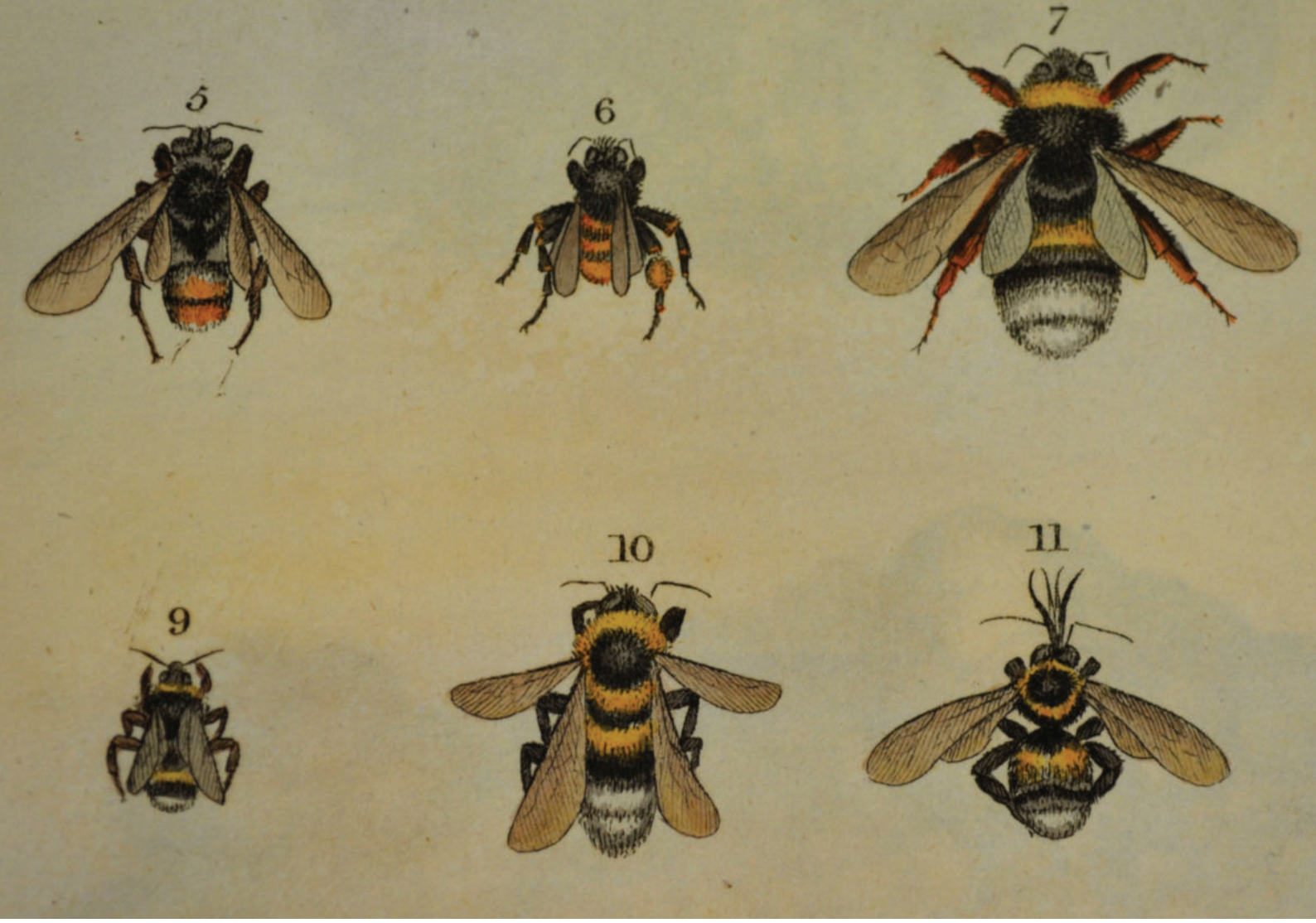
However the name did not stand for very long. Its swansong soon appeared. 'The 'Only Butterfly Named from Video Footage' flew again, but this time in a regretful Footnote.

In Torben's definitive work *Butterflies of West Africa* [Apollo Books, Stenstrup 2005} a Note in the section on *Bebearia* determined its fate:

> "[the video of the species] showed a butterfly close to *B. abesa* but with a clearly convex forewing margin and significantly more blue gloss. It now seems we made a mistake. Compared with *B. abesa* from Cameroon and the equatorial region, the taxon is clearly different. However the one on the video is probably typical of the *B. abesa* populations from west of the Dahomey Gap, and the Holotype species is actually from Cape Coast, Ghana - where Kakum is located. From Nigeria to Uganda the populations would seem to fall within ssp *pandera* Hecq. 1998. It is thus likely that the name *cercestis* Ward 1871 (TL 'Cameroons') is a senior synonym.

Torben was certainly the expert on African butterflies for our time. But for me as a maker of films on butterflies designed to appeal to those outside the profession as well as earn the respect of those inside it, he was invaluable not just for his authority and experience but for the breadth and clarity of his views and the courage with which he expressed them.

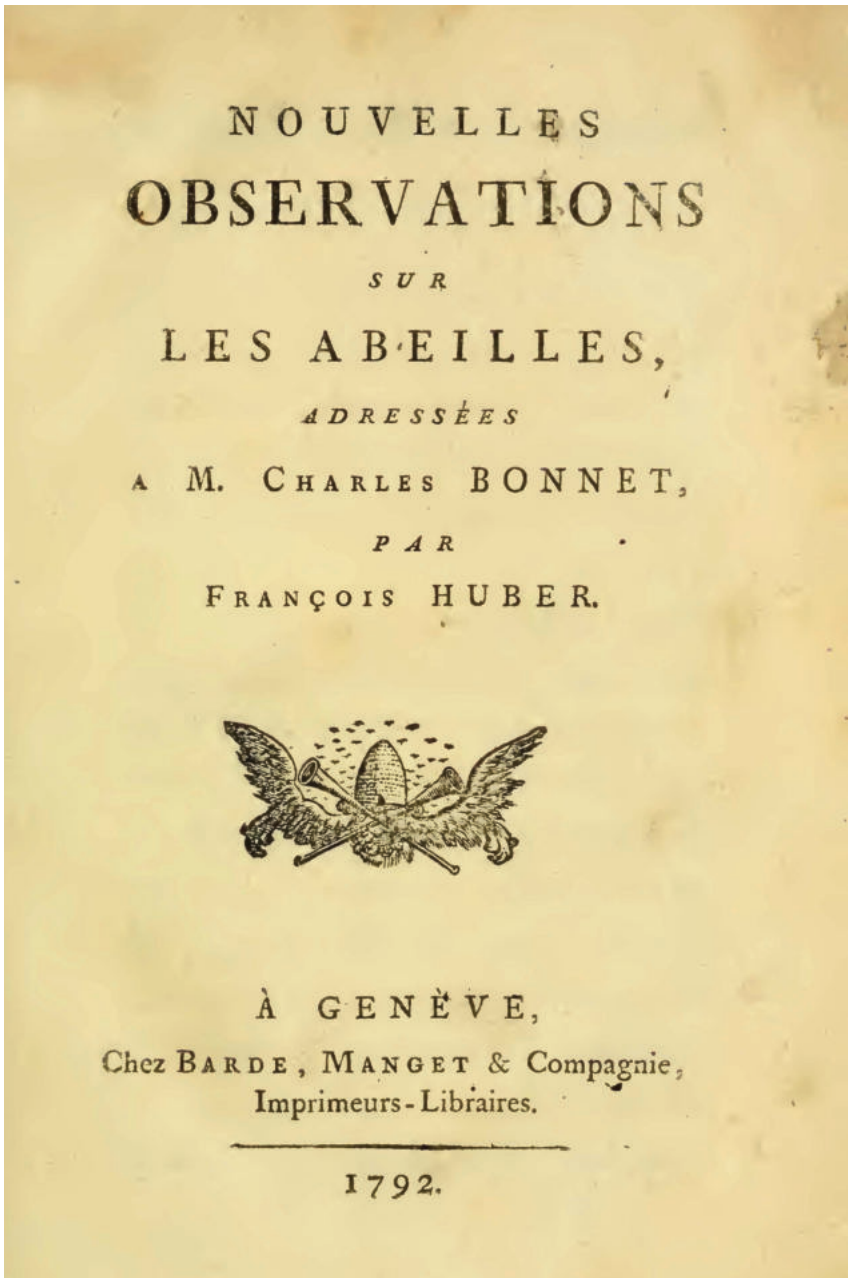
John Banks FRES
www.Cinebutterflies.com



Huber the Bees: François Huber and the science of entomology in eighteenth-century Geneva

John Hollier
and Anita Hollier

Muséum d'histoire naturelle de
Genève, C.P. 6434,
CH-1211 Genève 6, Switzerland



NOUVELLES

OBSERVATIONS

SUR

LES ABEILLES,

ADRESSÉES

A M. CHARLES BONNET,

PAR

FRANÇOIS HUBER.

À GENÈVE,

Chez BARDE, MANGET & Compagnie,

Imprimeurs-Libraires.

1792.

Figure 1. Title page of the first edition of *Nouvelles observations*.

FRANCIS HUBER.

Figure 2. Portrait of François Huber.

That the rise of entomology was linked to the seventeenth-century development of optical instruments, which allowed the details of small but complex animals to be observed and compared, was beautifully illustrated in *Antenna* by Jervis (2013). Eighteenth-century entomologists started to explore this newly visible diversity, and to observe its behaviours. Many entomological works concentrated on describing the species known or newly discovered; the system of Linnaeus became widely accepted, and modern insect systematics was born. Other authors put more emphasis on observations of behaviour and biology, most notably René Antoine Ferchault de Réaumur (1683-1757) who published six volumes of *Mémoires pour server à l'histoire des insects* between 1734 and 1742. These volumes include many minute observations of behaviour and life cycles, accompanied by amazingly accurate illustrations, making Réaumur one of the founders of ethology (Egerton, 2006). Réaumur was interested in many other scientific fields (his thermometer became the standard in France until replaced by a centigrade scale after the Revolution) and was an early experimentalist, demonstrating, among other things, that corals were animals and not plants.

Among Réaumur's correspondents was Charles Bonnet (1720-1793), a naturalist from Geneva. Starting from the observations of Réaumur and Noel-Antoine Pluche (1688-1761), whose very popular *Spectacle de la Nature* was published in seven parts between 1732 and 1750, Bonnet supplemented what was already known with his own observations of live specimens. His discoveries included parthenogenesis in aphids and the role of spiracles in the respiration of caterpillars and butterflies. Bonnet's *Traité d'insectologie*, first published in 1745, is full of fascinating information, but all too often it is impossible to work out which invertebrate (Bonnet used the term insect in a much wider sense than the current) is being discussed. His research included many other important discoveries and speculations, notably about plant respiration. Bonnet greatly influenced the study of science in Geneva in succeeding generations, not least because the famous savant Horace-Bénédict de Saussure (1740-1799) was the nephew of Bonnet's wife, and brought up in his household.

François Huber (1750-1831) moved in the same social circles in Geneva as Bonnet, both belonging to the oligarchic group of families that ran the city. His father, Jean, had had a typical career for his class, serving for many

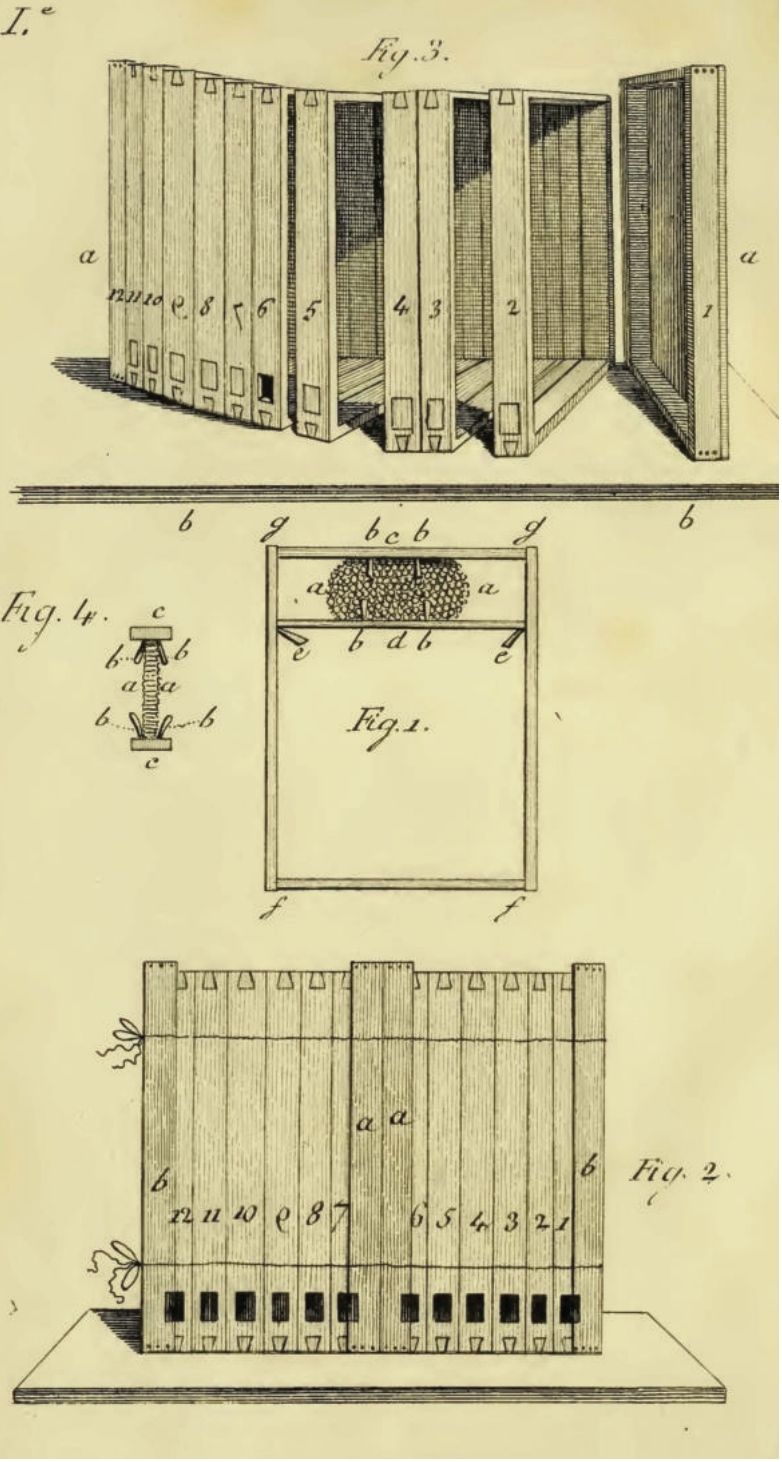


Figure 3. Huber's experimental hive, ancestor of modern book hives, from *Nouvelles observations.*

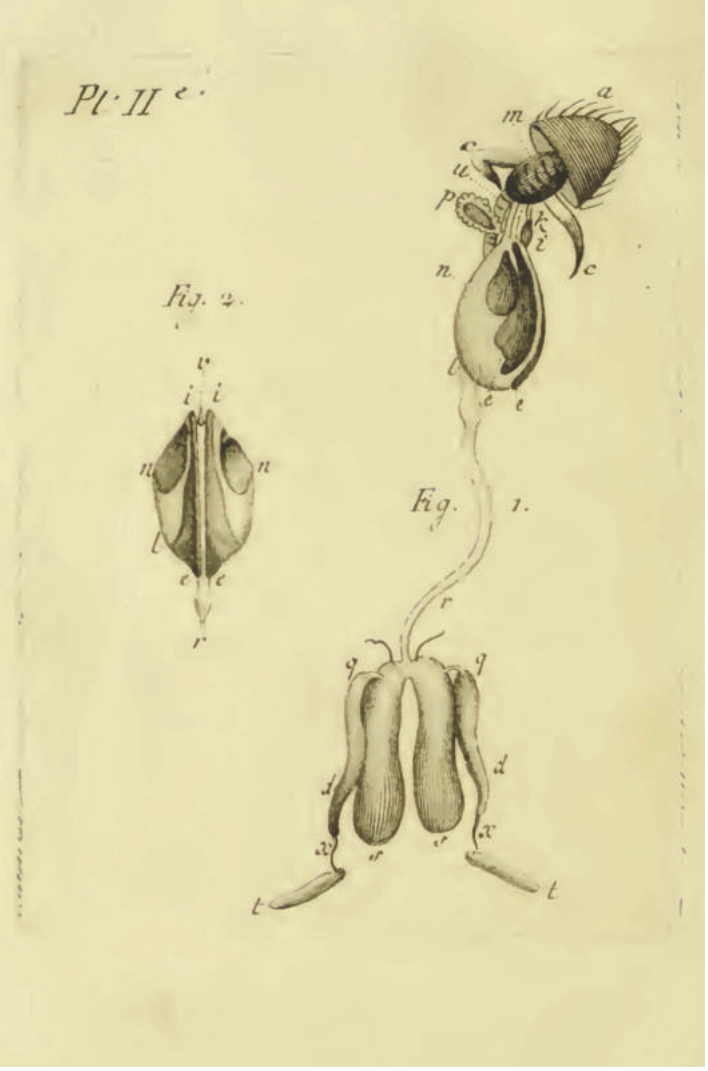
Figure 4. Bumble bee nest from Huber, 1802.

Figure 5. Bumblebees from Pierre Huber, 1802.

years as an officer in the French army and then retiring back to Geneva to dabble in politics and natural history. Jean Huber (1721-1786) published a work on the control of balloons in flight (based on the flight of raptors) in 1783, and his *Observations sur le vol des oiseaux* in 1784. He was a close friend of Voltaire and popularised the cutting of silhouette portraits in the salons of Geneva.

François Huber could not follow this career path because his sight began to deteriorate in his teens, resulting in blindness by the age of twenty. Remarkably, with the help of his wife, his servant François Burnens and later his son Pierre, he was still able to dedicate his life to science and to the study of the honey bee in particular. Réaumur had already made many observations of the honey bee but Huber brought scientific method to his observations by performing critical experiments. Using specially constructed hives that allowed observation, and various glass containers, Huber was able to elucidate the life cycle of the honey bee, showing that the queens are fertilised in flight, the animosity of queens to one another, that royal jelly can produce queens from worker larvae, that some workers have functioning genitalia and can lay eggs, etc. Some of this had been suggested by other observers but had not been demonstrated. These studies were published in 1792 as *Nouvelles observations sur les abeilles*, written in the form of letters to Bonnet. An English translation was published in 1806.

Further publications followed, concerning the raiding of hives by death's-head hawk moths and the formation of wax. The latter (Huber, 1804) is a text book example of the most advanced scientific method of the time, with the hypotheses, experimental methods, findings and conclusions clearly and concisely expounded with relentless logic. Huber



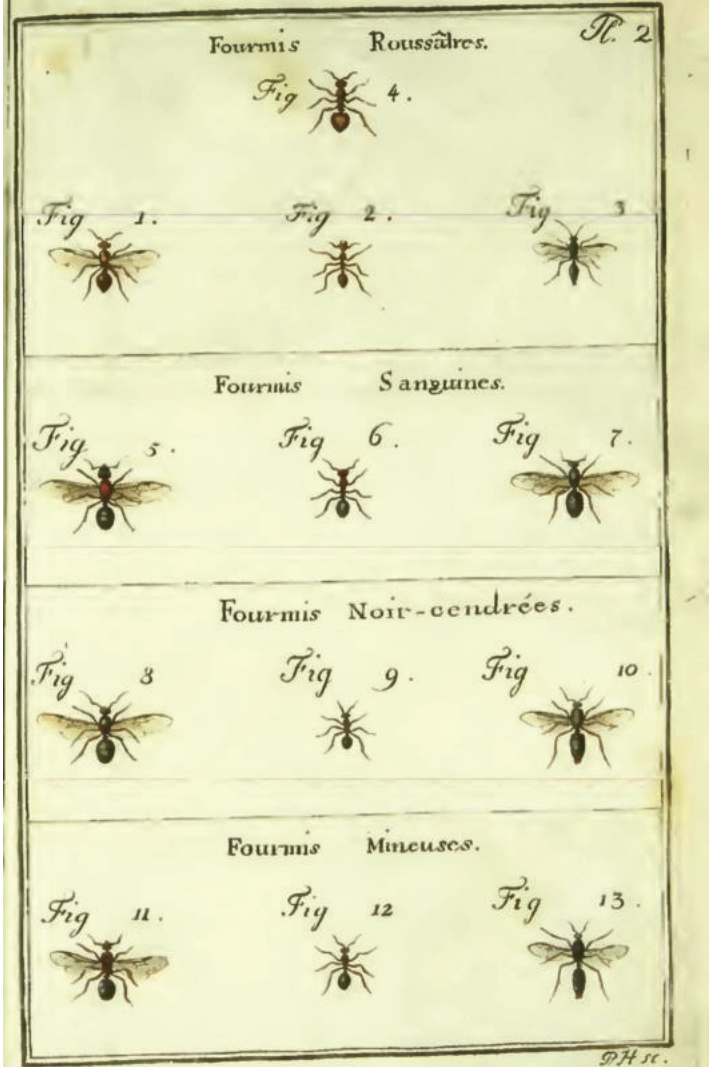


Figure 6 (left). Honey bee genitalia from *Nouvelles observations*; Figure 7 (right). Ants from Pierre Huber, 1810.

dared to disprove Réaumur, while complimenting him on his observations. These later works were incorporated in a second edition of the *Nouvelles observations sur les abeilles* published in 1814. Huber was helped with the preparation the new edition by his son, Jean-Pierre, known as Pierre Huber (1777-1840), who was also a keen naturalist. Because of the economic importance of honey, Huber's findings were widely read, and his use of scientific method reached a much wider audience than would have been the case had he produced a more general work on insects.

François Huber's grasp of experimental logic was of great use to other scientists, and he was co-author of one of the series of works on plant respiration and photosynthesis published by Jean Senebier (1742-1809) (Huber & Senebier, 1801), a line of research which followed from Bonnet's original observations, and was followed by those of Nicolas-Théodore de Saussure (1767-1845), the son of Bonnet's former ward.

Pierre Huber, as well as assisting his father, carried out independent studies, first of bumble bees and then of ants. The former was published in the Transactions of the Linnean Society of London (Huber, 1802) in both English and French language versions. The latter was published in book form (Huber, 1810), with an English translation appearing in 1820. In both cases the observations were acute and novel; he was the first to describe the harassment of the bumblebee queen by her workers trying to eat the newly laid eggs, and the behaviour of slave-making ants. He was also a pioneer of the study of ant interactions with aphids and other herbivorous insects.

Pierre Huber concentrated on meteorology in the 1830s, but returned to entomology towards the end of his life with a series of monographs on different insect species or groups. He was still a keen and accurate observer but the observational approach which had won acclaim in 1810 seemed stale and old fashioned by 1840. Pierre Huber's disregard of taxonomic nomenclature and species identification in publications such as his observations of Psocoptera (Huber, 1843) places him firmly in the epoch of Bonnet rather than that of Charles Darwin (1809-1882) or Jean Henri Fabre (1823-1915).

François Huber became famous for his work on the honey bee, and in Geneva, where it was common to append the wife's maiden name to the husband's surname, he was known instead as Huber des Abeilles (Huber the Bees). In English he is often referred to as "Blind Huber" and his story has been turned into a sympathetic historical novel (George, 2002). Pierre Huber was known as Huber des Fourmis (Huber the Ants) but this was probably only an echo of his father's soubriquet. Although his later studies made little mark, his early works were highly regarded, and Darwin remarked favourably on his qualities as an observer of ants.

Throughout the nineteenth century, descriptions and observational studies remained the norm in entomology, but Huber's introduction of scientific experimentation took firm root, particularly in the fields of physiology and economic entomology.

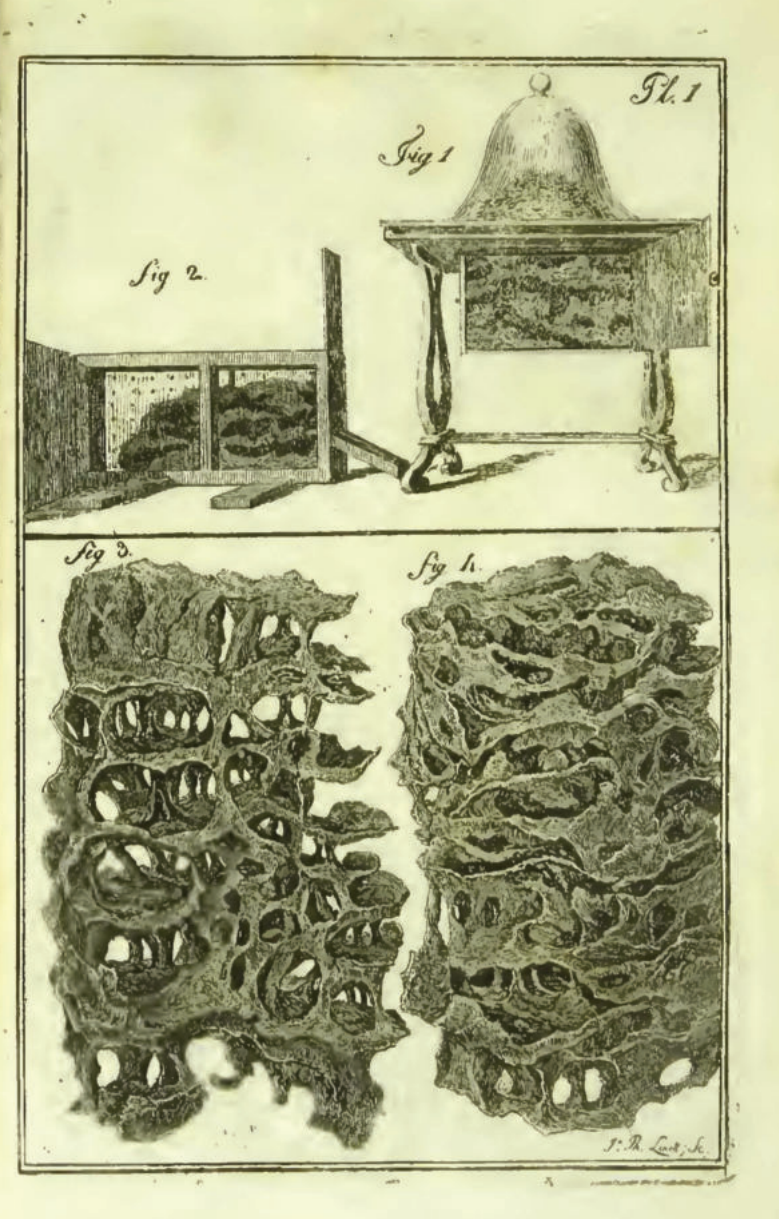


Figure 8. Ant nest and ant farm from Pierre Huber, 1810.

References

Egerton, F. N. 2006. A history of the ecological sciences, Part 21: Réaumur and his History of Insects. *Bulletin of the Ecological Society of America* **87**: 212-224.

George, S. 2002. *The Beekeepers Pupil*. Review, London.

Huber, F & Senebier, J. 1801. Mémoires sur l'influence de l'air et de diverses substances gazeuses dans la germination de différentes graines. Pachod, Genève.

Huber, F. 1804. Premier mémoire sur l'origine de la cire. *Bibliothèque britannique* **25**: 59-79.

Huber, F. 1806. New observations on the natural history of bees. Longman, Hurst, Rees & Orme, London.

Huber, P. 1802. Observations on several Species of the Genus *Apis*, known by the Name of Humble-bees, and called Bombinatrices by Linnaeus. *Transactions of the Linnean Society of London* **6**: 214-298, pl. 25-27.

Huber, P. 1810. *Recherches sur les moeurs des fourmis indigènes*. Paschoud, Paris & Genève.

Huber, P. 1820. *The Natural History of Ants*. Longman, Hurst, Rees, Orme & Brown, London.

Huber, P. 1843. Mémoire pour servir à l'histoire des psoques. *Mémoires de la Société de Physique et d'histoire naturelle de Genève* **10**: 35-47.

Jervis, M. A. 2013. Robert Hooke's Micrographia – an entomological cornucopia. *Antenna* 37: 176-189.

REQUEST FOR INFORMATION

Rev Arthur Miles Moss

I am seeking information for a biography of the Rev. Arthur Miles Moss, who was born in Windermere in 1872 and died in Seaford, Sussex in 1945. He was a brilliant artist, musician, and lepidopterist, who was Chaplain of the Anglican Church in Lima from 1907-1911, after which he built a church in Belem, Brazil, where he was Chaplain for over 30 years. He had there the whole of the Brazilian Amazon for his parish – the largest in the world. He was one of Rothschild's collectors and published important work on South American Sphingids and Papilios; his collection of British species is now housed in Kendal Museum, and the neotropical species in the Natural History museum in London.

I would be particularly interested to hear from people who may remember him or tales or his exploits, or know the whereabouts of any of his watercolours or butterfly collections. I can be contacted at the following e-mail address: philipehowse@gmail.com.

With many thanks

Philip Howse

Dr. Beynon's Bug Farm

My fascination with invertebrates began at a young age. When I was about five, I took on a serious construction project on the school windowsill, building a 7-spot ladybird house out of extremely large boulders (because that's obviously what 7-spot ladybirds need as a home)! The broken toe, caused by a tumbling boulder, was testament to my lack of knowledge, but I have never tired of creating habitats for invertebrates, and hopefully, today, I'm a little more informed than I was then!

I am now in the very fortunate position where I am turning my passion for invertebrates into a reality. About ten years ago, I decided that I wanted to start up my own 'research centre'. Whilst keen to remain in academia, I was determined to do this alongside (1) living on, and running, a working farm in St Davids, Pembrokeshire; (2) working on applied research and conservation projects; (3) running an invertebrate education centre and (4) working as a natural history television presenter! As a result, I founded Dr Beynon's Bug Farm Ltd in February 2013, with the strap-line of: 'Conservation through research, innovation and education'. I know that many may question the choice of the word 'bug' for all invertebrates but, to be honest, neither 'invertebrate' nor 'minibeast' alliterates with Beynon! It is also a great lead-in when explaining the issues associated with using common names and the importance of taxonomy.

Initially, the business didn't have a base: I was running mobile invertebrate education workshops, 'bug hunts' and consultancy projects across the UK, lugging my copious bags of equipment and tanks of live invertebrates to each event. Whilst I was managing to deliver the information, I felt I wasn't making

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Dung Beetles Direct Stand at the Welsh Government Tomorrow-Today Exhibition run by Farming Connect at the Royal Welsh Agricultural Show, 2014.

The Bug Farm farmhouse.

the best use of my time and, in the process, becoming slowly exhausted with the never-ending travelling.

The venture really started to gain momentum in 2012 when I won the Welsh Government and Hay Festival's Green Dragon's Den competition for 'innovation in sustainable business' to start-up one business arm of The Bug Farm, 'Dung Beetles Direct'. Through Dung Beetles Direct, the long-term aim is to breed native dung beetles to supply in bespoke packages to farmers and horse owners. In 2013-2014, I worked alongside Welsh Government's Farming Connect to trial dung beetle 'packages' on demonstration farms across Wales, with extremely positive results for dung beetle activity, dung removal and the cycling of soil nutrients. In advance of supplying packages of dung beetles, we are running a citizen science project, funded by the Pembrokeshire Coast National Park Authority (PCNPA) Sustainable development Fund, looking at the genetic diversity of dung beetles across the UK. Farmers and interested members of the public are collecting dung beetles for us, from across the UK, which are sent to Professor Alfried Vogler (Natural History Museum, London) for DNA sequencing. Working alongside my first employee, and invaluable colleague, Sarah Johnson, I currently provide advice on sustainable land and livestock management to benefit dung beetles and other wildlife. Whilst the delivery of packages of dung beetles is an important, future part of the venture, the dissemination of advice on sustainable farming practices, particularly the use of livestock parasiticides, is vital. There is no point supplying a farmer with a package of dung beetles if, the next day, they treat their livestock with a chemical parasiticide that will kill them all! We are therefore working with Professor Richard Wall (University of Bristol) on a NERC Impact Acceleration Account project to demonstrate the importance of dung beetles and sustainable livestock parasite control to farmers and horse owners. This project includes the production of a short film all about dung beetle conservation aimed at farmers, a presence at agricultural events and a series of workshops and talks.

I was looking out for a property on which to base The Bug Farm, when, in early 2013, the original family farm came up for sale. As this really was a once in a lifetime chance, I jumped at the opportunity. The 100 acre farm has been in the Beynon family since 1831, with a farm at the site since at least 1329! Like many things in life, the opportunity came at possibly the worst time: I was in the middle of writing up my doctorate and flying across America on an airship filming for BBC Two Operation Cloud Lab: Secrets of the Skies. With help from my extremely supportive parents, my wonderful Auntie Terry and a PCNPA Sustainable Development Fund grant, I managed to scrape together enough money to buy the farm! That was when the fun really started. The farm hadn't been farmed for over 15 years, so the first year was spent clearing and sorting. I also needed

The Laboratory and Lecture Room – as they were.

Left: Renovations underway at The Bug Farm; Right: The Lecture Room part-way through restoration.

Left: Ecosystem services provided by beetles workshop at The Bug Farm; Right: Insect workshop at The Bug Farm,summer 2014.

Left: The new office at The Bug Farm; Right: Restored pond at The Bug Farm.

Left: Sarah leading Bug Hunts; Right: Sarah with the Ysgol Bro Dewi Bug Club and their book on Minibeasts.

to ensure that the primary agriculture sections of the buildings and land were restored to a workable condition so that I could actually run a farm! This wasn't helped by three of the roofs blowing-off in the winter gales! Despite the initial hiccups, The Bug Farm is now a working farm. The family's Tyddewi Herd of Welsh Black cattle and my horses graze the substantial areas of marshy grassland, heath and Rhos pasture and we have sheep grazing the improved permanent pasture during its break from arable (spring barley) and vegetable (potato) production. This spring, we sowed a field experiment comparing two different deep-rooting herbal leys to rye grass and rye grass + clover. We are now looking for students to investigate effects of these leys on soil faunal diversity and functioning, soil structure, livestock live weight gains and gastrointestinal parasite burdens. During the winter, and with help from PCNPA and Amphibian and Reptile Conservation, we planted >100m of native hedgerow, over-seeded improved grassland with native wildflowers and reinstated a number of succeeded ponds. The Bug Farm was also recently accepted into the Glastir Advanced agri-environmental scheme.

The Bug Farm's first doctoral student, Rhodes Scholar, Paul Manning, arrived in April 2014 to what was probably the most chaotic research centre imaginable! Paul, who is co-supervised by Professor Owen Lewis (University of Oxford) and I, took over a field at The Bug Farm to look at effects of grassland and livestock management on soil and dung invertebrates and ecosystem functioning. Paul has come with us on our journey, occasionally sharing a bed with the resident bank voles, traipsing over to my parents' house for a weekly shower and being frequently attacked by Boris the cantankerous cockerel! Fortunately, Paul is a very patient soul, and the results emerging from his work are fascinating. In 2014, The Bug Farm also supported MSc student Warwick Wainwright on an Access to Masters project supervised by Professor Mike Christie (Aberystwyth University) and I. The research placed a rudimentary monetary value on ecosystem services provided by dung beetles to the UK cattle industry. I will present this paper as a Plenary Lecture at the RES International Symposium in Dublin in September 2015. As industry partner, The Bug Farm recently secured a NERC CASE studentship project with the University of Bristol. Along with Professor Richard Wall and Dr Martin Hall (Natural History Museum, London), I am co-supervising PhD student Bryony Sands, who is working on impacts of agricultural intensification on beneficial invertebrates in Zambia.

However, the research is only a part of the bigger plan at The Bug Farm. I am now in the process of the phase 1 development of the farmstead into a research and education centre and visitor attraction all about invertebrates. Working with a great team, the Grade II listed farm buildings are being sympathetically restored to their former glory. Wildlife habitat is being created at every stage in the form of build-in bird nest boxes, swallow and bat roof spaces and solitary bee nesting tubes! The research laboratory and student labs, cited in the old grain store and chicken sheds, are almost complete, as is the lecture room in the original milking parlour. Calf cots are now invertebrate breeding rooms and we've reached a stage where visiting students and volunteers have access to (almost) 21st century facilities!

In order to deliver the remit of research and education, I felt it was vital to reach out to some of the main

Sarah filming for BBC Coast.

decision-makers when it comes to how our food is produced: the consumers. I didn't just want to preach to the converted; the people who would be willing come to a lecture or workshop; I wanted to reach out to the general public. Back in early 2014, I decided that in order to do this, we also needed to open as a visitor attraction. Now this is quite something for someone who likes their own space! However, we are right in the middle of a prime tourist location here in St Davids, which is in the heart of the beautiful Pembrokeshire Coast National Park. With 7.2 million day visits to Pembrokeshire each year, few local wet weather facilities and an active local community, The Bug Farm is the perfect place to reach out to visitors and locals alike. The original research centre is therefore gradually morphing into a research centre plus a full-blown tourist attraction!

My aim is to enthuse people not only about tropical invertebrates, but also the weird and wonderful species that we have on our doorstep in Britain, and, more importantly, why they are so important. Visitors will enter and exit The Bug Farm through the old milk processing shed – currently in conversion to a ticket office, shop and art gallery stocking a treasure trove of invertebrate-related goodies. An indoor 'Bug Zoo' will be stocked with tropical invertebrates to introduce people to the big, colourful, exotic and unusual species. However, in time, The Bug Farm trail will lead visitors through a native invertebrate experience in an adapted polytunnel stocked with some of our native species and landscaped with their habitats. We will showcase the more visually-impressive, native species alongside those with fascinating ecosystem functions and behaviours. The aim is for our invertebrates to capture imaginations and win the hearts of invertebrate sceptics! The trail will, this year, proceed through the Walled Garden: a beautiful space that we are currently landscaping to show our visitors how it is possible to garden for wildlife in a small space. Visitors will also be able to walk along a self-guided trail through the marshy grassland to the river, which meanders through the farm. The trail will take visitors through the small plots of conservation seed mixtures that we have planted. Plus the much larger wild bird seed plots, annual- and perennial wildflowers plots, deep-rooting plots, biodiverse herbal grazing leys and phacelia strips. The aim here is to offer visitors a chance to see the larger scale agricultural conservation options and learn how their food choices influence how their food is farmed. This message will be continued through the onsite Grub Kitchen Restaurant, run by Andy Holcroft (see *Antenna*, 39 (1)).

Phase 2 work will begin during the 2015-2016 winter and will kick-off with a 'Bug Museum' – an informative learning space about the invertebrate world, with displays and exhibits focussing on themes such as 'taxonomy', 'mimicry' and 'invertebrate inventors'. We're on the lookout for specimens if anyone has any research by-catch that they are happy to send to a good home! The old grain silo will be transformed into The Cocoon – an interactive exhibit all about metamorphosis and a rustic Bug Barn (play barn) will keep the children entertained. We will fit out the zinc tractor shed as a bunkhouse, catering for groups of up to ~30 visitors and complete with one en-suite, fully accessible room. The adjacent old Nissen Hut will be the bunkhouse common room, drying room and kitchen, also catering for our campsite guests. The accommodation will enable us to provide for school and university field course groups and groups for other residential workshops and events. For bigger groups, we are conveniently located near a large bunkhouse on a neighbouring farm.

We plan to open phase 1 later this summer, but we're not putting a date on it until we're a little bit closer to completion! Of course, there's a lot to do – it's a lifetime project but, more than that, it's a labour of love and above all, something that I really do hope will help me do my bit for invertebrate conservation. I very much

Insects in the Kitchen: John Bennett's scrap metal insect sculptures

Stuart Reynolds
University of Bath

It's surprising how often the worlds of art and entomology meet. We're well accustomed to artists illustrating keys and natural history guides, for example. Often the artist can highlight critical structures for identification in a way that no photograph could. But the photographs accompanying this article show two table-top size sculptures of insects, which are not intended to be realistic representations, but which nevertheless express a hard-to-define "insectness"; these artistic hexapods are in fact made of "found" metal objects, mostly stainless steel kitchen utensils.

They were made by the artist John Bennett, based in the village of Chantry in Somerset. I came across John and his work at an art show at West Woodlands, near Frome, which was part of the May 2015 Wylye Valley Art Trail <http://wvat.co.uk/search/st%20algars%20yard>. John doesn't restrict himself only to insects, but hexapods do make up the bulk of his work. His work includes dragonflies, grasshoppers, blowflies, as well as the insects shown here. There are actually plenty of artists interested in insects, but John's work seems to me to be particularly successful in capturing the *essence* of the creature in question.

This made me think seriously about how humans recognise insects and other living objects in the natural world. This recognition obviously isn't only about the details of form or colour. These insect sculptures are in one sense nothing like their models from the natural world. Unlike the originals which are made of lightweight organic materials, these insects are heavy and made of metal. They shine like the polished metal structures that they are. Nevertheless, they are immediately

Figure 1. Devil's Coach Horse. Photo by the artist.

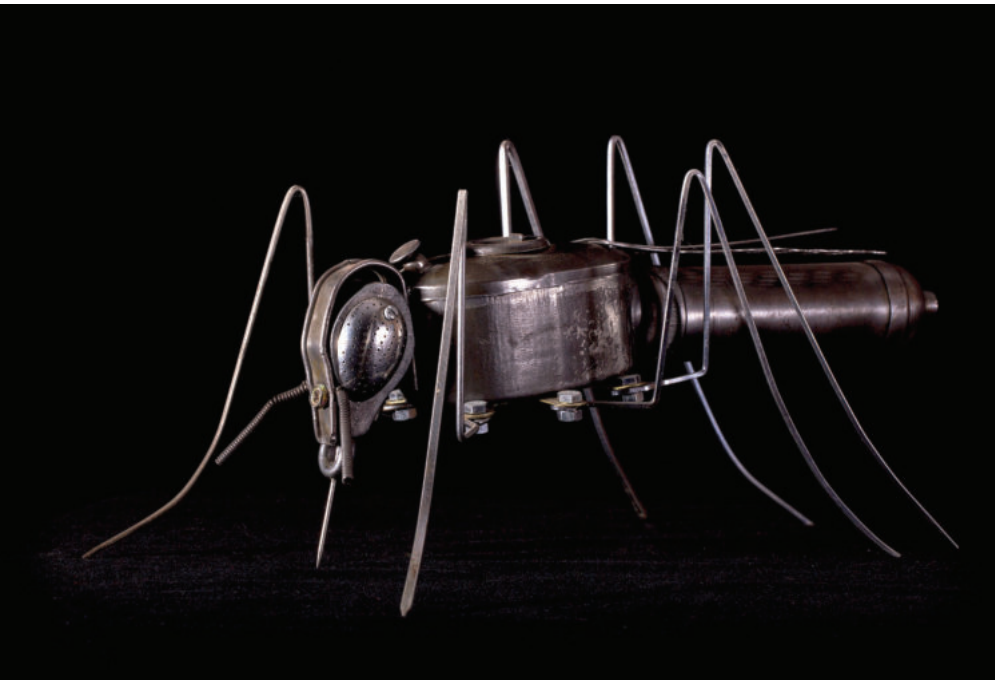


Figure 2. Mosquito. Photo by <www.killerbytedesign.co.uk>

recognisable, to the extent that an entomologist can easily allocate them to their Linnean classifications. Actually, one wouldn't be surprised if they were to walk or fly.

Look at John's magnificent Devil's Coach Horse (Fig. 1) – obviously a model of the common rove beetle *Ocypus olens* (Coleoptera: Staphylinidae). It's made of a various collection of kitchen bits and bobs: the abdominal segments are assembled from a stack of dariole cake moulds; the legs are made from cocktail forks; the compound eyes of teaspoons; the antennae of springs; and most impressively, the beetle's fierce mandibles are made from the jaws of a patent jam jar lid opener. The beetle's abdomen turns up threateningly at the tip just like that of the original.

Look also at John's equally impressive mosquito (Fig. 2). In this case I can't easily say which kind of mosquito is portrayed, but despite its cheese-grater wings, tea-strainer compound eyes, oilcan thorax and old fashioned grease-gun abdomen, it clearly *is* a mosquito. With its pointy sucking proboscis, it is absolutely ready to bite you. You can almost hear the high-pitched whine as it prepares to take flight. Despite the weight of the metal, this sinister insect sculpture looks light and flimsy, just like the real thing.

As it happens, John and I live in neighbouring villages. Interested in his artistic approach, I met John after the show our local village pub, the Talbot at Mells, and asked him to tell me more about his entomological sculptures and how he came to make them. John told me that he had been fascinated by insects ever since he was a boy at primary school (how many, many entomologists say this!), but then his interest went into a dormant state (we might say a kind of diapause). Educated in the 1950s and 60s at Hull Grammar School, he studied at the University of Manchester Institute of Science and Technology (UMIST, now a part of Manchester University) where he read chemical engineering, and then on to McMaster University in Canada, where he was introduced to computers. John subsequently worked in process control in the food industry in South Africa and the UK, eventually becoming a freelance IT consultant. Retiring in 2005, and encouraged by his wife Amanda, also an artist, John was inspired by the work of scrap metal artists like Edouard Martinet <http://www.edouardmartinet.net/> and James Corbett <http://jamescorbettart.com/> to explore how he could turn his interest in the natural world into metallic works of art.

I quizzed John about his methods. John is pragmatic about the parts of which his sculptures are to be made. He will, for example, cut up his scrap metal objects if necessary in order to achieve the desired effect (some other "found object" artists insist that only whole objects must be used – a very restrictive condition which John thinks unnecessary). He is also prepared to incorporate made parts (like the wire legs in the mosquito) where no satisfactory "found" objects are available. How are the bits fastened together? Dissatisfied by an initial foray into welding as a construction method for his sculptures, John now uses nuts and bolts and pop rivets to join the metal components of his sculptures together. This is a superior and much longer-lasting solution to the problem of building metal sculptures, especially if they are to be kept outside. John told me that he spends more time in selecting and cleaning up his found objects than in actually assembling them into the finished insect (it's a bit like doing all of a crossword puzzle before filling in the answers).

Coming back to my remarks above about the "essence" of an insect, John is highly aware that simple morphology isn't all that counts. No doubt this awareness is due to his own real interest in entomology. John told me that he is keen to seek out scrap parts with the right texture (look at the cheese grater wings in the mosquito) and we chuckled over an amusing anecdote about a potential purchaser who had jumped with surprise when the metal spring antennae of one of John's insect sculptures had vibrated when picked up, in exactly the way that those of real insects often do. This story particularly reminded me of how very realistic to the casual observer is the mimicry of the wasp beetle *Clytus arietis* (Cerambycidae), which is notable not only for having the right general appearance of a yellowjacket wasp (*Vespula* spp.), but also for behaving like one. The behaviour, involving jerky movements and much waving of the antennae, is so like that of the vespulid original that it is quite alarming to the casual observer, and this has no doubt been naturally selected to deter would-be predators. I urged John to sculpt one of these intriguing longhorn beetles. We'll see if he takes me up on the challenge!

If you are interested in owning one of John's existing scrap metal insect or to commission a new one, you can

The Inevitable Entomologist

An interview with Richard Bugman Jones

Peter Smithers

Richard Jones is as famous for his hats as he is for his passion for entomology, so as I was scanning the crowded coffee bar at Paddington station it was a hat I was looking for. No hats in sight but I did spot Richard's unadorned head, the famous hat laid casually on the table next to his espresso. We introduce ourselves and move off to the calmer environment of a nearby cafe to talk over his new book and entomology in general.

Richard is an inevitable entomologist, he grew up in a household steeped in natural history and walls lined with books. Visiting other houses as a child he often wondered why they were not also full of books. His father was a botanist who claimed to know just a little about insects but was also an excellent entomologist. Richard remembers boys with jam jars of caterpillars and other assorted insects knocking on their door to ask, "What's this Mister Jones?" As Richard puts it, "there was no time before entomology".

This childhood curiosity grew to a passion and has been a driving force in his life ever since. He studied biology at Sussex University and on graduation he found employment in an antiquarian book shop in London. He worked at this for a couple of years and then went into the publishing industry, editing medical books and journals. Entomology took a back seat in this phase of his life. "I became a biblioentomologist, collecting books on insects as I encountered them in my work".

This changed when he moved to his first flat and discovered that it had a wilderness garden. Around this time he also bought a microscope (until then it

Two-year old Jones with a butterfly net.

had been just a hand lens) and was soon using it to identify the myriad of insects that he collected from his garden and the surrounding green spaces. As Miriam Rothschild once said "Once you have microscope, life is never long enough".

Disappointed by the lack of entomological articles in *BBC Wildlife Magazine*, he phoned their office to challenge them and by chance found himself talking to the editor (those were very different days). Following a brief conversation her response was, "Why not write something then?" It began with a book review. This was followed by requests for information on insect natural history and photographs to identify. Readers' letters and photographs soon arrived on a regular basis in search of answers and identifications. Entomology had now become firmly established as a topic in the magazine. This led to other publishing projects such as *Extreme Insects*. The idea was to explore the strangeness of the insect world; the book would examine the weird and wonderful fringes of insect biology (see review in *Antenna* vol 34(4)) and it was a contact that came via *BBC Wildlife Magazine* who passed it Richard's way.

The move to a three-bedroom house had provided Richard with a study which was soon filled with books and insect cabinets. However the arrival of his second daughter effectively served him with an eviction order, so a new study was required. Fortunately the local primary school had some spare space. Richard could move his study into one of the small office rooms in return for a contribution to natural history at the school – anything from bug-hunting trips in Nunhead Cemetery to mythical creature Top Trumps. His books and microscope were moved the few hundred yards to their new home accompanied by a pet snake that had also received its marching orders. This must be the only school in the land that has an entomologist in residence.

The Little Book of Nits came about following a conversation with Justine Crow, an old friend who runs a book shop. "Our children had grown up together sharing many good times and of course their head-lice. I had recently organised a talk for the BENHS by Cambridge University's John Maunder who spoke about head lice. The talk had been a minor disaster as it had snowed several inches that evening and reduced the audience to five, including myself. However his enthusiastic tone and the off-beat topic had inspired me and left me primed with information on *Pediculus* biology". When Justine mentioned her children had them again Richard launched in with his deeply buried store of knowledge. "You should write a book" she had said. The idea was born. "I also approached Reaktion books, after they launched their acclaimed *Animal* series. They felt 'Head-louse' was a little too narrow a title, even for them, but I eventually found a welcome at Bloomsbury".

Whilst Reaktion had turned down the nit book they had suggested one on mosquitoes, so this became the next project (see review in Antenna 37(1)). His latest book *House Guests, House Pests* examines our relationship with the various invertebrates that have taken advantage of the homes that we build (see review in *Antenna* 39 (2)). This one was originally triggered when Richard found beetles (*Ctesias serra*) feeding on insect remains in spider webs under loose tree bark, and noted how similar they were to carpet beetles. A connection was made and *House Guests* was underway. Richard's irrepressible curiosity and enthusiasm continually leads him to the fringes of entomology, a place where we encounter the unsavoury or unloved. Richard gathers in these entomological outcasts and presents them as misunderstood characters that we just need to get to know. His next book will focus on something darker and even less attractive. *The Amateur Scatologist* will be a natural history of dung. This will examine the role of insects as recyclers, dung beetles and flies in mythology, life in our sewers, hunters' spore, and the use of dung in specialised foods (civet coffee for one). *Antenna* eagerly awaits an opportunity to review this.

We finish our coffee (non-civet), bid each other farewell, and Richard is off, hot foot to the NHM in search of the caterpillar tea he had read about on Max Barclay's blog that morning – research for the new book. The tea is apparently made with the frass of caterpillars that have fed on young leaves from tea bushes. Dung is something that most of us want to dispose of or at least recycle to the plants we grow, but here were entomologists turning it into an infusion to drink. This is dedicated research indeed.

Society News

XIV International Conference on Ephemeroptera and XVIII International Symposium on Plecoptera

By Kerry MacKay

Delegates from all over the world met at the James Hutton Institute in Aberdeen for this 2015 joint event. Lasting almost a week, delegates were treated to intellectual and thought-provoking presentations and discussions as well as some good old Scottish fun and traditions. I was surprisingly one of the few Scots present!

This was only the second conference I have attended and the first I was to speak at. As a recent graduate from the University of Aberdeen I was keen to mingle with the great minds of Ephemeroptera and Plecoptera research but justifiably daunted at the prospect of presenting to such world experts.

Day one focused on phylogeny, taxonomy and systematics and launched the Scottish theme with a delightful demonstration by a local Scottish dancing school. Day two looked at the bigger scale and considered ecology and behavioural ecology; this was the day of my presentation. I spoke about my MSci research project investigating the effect of large woody debris on riverfly communities. Apart from a slight nervous tremor my talk seemed to go well. There were plenty of questions and people were keen to suggest how to take the research further. As the only delegate not a PhD student or beyond I was pleased to get such a positive response. It also meant I could relax and enjoy the rest of the conference, knowing I had not made a fool of myself.

Day three was the mid conference tour, a chance to stretch our legs and get some fresh air. We headed into the Cairngorm National Park to Balmoral Castle and were treated with some glorious weather. Despite being Scottish, I had never visited Balmoral before so I enjoyed exploring the Royal family's Scottish home as much as the rest of the delegates. We then visited Glen Tanar estate for some sampling and a splendid barbeque in the rare Scottish sunshine.

Day four looked at distribution and biogeography in the morning and adaptation and change in the afternoon. Over lunch we held a mini Highland Games which included special conference versions of toss the caber, the welly toss, toss the turd, and toss the haggis. Team Plecoptera won! If the delegates were feeling traditioned-out, there was no rest for the weary. We were greeted by a piper for the conference dinner which was

Left: Sampling in Glen Tanar Estate; Right: Kerry MacKay enjoying the conference.

held at Ardoe House Hotel. After a delicious dinner and many well earned award presentations we completed the celebrations with a Ceilidh. All those dance lessons in school paid off as we twirled around the dance floor.

Starting a little later to allow recovery from the excitement of the Ceilidh, day five was the final day of lectures. We considered biodiversity, conservation and morphology. There were some amazing close up and cross section images appreciated with oo's and aah's from the delegates. We also had a sneak preview of the plans for the next conference in Brazil in 2018 and the results of the 'Guess the meaning of the Scottish word' competition. My favourite guess for the word crabbit was 'a Scottish frog's croak', complete with a doodle of a frog. To end the day we mingled with a selection of Scottish whisky, beer, Irn Bru and nibbles before heading to the pub.

Many delegates said their farewells early but those who stayed for the post conference tour were treated to whisky tasting at Strathisla Distillery, followed by a sampling stop at Craigellachie, lunch at the Lecht Ski Centre, before descending to Corgarff, Gairnshiel and finally to Burn O Vat in the Muir of Dinnet.

I am very grateful for the RES conference participation grant that made my attendance possible. It was exciting to socialise with so many world experts, some of whom were the only person in their country studying their taxa! I was able to share my research and I learned a huge amount about the work being done on these important taxa, but also about the need for a new generation of experts and much more research. I would also like to thank the symposium convenors, Jenni Stockan and Craig Macadam, for all their hard work organising and ensuring the conference ran smoothly. It is no easy task but they did an excellent job and everyone will fondly remember the Scottish conference.

Biography of a Marsh Christian Award Early Career Entomologist

Dave George
Stockbridge Technology Centre

My first foray into the realm of entomological science came during the sandwich year of my undergraduate degree at Coventry University. Having already spent three months volunteering on a turtle conservation project in Greece, I returned to the midlands to serve the remaining nine months as a lab technician in the then School of Natural Sciences. During this time I was permitted to run my final year project, supervised by Dr Diane Whitehouse (now Warwickshire College), focusing on aphid response to barley grown under varying soil moisture. The resulting dissertation was awarded the 2001 Student Prize, and from that point on my career in research has never strayed far from invertebrates of one kind or another, despite the odd publication of a more avian persuasion (1,2).

Having graduated with a First Class Honours degree in Applied Ecology, I immediately accepted a funded MRes at Coventry University, again with Dr Diane Whitehouse, jointly hosted by what was then Warwick HRI. Co-supervision at Warwick was provided by Dr Rosemary Collier on a project that focused on increasing in-crop plant diversity as a means of managing *Brassica* pest insects, aspects of which were published in the RES journal, Agricultural and Forest Entomology (3). After a brief period working as an Educational Assistant for the How Hill Trust in my home county of Norfolk, my work in this area continued into my PhD. Funded by the AHDB this work retained a focus on pest management in *Brassica* crops, this time including trap cropping as a means to manipulate pest insect populations (4-7). Though based primarily in Newcastle University's School of Biology, under supervision from Dr Gordon Port, Dr Rosemary Collier again served me well as Co-supervisor via Warwick HRI.

Before completing my PhD in 2007, I took up a post-doctoral appointment within the School of Agriculture at Newcastle University, working with Dr Jonathan Guy and Prof Olivier Sparagano (now Coventry) on a project to assess the potential of botanical products as acaricides for the poultry red mite, *Dermanyssus gallinae* (8-12), with several key publications from this work appearing in the Society's Medical & Veterinary Entomology (11,12). Having completed my two year contract I was retained in my role as a Research Associate to progress commercial projects investigating novel chemical and non-chemical solutions to *D. gallinae* control (13,14).

In 2009, shortly before becoming a father for the first (but not last) time, I joined Lancaster University's

Environment Centre as Research Associate for the Ecostac Project (15,16). This five year study, one of the last awarded under Defra's HortLINK model, sought to demonstrate that horticultural and arable producers could achieve more than just conservation benefits through use of floral seed mixes. Full results have yet to be published from this work, though data supported that with careful and considered seed mix selection, resulting field margins could stack benefits for insect pollinators and pest natural enemies, delivering pollination, conservation and pest control returns that culminated in increased near-margin yields in three of the project's four crops (for a brief review see this year's ECE Special Edition of *Antenna*, pages 77-78). Led by Prof Felix Wäckers, Ecostac included research partners at Stockbridge Technology Centre Research Foundation, also the primary experimental site for the project, and Fera. Through links with York, several Masters Students contributed to bolt-on studies, including a project focusing on interactions between hoverflies and parasitoid wasps in terms of floral resource use (17).

I returned to Veterinary Entomology in 2012 when I accepted a Research Fellowship at Northumbria University, working once again under Prof Olivier Sparagano on projects focused primarily, though not exclusively, on *D. gallinae* control (18-20). During this time I retained links to Lancaster through sub-contract, which allowed me to continue to work on the Ecostac Project until its completion in 2013/2014. I also maintained links with Stockbridge over this period, applying for collaborative bids with their Entomology Department and consulting on projects with an agro-ecological focus that were being undertaken both on and off site.

In 2014 I was fortunate enough to be offered the post of Head of Entomology at Stockbridge. Replacing Dr Pat Croft following her move to CRD, I immediately renewed links with Warwick (and Dr Rosemary Collier) through the AHDB-funded SCEPTRE Project, well into its final season when I arrived on site in June (21). Though the decision to leave academia was a hard one, the appeal of being able to lead and develop a broad array of work in near-commercial applied entomological science, ranging from pesticide testing and investigating insect responses to LED crop production regimes, through to exploring insect responses to novel field based IPM and agro-ecological production approaches, was too strong to resist. I nevertheless maintained a 0.2FTE position at Northumbria for a time (until Sept 2015) to allow me to complete existing projects that included Co-Proposing a Dutch PhD student (22) and leading a Royal Society funded study on 'honeybee health'. This work benefitted greatly from direct access to the research apiary present at Stockbridge, created several years earlier by Dr Luke Tilley (now RES Director of Outreach).

In spring 2015 I assumed responsibility for the Sustainable Agriculture Department at Stockbridge, along with its ongoing projects in the allied fields of soil/crop sensing and Precision Agriculture. The most significant of these, the Tru-Nject project, is a three year Innovate UK funded study to demonstrate the benefits of high resolution sensing and precision agricultural technology (GPS/RTK tractor and implement steer, plus variable rate application of fertiliser) to arable and field vegetable growers. We are, of course, also considering effects on insects. I have since been employed as the centre's Director of Entomology and Sustainable Agriculture, a position which should allow me to work across disciplines with the end goal of assisting producers to achieve the current agricultural zeitgeist of 'sustainable intensification'. To my mind this concept has been mislabelled as an oxymoron, being achievable in most, if not all crop sectors by combining 'high tech' production practices with better and more multi-facetted use of non-crop farm habitat. Controlling pest insects, and encouraging beneficial insects, can potentially be achieved by either methodology, and are both essential components if sustainable intensification is to be realised to its full potential. These are therefore likely to be key research themes for me going forward.

I'm proud to say that my work has had an impact on commercial crop/livestock production, via registration of numerous pest control products for professional use, and through research that has informed pesticide development, insect conservation (the two needn't be in fierce opposition) and adoption of IPM and biological control in multiple production sectors. I'm a regular promotor of all of the above, providing invited talks to public, academic and industrial audiences throughout Europe and appearing several times on national television (and once on YouTube if you look hard enough). I'm also a keen communicator of entomology *per se*, exhibiting at every RES Insect Festival to date and regularly contributing to the Society's NIW. I'm also actively involved in education of the next generation of professional entomologists, and have lectured/presented to undergraduate and postgraduate students at institutions including Newcastle, Lancaster, York, Reading, Coventry and Northumbria. I'm also active in supporting student research and am currently co-supervising three PhDs through Stockbridge, where, along with my Project Manager for Entomology, Dr Jen Banfield-Zanin, we regularly host undergraduate and MSc/MRes students.

Having first been introduced to the RES as a PhD student, I have since been privileged to become a Fellow, Trustee and Hon. Reg. Sec. of the Society, also co-editing *Antenna* with Peter Smithers. Through links forged via the RES and elsewhere, I've been fortunate enough to be involved in collaborative research in both the UK and overseas, resulting in publication of over 35 papers in peer-reviewed journals to date. In addition I've made numerous contributions to the industry press, targeted to UK producers in the poultry and crop production sectors, these being at least equally important to ensure that my research reaches potential end-users for maximum impact (23).

I am extremely proud that my achievements to date have led to my receiving the 2015 Marsh Christian Award for an Early Career Entomologist, and thank all those that have contributed to, or otherwise encouraged, my entomological endeavours thus far.

References

1. George DR, Sparagano OAE, Port G, Okello E, Shiel RS, Guy JH, 2010. The effect of essential oils showing acaricidal activity against the poultry red mite (*Dermanyssus gallinae*) on aspects of welfare and production of laying hens. *Animal Welfare*, 19, 265-273.
2. Smith TJ, George DR, Sparagano OAE, Seal C, Shiel, RS, Guy JH, 2009. A pilot study into the chemical and sensorial effect of thyme and pennyroyal essential oil on hens eggs. *International Journal of Food Science and Technology*, 44, 1836-1842.
3. George DR, Collier RH, Whitehouse DM, 2013. Can imitation companion planting interfere with host selection by *Brassica* pest insects? *Agricultural and Forest Entomology*, 15, 106-109.
4. George DR, Port G, Collier RH, 2007. Selection of trap crop and companion plants for the management of pest insects in field vegetables. *Integrated Protection of Field Vegetables IOBC wprs Bulletin*, 30, 113-121.
5. George DR, Collier R, Port G, 2009. Testing and improving the effectiveness of trap crops for management of the diamondback moth ***Plutella xylostella*** (L.): a laboratory-based study. *Pest Management Science*, 65, 1219-1227.
6. George DR, Collier RH, Port G, 2009. Dead end trap crops. *Integrated Protection of Field Vegetables IOBC wprs Bulletin*, 51, 27-30.
7. George DR, Collier RH, Whitfield C, Port G, 2011. Could movement of neonates from non-host plants affect the potential of polyculture to reduce crop colonisation by pest insects? *Crop Protection*, 30, 1103-1105.
8. George DR, Masic D, Sparagano OAE, Guy JH, 2009. Variation in chemical composition and acaricidal activity against *Dermanyssus gallinae* (De Geer) of four different eucalyptus essential oils. *Experimental and Applied Acarology*, 48, 43-50.
9. George DR, Smith TJ, Shiel RS, Sparagano OAE, Guy JH, 2009. Mode of action and variability in efficacy of plant essential oils showing toxicity against the poultry red mite, *Dermanyssus gallinae*. *Veterinary Parasitology*, 161, 276-282.
10. George DR, Sparagano OAE, Port G, Okello E, Shiel RS, Guy JH, 2009. Repellence of plant essential oils to *Dermanyssus gallinae* and toxicity to the non-target invertebrate *Tenebrio molitor*. *Veterinary Parasitology*, 162, 129-134.
11. George DR, Sparagano OAE, Port G, Okello E, Shiel RS, Guy JH, 2010. Toxicity of plant essential oils to different life stages of poultry red mite (*Dermanyssus gallinae*) and non-target invertebrates. *Medical and Veterinary Entomology*, 24, 9-15.
12. George DR, Sparagano OAE, Port G, Okello E, Shiel RS, Guy JH, 2010. Environmental interactions with the toxicity of plant essential oils to the poultry red mite *Dermanyssus gallinae*. *Medical and Veterinary Entomology*, 24, 1-8.
13. George DR, Shiel RS, Appleby GC, Knox A, Guy JH, 2010. *In vitro* and *in vivo* acaricidal activity and residual toxicity of spinosad to the poultry red mite, *Dermanyssus gallinae*. *Veterinary Parasitology*, 173, 307-316.
14. Ali W, George DR, Shiel RS, Sparagano OAE, Guy JH, 2012. Screening of potential predators of the poultry red mite (*Dermanyssus gallinae*) and assessment of *Hypoaspis miles* performance under varying biotic and abiotic conditions. *Veterinary Parasitology*, 187, 341-344.
15. George DR, Carrié RJG, Wäckers FL, 2012. Selection of floral resources to optimise conservation of agriculturally-functional insect groups. *Journal of Insect Conservation*, 16, 635-640.
16. George DR, Croft P, Wakefield M, Wäckers FL, 2012. Perennial field margins for functional biodiversity in UK vegetable rotation schemes: Establishment and resource provision. *Landscape Management for Functional Biodiversity IOBC wprs Bulletin*, 75, 77-81.
17. George DR, King L, Donkin E, Jones CE, Croft P, Tilley LAN, 2013. Can intra-guild competition from hoverflies affect attractiveness and suitability of buckwheat floral resources to the parasitoid wasp *Aphidius ervi* Haliday? *Biological Control*, 67, 339-547.
18. George DR, Finn R, Graham K, Sparagano OAE, 2014. Present and future potential of plant-derived products to control arthropods of veterinary and medical significance. *Parasites and Vectors*, 7, 28: doi:10.1186/1756-3305-7-28.
19. George DR, Sparagano OAE, Harrington D, Giangaspero A, 2014. Significance and Control of the Poultry Red Mite, *Dermanyssus gallinae*. *Annual Review of Entomology*, 59, 447-466.
20. George DR, Finn RD, Graham KM, Mul MF, Maurer V, Valiente Moro C, Sparagano OAE, 2015. Should the poultry red mite *Dermanyssus gallinae* be of wider concern for veterinary and medical science? *Parasites & Vectors*, 8, 178: doi:10.1186/s13071-015-0768-7.
21. George DR, Banfield-Zanin JA, Collier R, Cross J, Birch ANE, Gwynn R, O'Neill T, 2015. Identification of novel pesticides for use against glasshouse invertebrate pests in UK tomatoes and peppers. *Insects*, 6, 464-477.
22. Mul MF, van Riel J, Meerburg B, Dicke M, George D, Koerkamp PG, 2015. Validation of an automated mite counter for *Dermanyssus gallinae* in experimental laying hen cages. *Experimental & Applied Acarology*, DOI eprint: 10.1007/s10493-015-9923-2.
23. George DR, Banfield-Zanin JA, Wäckers FL (in press). Flower Power: Making the most of flowering seed mixes. AHDB Factsheet.

Photo: Me pretending to collect data from a stand of potted sunflowers growing in a Stockbridge glasshouse. They're not my sunflowers, there were no insects on the single leaf I examined whilst posing for the shot, and even if there had been there's no record sheet attached to that clipboard. They did make for a nice photo though, skilfully taken by Dr Jen Banfield-Zanin.

RES Hand Books

Lin Field
RES Editorial Officer

The RES has a long history of publishing Handbooks to provide illustrated identification keys to the insects of Britain, together with concise morphological, biological and distributional information.

They are now published in partnership with the Field Studies Council and Members/Fellows of the RES receive a 30% discount on all Handbooks as part of their Membership benefits.

We also have a wide selection of out-of-print handbooks available as downloads, free from the RES website.

This is an important part of the RES's publication portfolio and we are aiming to extend the range of Handbooks and thus further increase the Society's valuable contribution to entomology.

We now have Dr Andrew Polaszek, from the Natural History Museum, London as the Handbook Series Editor, who is working with me, Rebecca Farley-Brown (from the Field Studies Council) and Bill Blakemore. We have also set up an Advisory Group (Beulah Garner, Ian Kitching, Simon Leather, Judith Marshall, Erica McAlister, Ben Price, Chris Raper and Peter Shaw) to help identify future topics and contributors. If anyone would like to join in the discussion please contact Andy (a.polaszek@nhm.ac.uk) or myself (lin.field@rothamsted.ac.uk).

Soil Ecological Society Biennial Meeting, Colorado Springs

Stuart Norris

I attended the Soil Ecological Society biennial meeting in Colorado Springs from the 8th to the 12th of June 2015. The meeting was held at Cheyenne Mountain Resort with the stunning backdrop of the Rocky Mountains and the famous Pikes Peak. The meeting gave me an opportunity to present my recent findings about above- and below-ground invertebrate food web stability to a diverse audience. The attendees were predominately investigating bacterial and fungal soil functionality and diversity which gave me the opportunity to apply my knowledge of invertebrate and plant ecology to give different insights into understanding pressures and drivers on bacterial and fungal ecosystem functionality. The meeting was an excellent academic forum in which scientists from a wide range of disciplines were able to discuss both applied and theoretical ideas to better understand the challenges that face soil ecology over the next 30 years. On a personal note, I had never travelled to America before and found it to be a great experience in which I met a number of people with similar research interests that I hope to keep in contact with and develop collaborations with in the future. The funds provided assisted with travel costs and were gratefully appreciated as I would not have been able to participate in this conference if it wasn't for the generosity of the Royal Entomological Society.

SCHEDULE OF NEW FELLOWS AND MEMBERS

as at 6th May 2015

New Honorary Fellows
None

New Fellows (1st Announcement)
Dr Anne Oxbrough
Professor Natarajan Chandrasekaran
Mr Christopher R Shortall

Upgrade to Fellowship (1st Announcement)
Mr Peter John Boardman

New Fellows (2nd Announcement and Election)
Dr Jane Stout
Professor David Barry Sattelle

Upgrade to Fellowship (2nd Announcement and Election)
Mr Mark Andrew Hopp
Dr Darren Mark Evans
Ms Lesley Elaine Smart
Dr Jo-Anne Nina Sewlal
Dr Anthony James Wilson

New Members Admitted
Mr Andrew John Green
Dr Bilal Saeed Khan
Dr Robert Tansey
Mr Ian Richard W Elliott
Dr Lisa Joy Reimer
Dr Elisa Rigosi

New Student Members Admitted
Ms Rachel Mcdonald
Miss Susie E Hewlett
Miss Emma Bradford
Miss Catriona Helen Mcintosh

Re-Instatements to Fellowship
Ms Densey Clyne
Professor Canute Pancras Mutebi Khamala
Professor Jayanthi Priyankara Edirisinghe

Re-Instatements to Membership
Mr Rien De Keyser
Dr Muhammad Mazhar Ayaz

Re-Instatements to Student Membership
None

Deaths
Mr T G Howarth, 1939, Dorset

SCHEDULE OF NEW FELLOWS AND MEMBERS

as at 3rd June 2015

New Honorary Fellows
None

New Fellows (1st Announcement)
Dr Dana L Vanlandingham

Upgrade to Fellowship (1st Announcement)
Dr Gudbjorg Inga Aradottir

New Fellows (2nd Announcement and Election)
Dr Anne Oxbrough
Professor Natarajan Chandrasekaran
Mr Christopher R Shortall

Upgrade to Fellowship (2nd Announcement and Election)
Mr Peter John Boardman

New Members Admitted
Dr Bhagwati Uniyal (As At 6.5.15)
Dr V P Uniyal (As At 6.5.15)
Mr Derick Stirling
Mr Craig Christopher Robert Munns
Dr James Gilbert

New Student Members Admitted
Mrs Edith Julieta Sarmiento-Ponce

Re-Instatements to Fellowship
Dr Magda Charalambous

Re-Instatements to Membership
Mr Dominic Charles Henri
Dr Michael Orchard

Re-Instatements to Student Membership
Mr Alex Dittrich

Deaths
Dr S L Thrower, 1998, Isle Of Man

Book Reviews

Lepidoptera: Yponomeutoidea I (Argyresthiidae, Attevidae, Praydidae, Scythropiidae, and Yponomeutidae)

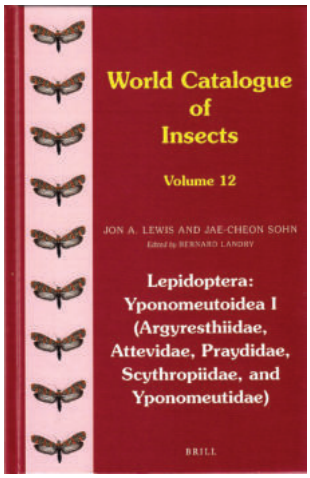
Jon A. Lewis & Jae-Cheon Sohn.

Edited by Bernard Landry.

World Catalogue of Insects, Volume 12. Brill, Leiden & Boston, xxiv+253 pp.

ISBN: 978 90 04 25474 9

EUR 104; US$ 135.



There are very many species of small moths and the superfamily Yponomeutoidea includes around 1,800 of those already named. Linnaeus described the small moths he knew in his genera *Tineae*, *Tortrices* and, depending on what you consider a small moth to be, *Pyrales* and *Alucitae*. Today lepidopterists refer to them collectively and loosely as 'microlepidoptera' or 'micros' - a grouping of convenience rather than a monophyletic lineage. But if the trenches were excavated by Linnaeus in the 18th century, it was Edward Meyrick particularly who, between the last part of the 19th century and the first part of the 20th century, laid the taxonomic foundations of the classification of 'micros' and, with other contemporaries, described numerous genera and species. Since then there has been considerable revision of the higher categories of Lepidoptera with extensive shuffling of genera and species between them. This situation has come about through more detailed and critical morphological studies (mostly of adult stages) and, more recently, molecular work. The price we have paid for our increase in knowledge is that the higher classification of the Lepidoptera has become so complex and category-inflated that only specialist lepidopterists have much hope of recognizing many of the higher taxa. The authors of this catalogue describe in their introduction the involved taxonomic history of our current delineation of the Yponomeutoidea and explain how this history has evolved tortuously over the 100 years since the taxon's inception. Broadly, recent research (by Jorma Kirki in the 1980s and in 1990 and by the catalogue's first author and colleagues in 2013) has rendered the superfamily and its component families sound, but the phylogenetic relationships between the families remain poorly resolved. (It is slightly unnerving in a catalogue that there are two typographical errors within the first three paragraphs of the Introduction.)

This catalogue treats five of the eleven families of Yponomeutoidea (a second part will deal with the remaining six). Taxonomic catalogues do not make compelling reading – but then, catalogues are intended for non-linear reference to information such as the names of taxa, author and date of description, taxonomic status and type specimens. They are perceived better as a component of taxonomic infrastructure.

As with all competent catalogues, this one does much to propel us towards a better understanding of just which genera and species should be included in the target taxon. The body of the catalogue is ordered alphabetically: by family, subfamily (if it exists), genus and species. Essential components of names, authors, dates and references are provided as is the type species of every genus. For each species the original genus is included as are data on type localities, type deposition, distribution and, where known, host-plant records. Some revisionary changes are incorporated into the text: several lectotypes are designated along with a single neotype; four species are synonymized; and one genus and two species names are recombined with other genera. Access is assisted by an index to genus and species names. Exclusion is also important – the authors provide a valuable and reasoned conspectus of those genera and their component species that they exclude from the Yponomeutoid families treated in this work. They also list the species removed from the family Yponomeutidae and record their current taxonomic status.

This volume is one of a series composing the *World Catalogue of Insects*, published by Brill. The initiative is admirable and the aims of the series are explained on the Brill website (World Catalogue of Insects, n.d.). Nevertheless, the data recorded in this book are of a kind that would be exposed ideally in database-format on the Web, which would permit wide access and the capacity for quick updatability as new knowledge became available. But given that researchers continue to need formal publication for career advancement, we remain trapped, at least partly, in the need for traditional format, which in itself requires viable commercial models to allow such publication. And a further advantage of a book is obvious enough in those all too frequent situations when websites and databases are not maintained.

World Catalogue of Insects. Available from http://www.brill.com/publications/world-catalogue-insects. [30 June 2015.]

Malcolm Scoble
Department of Life Sciences, Natural History Museum, London

The Bees

Laline Paull

Forth Estate, London

ISBN 978-0-00-755774-5

£8.99

When I saw this book in my local bookshop, I picked it up more out of a sense of duty as an entomologist than a keen desire to read it. The review on the inside cover that said it was the best of its kind since *Watership Down*, and left me wondering just how life in a bee colony might be portrayed. My fears were then amplified when the lady on the till waxed lyrical about the book saying that at times she had forgotten that the heroine was just a bee. However, once I immersed myself in the story all my fears faded away as I discovered that *Bees* was an excellent read.

Laline Paull has recreated the world of a honey bee colony as seen through the eye of a worker bee, Flora 717. She paints a vivid picture of a harsh and highly structured society that revolves around the queen; 'Accept, Obey and Serve' is the mantra by which all the workers live.

The story begins with Flora's emergence from a brood cell and charts the daily life of the colony over the summer, into the winter and then the colony's emergence into the spring, detailing the many trials and tribulations that Flora and the colony endure. While the author uses many anthropomorphic devices to make the story accessible, the narrative is steeped in an excellent understanding of bee biology. Laline Paull captures the essences of the pheromone-dominated society, offering an insight into a world where the queen's love controls every aspect of the colonies well-being. There is a temptation as an entomologist to pick holes in the story, but it is these entomological transgressions that help the general reader to relate to Flora's alien world and to make this an extremely enjoyable, action packed novel.

At a time when a better public understanding of the way that our bees interact with local environments has never been more pressing, this novel will introduce the delicate nature of this relationship to a wider audience. *Bees* is an atmospheric tale of repressed rebellion, loyalty and survival but above all it is a tale of great adventure that highlights one of the major environmental challenges of our time.

Peter Smithers

Wild Guides

Britains Hoverflies - A field guide

2nd edition

Stuart Ball & Roger Morris

Princetown press

ISBN 978-0-691-16441-0

£24.95

The *Wild Guides* are rapidly becoming the definitive format for UK field guides dealing with relatively small and focused groups of our fauna and flora. Their clear, concise and comprehensive format has set a new bar in the field guide arena. The second edition of *Britain's Hoverflies* is no exception, demonstrating the continuing evolution of this format.

The book opens with an introduction to hoverfly biology, with sections on life cycle, migration, mimicry and a new section on polymorphism. It also offers a section on a range of field techniques for finding hoverflies. This is followed by a glossary that leads into a comprehensively illustrated introduction to hoverfly morphology and an illustrated key to the tribes in this family. There is also a concise simplified guide to the tribes in table format for quick reference. Another new section is the photographic guide to the most commonly photographed hoverflies which will be a great asset to beginners.

The guide then offers detailed accounts of 167 of our 283 species, these being those that can be readily identified to species or genera in the field. The section dealing with each tribe opens with an illustrated key to the genera, and where genera contain many species there is also a tabular key to help separate them. Each species account offers a brief outline of the flies' biology, critical features, notes on similar species, annotated photographs, a distribution map and a flight period chart.

The guide also contains a number of appendices; these are a table of the hoverflies covered in the book, giving details of distributional and conservation status, plus notes on their ease of identification. This is followed by sections on collecting, conservation, recording, gardening for hoverflies and a new section on photographing hoverflies. The guide is also fully indexed.

This book is ideal for both those beginning the study of hoverflies, and for experienced field workers. Its diverse and comprehensive approach allows rapid identification in the field for those familiar with the group while also offering a more detailed approach for beginners. As the authors explain, the guide is meant as an introduction to this group and thus offers a comprehensive list of books and papers for further reading.

The multifaceted approach combined with extremely high quality photographs make this book an outstanding example of what a modern field guide can and should be. The authors are to be congratulated on the production of an informative, attractive and extremely useful introductory guide to this popular group of insects. This is a must-have volume for any field biologist.

Peter Smithers

Wild Guides

Britain's Butterflies - A field guide to the butterflies of Britain and Ireland

3rd edition

David Newland, Robert Still, andy Swash and David Tomlinson

Princetown Press

ISBN 978-0-691-16643-8

£17.95

This *Wild Guide* continues the series theme by offering a comprehensive account presented in a diversity of formats. The guide contains introductory chapters covering butterfly life cycles and butterfly habitats with a table showing the habitat preferences of all the UK species. This is followed by a section on morphology and identification with notes on colour forms and aberrations plus a photographic guide to the main groups of butterfly and a glossary.

Each of the species accounts offer photographs of the upper and lower surfaces of the wings, with notes on the critical features, behaviour, early life stages and food plants. There is also a distribution map and life cycle chart showing when the various life stages are present.

These accounts are followed by a photographic guide to larval food plants which is also presented in tabular form for quick reference. A photographic guide to the eggs, larvae and pupa of the UK fauna is also included, followed by a table showing the distributional status of each species.

The large number of photographs showing each species from various angles combined with the accessible and informative text make it an indispensable guide for beginners and experts alike. This third edition is an excellent addition to the *Wild Guide* series and an irresistible addition to any natural historian's bookshelf. *Wild Guides* are in danger of becoming addictive to anyone with an interest in the natural world.

Peter Smithers

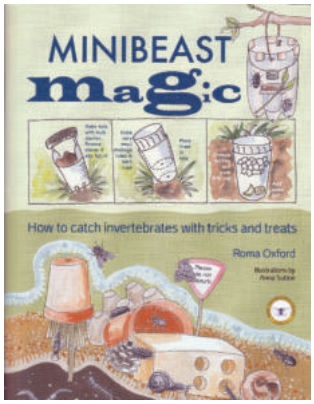
Minibeast Magic

Roma Oxford, illustrated by Anna Sutton

Royal Entomological Society

ISBN 978-1-910159-00-2

£15.00



This is a book that I wish I had had available when I was an eight year old boy. *Minibeast Magic* is a wonderful guide to finding and catching invertebrates for young entomologists of all ages. It teems with tips for the apprentice entomologist but may also have a trick or two to reveal to older hands at the game.

It begins with a few top tips on safety in the field and notes on observational skills. It then defines the major invertebrate groups based on leg number before launching into detailed instructions as to how to make various pieces of insect collecting equipment from common household materials.

It describes in detail the construction and use of spy pots for holding and observing invertebrates, sweep nets, pooters, bubble wrap traps, pitfall traps, bug hotels, light traps and extraction funnels among others. It concludes with a Who's Who of invertebrates, a list of recommended further reading and a concise glossary.

Roma Oxford's text is clear, concise and extremely easy to follow, while the presentation style makes it attractive and appealing. Anna Sutton's illustrations are bright, colourful and enormous fun, both complimenting the text and helping to explain it.

Here is a book that will galvanise young entomologists to turn out the kitchen cupboards and build an arsenal of collecting equipment before rushing into the garden to unearth its entomological riches. The entertaining and informative format of *Minibeast Magic* is bound to inspire the next generation of invertebrate biologists and propel them on a series of heroic entomological adventures the length and breadth of the garden.

This book is indispensable for Teachers, Parents, Cub and Brownie leaders and of course any and every young entomological explorer. Roma Oxford and Anna Sutton have produced a book that is truly magical in both its presentation and its aspiration. Long may they continue to cast their entomological spells.

Peter Smithers

J. O. Westwood Medal and Award for Insect Taxonomy

CALL FOR NOMINATIONS

In response to the urgent need to expand the research effort in insect taxonomy and to encourage monographic revisionary work, the Department of Entomology of the Natural History Museum, and the Royal Entomological Society, launched a new joint award for excellence in insect taxonomy in 2006. We plan to award the medal biennially for the best comprehensive taxonomic work published on a group of insects or related arthropods, typically a taxonomic revision or monograph, as judged by an independent international panel of experts and agreed by representatives of the two organisations. The award of this medal recognises only the highest standards of descriptive taxonomy. The winner of the 2014 award was Prof. Lee Herman for his monograph entitled 'Revision of the New World species of Oedichirus (*Coleoptera, Staphylinidae, Pseudolarinae, Pinophilini, Procirrinae*)' (*Bulletin of the American Museum of Natural History*, no. 375. 2013). The work was of the highest standard by a gifted scientist and is an outstanding addition to insect taxonomy.

We have announce that the fifth award will be made in 2016 and for which we now request nominations. The medal will be awarded for an outstanding recently published revision or monograph on a group of insects or related arthropods. The work nominated should have been published between 1st January 2013 and 1st January 2015. It is open to authors from any country in the world who demonstrates the highest standards in descriptive taxonomy in the work nominated. All interested in applying themselves, or in nominating another author, should submit a nominating letter, letters of support from two acknowledged experts, and at least one copy of the work by no later than 30th September 2015, to **Dr Andrew Polaszek, Department of Life Sciences, Natural History Museum, London SW7 5BD, UK**, clearly marked 'Westwood Award' or electronically to <A.**Polaszek@nhm.ac.uk**>. We shall hope to announce the winner early in 2016 and make the presentation at Ento '16.

The award has been named in honour of the leading 19th century British entomologist, John Obadiah Westwood (1805-1893). Westwood was the inaugural holder of the Hope Chair of Entomology at the University of Oxford, when it was established by the Reverend F. W. Hope in 1861. Westwood was one of the original group of founding members of the then Entomological Society of London in 1833 and served as President for three separate periods, 1851-52, 1872-73 and 1876-77. In 1883 he was elected to the unique position of Honorary Life President of the Society. He was a prolific author and published on most groups of insects and illustrated his own works, and those of many others, with his exquisite drawings and paintings. Perhaps his most influential work was *An Introduction to the Modern Classification of Insects* published in two volumes in 1839, pp. 1-462, and 1840, pp. 1-587, by Longman, Orme, Brown, Green and Longmans, London. As a major appendix to Volume 2 he added his *Synopsis of the Genera of British Insects*, pp. 1-158. In this latter he first clearly established the concept of a type species for a genus, analogous to the type specimen for a species, and thus helped to provide a stable foundation for insect nomenclature. It is particularly appropriate that our award should be dedicated to this early pioneer of insect taxonomy.

Diary

Details of the Meetings programme can be viewed on the Society website (www.royensoc.co.uk/meetings) and include a registration form, which usually must be completed in advance so that refreshments can be organised. Day meetings typically begin with registration and refreshments at 10 am for a 10.30 am start and finish by 5 pm. Every meeting can differ though, so please refer to the details below and also check the website, which is updated regularly.

Special Interest Group meetings occupy either a whole day or an afternoon (check www.royensoc.co.uk/meetings for details).

Offers to convene meetings on an entomological topic are very welcome and can be discussed with the Honorary Secretary.

MEETINGS OF THE ROYAL ENTOMOLOGICAL SOCIETY

2015

Sept 2-4 Ento' 15 Annual Science Meeting and International Symposium

"Insect Ecosystem Services"

Venue: Trinity College Dublin

Convenors: Drs Jane Stout, Olaf Schmidt, Archie K. Murchie, Catherine Bertrand, Stephen Jess, Brian Nelson

Registration now open: www.royensoc.co.uk

Speakers confirmed to date:

Janne Bengtsson (Uppsala, Sweden)
Sarah Beynon (Pembrokeshire)
Jerry Cross (East Malling)
Tom Bolger (Dublin)
Dave Goulson (Sussex)
Alexandra-Maria Klein (Freiburg, Germany)
Simon Leather (Harper-Adams)
Craig Macadam (Buglife, Stirling)
Sarina Macfadyen (CSIRO, Australia)
Lynn Dicks (University of Cambridge, UK)
Charles Midega (ICIPE, Kenya)
Michael D. Ulyshen (USDA – Forest Service, USA)

Sept 8-9 Arthropod Cuticle SIG

Venue: Technische Universitat Dresden, Germany

Convenors: Prof. Klaus Reinhardt (klaus.reinhardt@tu-dresden.de), Prof. Stuart Reynolds (s.e.reynolds@bath.ac.uk)

The annual meeting will be held on 8./9. September 2015 at the Technische Universitaet Dresden (Germany). The meeting will have a slight focus on cuticle material properties and cuticle chemistry (see keynote speakers) but other contributions are also welcome. There will be no registration fee for members and fellows of the Royal Entomological Society; non-members will be asked to contribute a participation fee of 20 Euros. The deadline for registration is 12 July. If there are more contributions than spaces, decision will be made by 25 July.

For further details: see http://tudaz.net/sig/

Nov 4 Entomophagy SIG

Venue: Sutton Bonington, University of Nottingham

Convenor: Peter Smithers (psmithers@plymouth.ac.uk)

For more information contact convenor.

Nov 5 Orthoptera SIG

Venue: Natural History Museum, London

Convenors: Björn Beckmann (orthoptera@ceh.ac.uk), Judith Marshall (j.marshall@nhm.ac.uk)

The group provides a forum for the discussion of all aspects of research on Orthoptera, including neurophysiology, acoustics, behaviour, ecology and taxonomy. There is an annual meeting, usually in November with a lecture, poster session, short paper session, demonstrations and a buffet supper. All the sessions are informal and the group encourages research students to contribute. For further information contact the convenor.

Nov 5-6 Aphid SIG – French Aphid Research Network Joint Meeting

Venue: Société Nationale d'Horticulture de France, Paris

Convenor: Jean-Christophe Simon

The French Aphid Research Network (BAPOA, for Biologie Adaptative des Pucerons et des Organismes Associés, https://www6.inra.fr/encyclopedie-pucerons/Pucerons-et-recherche/Reseau-BAPOA) supported by INRA (French Agriculture Research Institute) and the Aphid Special Interest Group of the Royal Entomological Society (http://www.royensoc.co.uk/sig/aphids.htm) are pleased to invite you to a joint meeting on aphids in Paris, November 5-6, 2015 in the conference room of Société Nationale d'Horticulture de France (84 Rue de Grenelle, 75007 Paris, http://www.snhf.org/location-de-salle.html).

These two days are a unique opportunity to share our works on aphids from either side of the Channel, in a friendly atmosphere and a pleasant place in the heart of Paris (next to Eiffel Tower). This meeting will be free of Registration fees but we will ask you to pay accommodation and dinner. More details about the programme and the organization will be available in due course.

Nov 12 **Scottish Regional Meeting**
"Soil Entomology"
Venue: St Mungo Museum, Castle Street, Glasgow
Convenor: Dr Jenni Stockan (jenni.stockan@hutton.ac.uk)
Offers of talks in all areas of soil entomology are welcome.

Nov 20 **SW Region Annual Meeting**
Venue: Devenport Lecture Theatre, Portland Square Building, Plymouth University
Convenor: Peter Smithers (psmithers@plymouth.ac.uk)
Speakers: Sarah Arnold, University of Greenwich. "The midges behind the Mars bar"
The chocolate industry depends upon the tiny midges that pollinate the cocoa flowers - and yet we know so little about them. The talk will introduce our work to learn more about cocoa midges and whether we should be doing more to look after them.
Dave Bilton, Plymouth University.
Sexual conflict in diving beetles. Interactions between males and females are not always straightforward, as mating and reproduction typically have very different costs for the two sexes. In diving beetles this has driven coevolutionary arms races, involving conflict between males and females both before and after mating. The talk examines how these arms races have shaped the appearance of many diving beetle species, as well as the design of their reproductive systems and gametes.
Andrew Whithouse & Chris Ayre, Buglife. Saving possibly the rarest spider in the world. The campaign and search for *Nothophantes horridus*.

2016

Mar 2 **Verrall Lecture by Maxwell V. L. Barclay, Curator and Collection Manager, NHM**
"Collections – the Last Great Frontiers of Exploration"
Venue: Flett Lecture Theatre, NHM, London
Convenor: Dr Archie K. Murchie

Sep 5-8 **Ento' 16 Annual Science Meeting**
Venue: Harper Adams University College, Shropshire
Convenor: Prof. Simon Leather

Other Meetings

2015

Sept 7-9 **International Symposium on Biopesticides – Innovative technologies and strategies for pest control**
Venue: Swansea University, Swansea
Convenor: Tariq M. Butt
See:http://www.swansea.ac.uk/biosci/researchgroups/snapandbanpgroup/biocontrolandnaturalproductsbanp/symposiuminfo

2016

Apr 26 – May 1 **7th International Conference on Fossil Insects, Arthropods and Amber**
Venue: National Museum of Scotland, Edinburgh
Convenor: Dr Andrew Ross
This is the main conference on the scientific study of non-marine fossil arthropods and amber. It is usually held every three years and this is the first time that it will be held in the UK. The conference will comprise of a Reception at the Royal Society of Edinburgh, three days of lectures at the National Museum of Scotland and two optional days of field-work to non-marine fossil arthropod sites. To be added to the mailing list and receive the 2nd Circular with instructions on how to register, please e-mail a.ross@nms.ac.uk

2018

Jul 2-6 **European Congress of Entomology**
Venue: Expo Convention Centre, Naples, Italy

author guidelines

We are always looking for new material for *Antenna* – please see below if you think you have anything for publication

AIMS AND SCOPE

As the Bulletin of the Royal Entomological Society (RES), *Antenna* publishes a broad range of articles of relevance to its readership. Articles submitted to *Antenna* may be of specific or general interest in any field related to entomology. Submissions are not limited to entomological research and may, for example, include work on the history of entomology, biographies of entomologists, reviews of entomological institutions/methodologies, and the relationship between entomology and other disciplines (e.g. art and/or design).

Antenna also publishes Letters to the Editor, Meeting Reports, Book Reviews, Society News, Obituaries and other items that may be of interest to its Readership (e.g. selected Press Releases). *Antenna* further includes details of upcoming entomological meetings in its Diary Section and features information and reports on RES activities including National Insect Week, Insect Festival and National, Regional and Special Interest Group meetings. Details of RES Awards and recipients are also covered, as is notification of new Members (MemRES), Fellows (FRES) and Honorary Fellows (HonFRES).

READERSHIP

Antenna is distributed quarterly to all Members and Fellows of the RES, as well as other independent subscribers.

INSTRUCTIONS FOR AUTHORS

Standard articles are normally 2,000-6,000 words in length, though shorter/longer submissions may be considered with prior approval from the Editorial Team. The length of other submitted copy (e.g. Letters to the Editor and meeting reports) may be shorter, but should not normally exceed 2,000 words. The use of full colour, high quality images is encouraged with all submissions. As a guide, 4-8 images (including figures) are typically included with a standard article. Image resolution should be at least 300 dpi. It is the responsibility of authors to ensure that any necessary image permissions are obtained.

Authors are not required to conform to any set style when submitting to *Antenna*. Our only requirement is that submissions are consistent within themselves in terms of format and style, including that used in any reference list.

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All submissions are reviewed and, where necessary, edited 'in-house' by the *Antenna* Editorial Board, though specialist external review may be sought in some cases (e.g. for submissions that fall outside the Editorial Boards expertise). Receipt of submissions will be provided by email, with submitting authors of accepted articles being offered the opportunity to approve final pdf proofs prior to publication. Where appropriate, authors will be requested to revise manuscripts to meet publication standards.

SUBMISSION PROCESS

All submissions should be sent electronically to 'antenna@royensoc.co.uk', preferably in MS Word format with images sent as separate files (see above). Image captions and figure headings should be included either with the text, or as a separate file.

EDITORIAL BOARD

Royal Entomological Society

The Society's Offices

- The Mansion House is open to members Monday to Friday between 9.30 am and 4.00 pm
- The General Office is open for enquiries and sale of publications

The Library

- The Society possesses one of the finest entomological libraries in the world, which is open to the membership
- A loan and photocopying service is available to the membership
- The Library is open on all weekdays for private study and research by arrangement with the librarian

Activities of the Society

- Frequent one-day workshops organised by the Society's Special Interest Groups
- National Science Meeting annually – with a specialist international Symposium biennially
- Regional activities in all parts of the United Kingdom
- Postgraduate Forum
- *Antenna* – the house journal of the Society, sent free to the membership
- Each year the Society gives the Marsh Insect Conservation Award (prize £1,000), and other Awards (see website)
- In 2004 the Society launched 'National Insect Week' which is now a biennial event (see www.nationalinsectweek.co.uk)
- In 2007 the Society launched the 'Wallace' Award for Postgraduates
- Biennial Insect Festival

Publications

- The Society publishes seven internationally recognised scientific journals:

  Ecological Entomology
  Agricultural and Forest Entomology
  Physiological Entomology
  Systematic Entomology
  Medical and Veterinary Entomology
  Insect Molecular Biology
  Insect Conservation and Diversity

- Each year three of the journals will select the best paper that they have published over a two year period to receive a Society Academic Award, presented by the President of the Society.
- The Society's house journal *Antenna* contains reports on all Society Meetings and other activities; there are also articles, readers' correspondence and a Diary Section. *Antenna* also contains a Postgraduate Student section.
- *The Handbooks for the Identification of British Insects* is a continuing series of important works.
- The highly successful *Symposia Volumes* are published biennially following each Symposium.
- In 2008 the Society launched a new academic Journal *Insect Conservation and Diversity*

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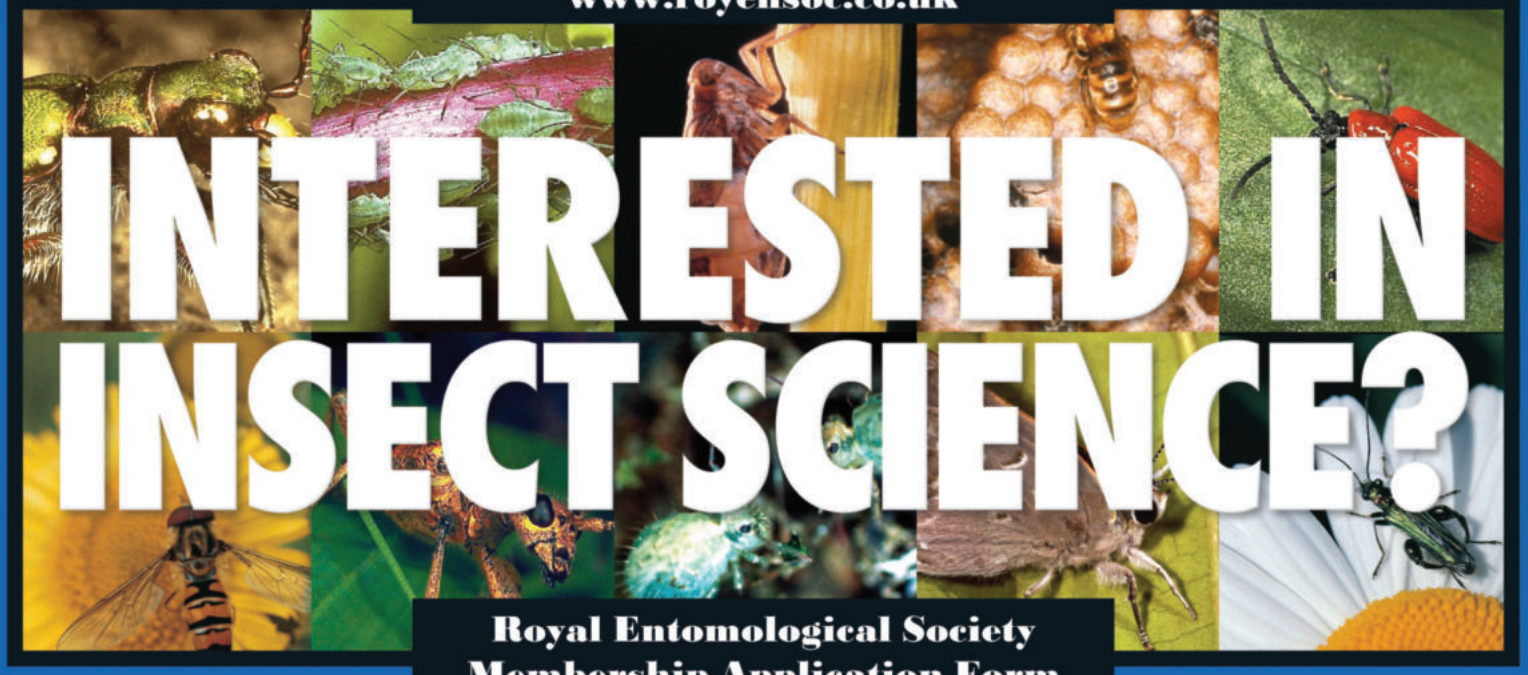

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Bank: Lloyds Bank plc, St Albans Branch
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Sort code: 30-97-25
BIC: LOYDGB21185
BAN: GB47 LOYD 3097 2501 9215 33

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The Royal Entomological Society exists to promote the dissemination of knowledge in all fields of insect science, and to facilitate communication between entomologists, both nationally and internationally. It is the principal society in the United Kingdom for professional entomologists, and also has many overseas members, as well as a strong amateur membership.

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The Society comprises Fellows and Members:

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Membership is open to all who have a genuine interest and enthusiasm in entomology. Membership does not require academic qualifications. Members are now entitled to use the suffix *Mem.R.E.S.*, not applicable for students

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