



# Newsletter

No. 7

May 2015

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[www.entsocvic.org.au](http://www.entsocvic.org.au)

## Forthcoming excursion to the Melbourne Zoo Butterfly House

The ESV's next excursion is to the Melbourne Zoo Butterfly House, this year celebrating its 30th anniversary in December. Those with long memories will recall that when the Butterfly House was conceived in the early 1980s, insect education and display was not a high priority in Australia generally, and it was only through the persistence and dedication of a few enthusiasts that it became a reality, and a ground-breaking one at that.

The Butterfly House remains one of the most popular exhibits at Melbourne Zoo, which receives one of the highest per capita visitation rates of any zoo in the world. More than 50 butterfly species have been flown over the years, and nearly three quarters of a million individual butterflies.



Almost all butterflies are bred on site, using host plants also grown on site in the plant nursery. As the butterfly species are mostly tropical, the host plants (more than 4,000 per year) are also largely tropical and must be propagated indoors, with all the attendant pests that high humidity and temperatures generate.

Over the years, other invertebrate species have been added to the live collection, including spiders, molluscs, millipedes, crustaceans and a range of insects. While the focus remains the display of butterflies for the enjoyment and education of visitors, several conservation projects (such as the recovery of the Lord Howe Island Stick Insect) have also been initiated (see Forthcoming Publications in this edition).

Although common in Europe and the US, butterfly houses are a rarity in Australia, even 30 years after this one opened. Invertebrate display,

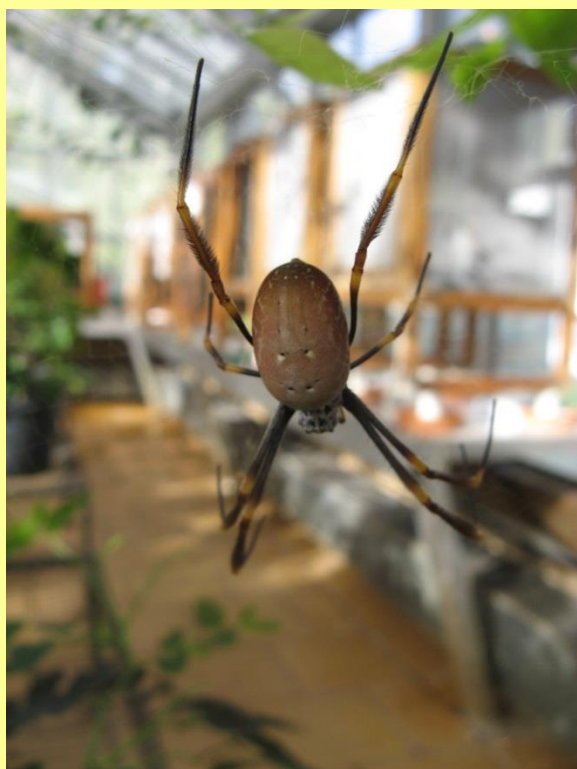


education and conservation may have come a long way in this country, and almost a million visitors wander through the Melbourne Zoo Butterfly House each year, but there is still a long way to go.



Lord Howe Island Stick Insects (*Dryococelus australis*) in their 'nest boxes' during the day.

The ESV excursion will cover the Butterfly House and behind-the-scenes at the invertebrate rearing facilities, conservation and breeding of the Lord Howe Island Stick Insect, and the plant nursery.



Female Golden Orbweaver (*Nephila* species) in the behind-the-scenes glasshouse

The excursion will take place on Saturday 22 August. More details in future Bulletins and Newsletters.

## ESV Council news

### **Peter Marriott's investiture**



As mentioned in previous editions of the Newsletter, Peter Marriott received the Order of Australia earlier this year for his community service with groups such as Scouts and the Entomological Society of Victoria. Peter's investiture as an AM at Government House can be found at

<http://livestream.com/dpcmultimedia/order-of-australia-17-4-2015>

He enters stage left at 12 minutes, 20 seconds.

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## ESV Calendar 2015

### **Tuesday 16 June 2015**

Members' night

### **Tuesday 21 July 2015**

Council meeting

### **Saturday 22 August 2015**

ESV excursion, Melbourne Zoo Butterfly House

### **Tuesday 15 September 2015**

Council meeting

### **Tuesday 20 October 2015**

Members' night

### **Tuesday 17 November 2015**

Council meeting

### **Saturday 5 December 2015**

Christmas gathering, Westgate Park



## Meet your ESV Council

**Joshua Grubb**  
Treasurer, ESV



### **What's your favourite group of insects?**

I quite like moths and beetles. Having said that, I like all insects. I worked on caddisflies and found them enjoyable – what fascinates me most about moths is their aesthetic appeal. With caddisflies it's their ecology that's interesting. Beetles have an enormous diversity of life histories and ecologies.

### **What do you enjoy about your research?**

One thing I like about research is the range of things you get to do – writing, lab work, field work – I enjoy them all. Having the opportunity to discover things that haven't been discovered before.

### **What was your Honours research about?**

I did my Honours looking at lateral movements of caddisflies away from streams. I found that males and females had different distribution patterns – females tended to clump around streams, while males were more widely distributed. Different species also showed different distribution patterns. One of the highlights was night collecting, using UV light traps, which gave me the time to wander around the streams. One night, high numbers of dobsonflies emerged and I hadn't seen them in the wild before. It was also fascinating to see other animals, including a Short-finned Eel who lived around one of my study sites and I would see nightly.

### **What about your current research?**

My PhD project at Latrobe looks at the recovery of detritivorous invertebrates after fire, focussing on amphipods, isopods and millipedes (and I know that none of these are actually insects). There are three parts to the research: how they survive the fire itself; how they manage to persist in the dramatically changed environment; and how these same groups manage to colonise recently burnt areas from surrounding environments. I'm six months into the project and it's keeping me very busy.

### **What's your dream job?**

I would definitely like to carry on with research. I particularly enjoy having colleagues to collaborate with, which has helped broaden my area of knowledge and research.

### **What's more important – the animals or the question?**

Both. I like working on questions in the abstract, but the questions have no meaning unless they're grounded in reality. The balance for me is tipped slightly towards the question, but I wouldn't ask questions about animals I'm not interested in. I've moved, for example, from aquatic insects to terrestrial non-insect detritivores. My interest in the animals also informs the questions.

### **What's your most memorable find?**

Probably a proboscis worm (Nemertean) I found under a log on the Alpine Bioscan. The appearance of the eversible proboscis of this species made me yell out in surprise. But in general, what gets me most excited is finding animals in the wild that I'd only ever read or heard about. When I was younger we removed an old tree stump from my backyard and found grubs and pupae. I kept them and they emerged as adult Fiddler Beetles (*Eupoecila australasiae*) and Stag Beetles (*Lamprima aurata*) and I was fascinated that insects I thought I would never see in real life were right in my backyard.

In the Otways a few years ago I found a Lycid-mimicking Weevil (probably *Rhinotia* species), and guessed immediately what it was. Australia has such a unique collection of endemic and interesting species, which makes it a great place to study entomology.

## Giant Honey Bee Lecture

Sponsored by the Victorian Apiarists' Association Inc (VAA) and Presented by VAA Melbourne Section

### **Topic**

"Return of the Giant Honey Bees:  
Tales from a Magical Mango Orchard"  
presented by Dr. Willard (Will) Robinson.

### **When:**

- Saturday 13th June 2015
- 2:00 pm to 3:30 (followed by informal discussion till 4:00)
- Registration from 1:30 pm

### **Location**

- First floor of the Gene Technology Access Centre on the grounds of the University High School, 77 Story Street Parkville.
- Tram stop 11 on tram route 19 or 20.  
Enter via path off Royal Parade.
- After 12:30 pm a limited amount of free parking is available in Royal Parade, in Story Street and in surrounding streets.
- All day parking is also available in the adjacent Royal Melbourne Hospital underground car park for \$10.
- Bicycles may be locked to stands at the back of the Centre.

### **About the Presenter and Topic**

Will Robinson received his BSc and PhD from Cornell University, and his MSc from Washington State, all in entomology. He has been a university lecturer for the past 25 years and also now teaches at a learning community centre in Yellowstone National Park. He has worked in Africa, Asia, the Middle East and South America on beekeeping and crop pollination issues for the Food and Agriculture Organization of the UN and the US Agency for International Development. In 2014 he was named a Fulbright Roster Specialist in Apiculture.

Will has authored numerous research papers on honey bees and pollination, as well as many popular and practically-oriented articles on bees, other insects and natural history. He has recently undertaken research in Thailand into the migration of colonies of the giant honey bee, *Apis dorsata*. [Click here](#) for details about some of his research on this topic.

Will's lecture will focus in some depth on the science of his research. He will describe his discovery in Thailand of a mango orchard that plays an amazing role in honey bee biology, where large numbers of migrating giant honey bee colonies stop to rest and refuel, and where absconding Indian hive bees gather to fight attacking predatory hornets. Bees of both species display fascinating behaviours while in the area. Will argues that such sites are common in southern Asia, are vital to the bees' survival, and warrant conservation measures.

### **Cost**

There will be no charge to attend the lecture thanks to the VAA for sponsoring the presenter and to the Gene Technology Access Centre for providing the venue.

There will, however, be a charge of \$5 for afternoon tea.

Payment will be collected on the day of the lecture from 1:30 pm during registration.

Application to attend the lecture can be made by email or by post.

- Your application should contain
  - your first and last name,
  - your phone number (preferably mobile),
  - your postal address (if applying by mail) and
  - whether or not you will be paying the \$5 for afternoon tea.

- Applications close on Friday 5th June.

- Email applications should be sent to VAA Melbourne Section at [vaamelbournesection@hotmail.com](mailto:vaamelbournesection@hotmail.com)

- Postal applications should be sent to VAA Melbourne Section, c/o Post Office Box 709 Newlands Estate Post Office, Coburg Vic 3058.

- As it is anticipated that there will be a high demand for this lecture and available space is limited, not all applicants may be able to attend. Please register early to avoid disappointment.

- Applications will be accepted in the order that they are received.

- Both successful and unsuccessful applicants will be notified.

- Successful applicants will be expected to attend.

For Further Information contact:

- VAA Melbourne Section at [vaamelbournesection@hotmail.com](mailto:vaamelbournesection@hotmail.com), or at the above address.

## Overseas news

A message from the European Association of Zoos and Aquariums, Terrestrial Invertebrate Taxon Advisory Group

Dear Colleagues,

We are excited and pleased to announce that the EAZA TITAG will be holding the symposium "TITAG15" at Artis Royal Zoo during the period of 19-22nd August 2015. We are planning on a full itinerary covering subjects such as conservation, research and exhibit development as well as practical demonstrations, film screenings and exciting talks relating to the field of invertebrates in zoological collections.

To get an idea of the numbers of attendees we would like to invite prospective attendees to register their interest of attendance with myself and Tamás via email

(mbushell@bristolzoo.org.uk & rovarhaz@zoobudapest.com), following this a formal registration form will be circulated. We would also open up a call for papers and presentations - these should be aim to be 20 minutes long ideally and ask that you let us know by March 31st. We would also like to invite poster presentations which should follow the format used during the EAZA Annual Conference.

We look forward to hearing from you!

Mark Bushell  
Assistant Curator of Invertebrates  
Vice-chair – EAZA TITAG  
Coordinator – EAZA TITAG Regional Collection Plan  
Co-chair – IUCN SSC Grasshopper Specialist Group  
Coordinator – BIAZA TIWG Invertebrate Health & Hazardous Invertebrate Focus Groups

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## Correspondence

An unusual letter to the ESV  
Did *Battus polydamus antiquus* exist?

Dear Readers of The Victorian Entomological Society Journal,

While writing a research paper on entomological knowledge in Victorian Literature I came across a problem in identifying a butterfly, a problem that I thought was worth sending into the society in hope of an answer from someone with a greater knowledge of entomology and entomological history than myself.

In a late 18th century book on insects for a popular audience, *A Natural History of Insects*: compiled from Swammerdam, Brookes, Goldsmith &c (1792), I came across a butterfly labeled 'The Black Butterfly of the West Indies', which I needed to identify for my study. After some investigation I concluded that the butterfly in question may be *Battus polydamus antiquus*, an extinct insect from Antigua first identified by Dru Drury in 1770.

In seeking to gather some understanding about *polydamus antiquus* I could find no information about the butterfly or how it went extinct. One of the interesting facts I did find about *Battus polydamus antiquus* is that it is only known by an 18th century illustration that was later used to identify it as a subspecies and then label it as extinct in 1906. Moreover, out of over twenty subspecies *polydamus antiquus* is the only butterfly to have gone extinct.

In briefly studying Dru Drury's classification of lepidoptera I think I noticed some contradictions in his regional classification of lepidoptera. For example, the holarctic moth *Smerinthus jaimiacensis* is named after Jamaica but, as a holarctic moth, it cannot logically live in the tropics of Jamaica. Nevertheless it is described in a famous Victorian book based on Drury's work, *Illustrations of Exotic Entomology* (1837), as living in the tropics of Jamaica.

After seeing this error, which may be nothing more than my own ignorance concerning entomology, I began to think that *Battus polydamus antiquus* may also be an error in Drury's geographical identification. Could it be possible that this butterfly never existed on the island Antigua and was incorrectly labeled and described by Drury in 1770? Could *polydamus*



antiquus be one of the only butterflies to have gone extinct out of not existing?  
If anyone is interested in this problem, can help answer my question, or point out my errors I would be glad to hear from them via the journal, in letter or email.

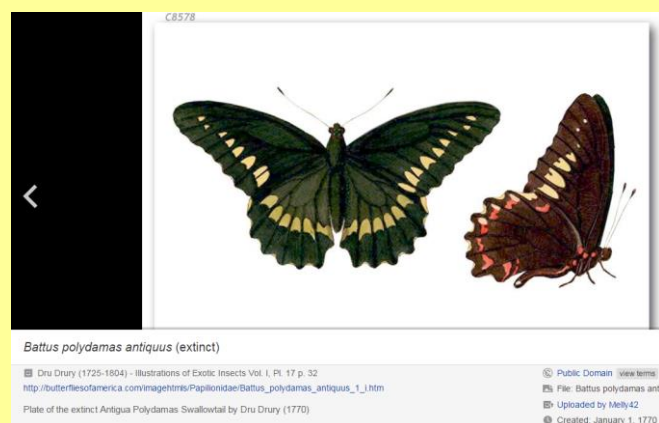
Kind Regards,  
Christopher Harrington  
3/458 Victoria Pde  
East Melbourne 3002  
christophergharrington@gmail.com

Hi Christopher,

The editor of the Victorian Entomologist has passed your enquiry to me. I am the senior curator of entomology at Museum Victoria and I deal with such interesting, curly taxonomic questions.

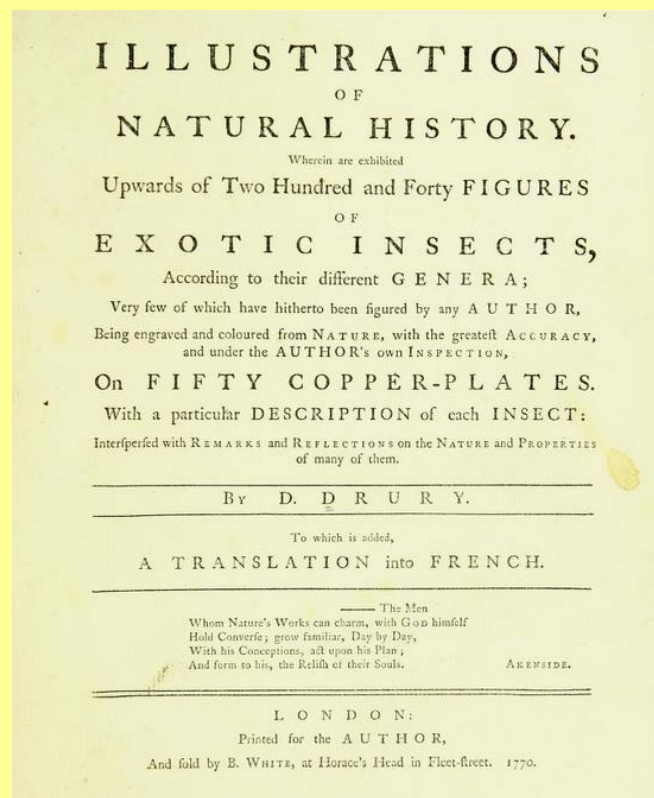
Taxonomy of today is governed by set of rules determined by the ICZN – International Commission of Zoological Nomenclature – but of course, there was no ICZN around in 1770 when Dru Drury first illustrated this subspecies. However, the ICZN has published a set of rules for how to treat species named before 1940 to assist with the decision of whether or not they are indeed valid species.

Here are the illustrations of the *Battus polydamus antiquus* subspecies.

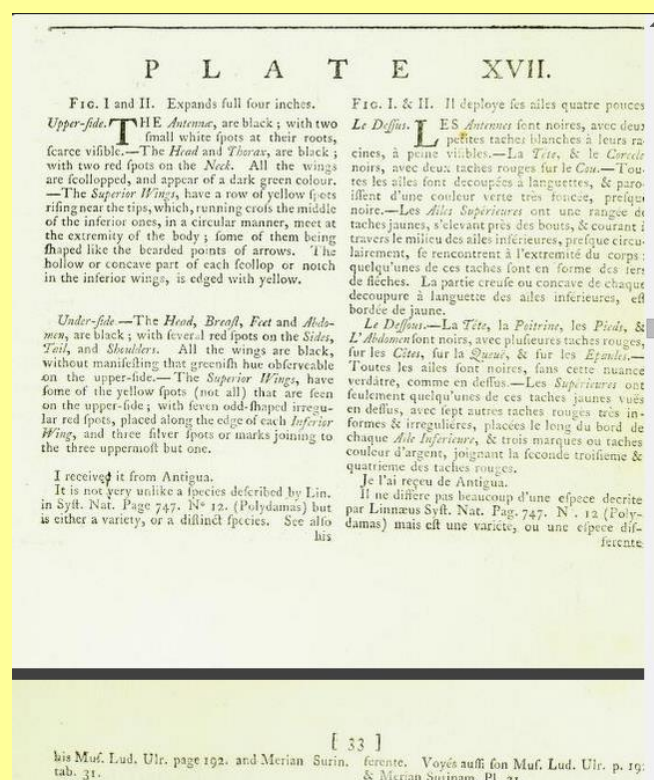


You can view an original Dru Drury's entire publication at a relatively new resource called "Biodiversity Heritage Library" (BHL):

<http://www.biodiversitylibrary.org/item/132656#page/5/mode/1up>



And here is a description for the subspecies *Battus polydamus antiquus*.

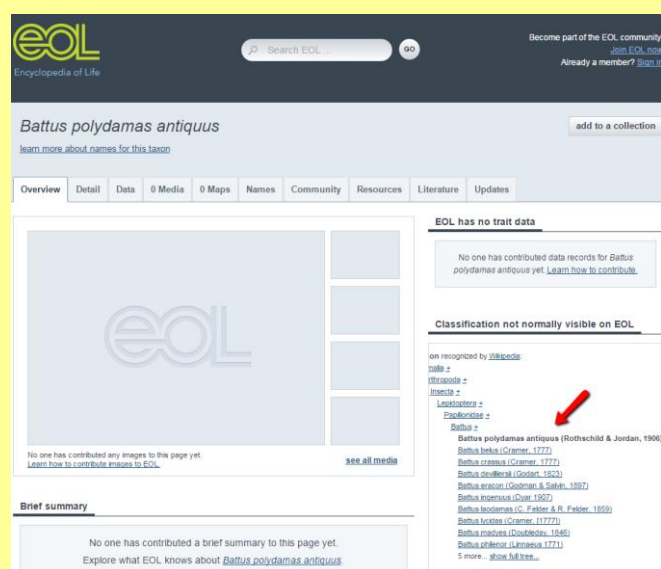


For a species to be considered as "valid" is must contain at least a minimal text description – with or without illustrations; but, it cannot be described only by illustrations.

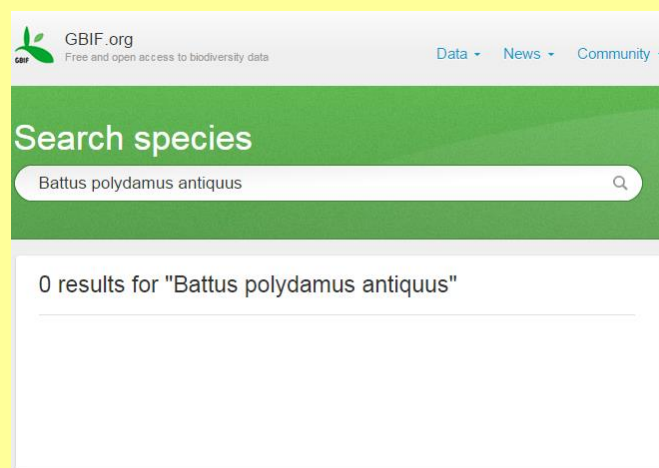
Clearly, the description of *Battus polydamus antiquus* contains both textual and illustrative components and is contained in a published and available text so it must be considered to be a valid name.

On the world nomenclature aggregator websites, the name appears only on EOL – Encyclopedia of Life:

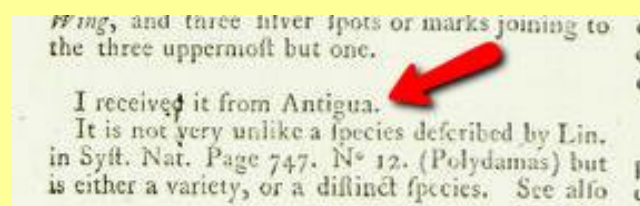
<http://eol.org/pages/13872595/overview>



But it does not appear on GBIF – Global Biodiversity Information Facility:



I could find no information about the butterfly or how it went extinct. An interesting statement in Drury's description is:



That most likely is where the problem exists. Drury did not collect the specimens himself, rather he had to rely on a labelled specimen. Who knows whether the Antigua location was correct or not. The literature is littered with incorrect localities used when describing a new species.

I recall a recent example of a native bee that had a described location as Hermannsburg, Central Australia, NT. Now Hermannsburg is located south of the MacDonald Ranges which run east and west of Alice Springs. The species was described by a German author and it turns out the person who sent him the specimens did not actually included a location for the bees so the German author used the location from where the parcel was posted: Hermannsburg. Later evidence showed that the person who posted the parcel had offered the local aborigines financial rewards for any bee specimen they brought to him. The species has been recorded north of the MacDonald Ranges but never south so we presume the original specimens had been collected by aborigines north of the range and posted from Hermannsburg south of the range.

That's just one example from the early 1900s rather than from 1770.

And:

"In briefly studying Dru Drury's classification of lepidoptera I think I noticed some contradictions in his regional classification of lepidoptera. For example, the holarctic moth *Smerinthus jamiacensis* is named after Jamaica but, as a holarctic moth, it cannot logically live in the tropics of Jamiaca. Nevertheless it is described in a famous Victorian book based of Drury's work, *Illustrations of Exotic Entomology* (1837), as living in the tropics of Jamaica.:

As above! For locations.

I doubt you will ever be able to determine whether or not the species actually occurred on Antigua and if it did, then why it is now extinct.

Finally ...

> Could *polydamus antiquus* be one of the only butterflies to have gone extinct out of not existing?



I think it is likely that it did actually exist but we have no real proof where it occurred or whether the illustrations are an accurate representation of the species as none have again been seen. Fascinating stuff.

Dr Ken Walker  
Senior Curator, Entomology  
Museum Victoria  
GPO Box 666  
Melbourne Vic 3001 Australia

## The Great Australian Fly

*From The 360 Team, TV Production Company*

This documentary was aired across Australia at 8.30pm on Tuesday 7 April 2015. It is no longer available on iview, but keep an eye out for it at your local ABC shop in the future.

Part social history, part scientific study, THE GREAT AUSTRALIAN FLY introduces the people who devote their lives to flies through science, criminology, medicine, as breeders, and for love. Exploring why we might need to stop swatting and start embracing the fly! If you are enthusiastic about the macro world around us, then this one is for you. Please share with your friends and family, from fly-phobic to fly-enthusiast! Head on over to the Facebook page and give it a 'like.' You'll find excerpts from the film and also a few behind the scenes videos on the 'making of.'

<https://www.facebook.com/pages/The-Great-Australian-Fly/212845885568562>

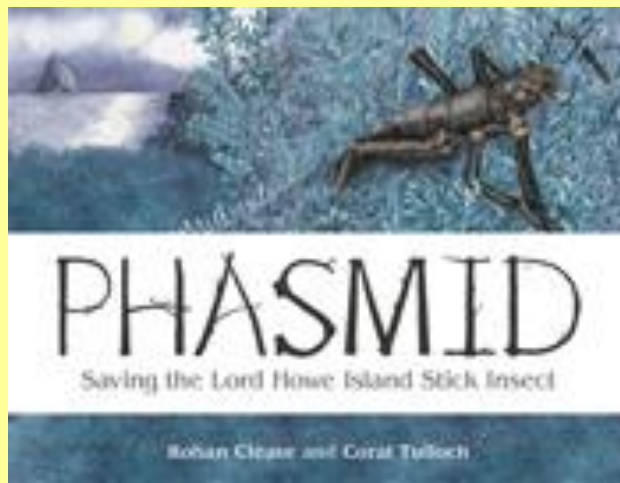
For your interest, here is a link to the trailer.

<https://www.youtube.com/watch?v=aDoUF7G4QDc>



## Forthcoming publication

### Phasmid: Saving the Lord Howe Island Stick Insect



*By Rohan Cleave and Coral Tulloch*

Hardback, 32 pages with colour illustrations, CSIRO Publishing.

Phasmid is the amazing true story of the Lord Howe Island Phasmid, or Stick Insect. Believed to be extinct for nearly 80 years, the phasmids were rediscovered on Balls Pyramid, a volcanic outcrop 23 kilometres off the coast of Lord Howe Island, Australia. News of their unbelievable survival made headlines around the world and prompted an extraordinary conservation effort to save this remarkable invertebrate.

This wonderful tale captures the life of one of the world's most critically endangered invertebrates, from beginning life as an egg to surviving harsh environments and the hopeful return to their homeland, Lord Howe Island. With a captivating narrative by Rohan Cleave, invertebrate zookeeper at Melbourne Zoo, and stunning watercolour illustrations by renowned artist Coral Tulloch, Phasmid is a positive story about one species' incredible survival in a time of worldwide species decline.

Phasmid is ideal for parents and young readers (aged 4-7).

*"Phasmid tells the remarkable story of the rediscovery and rescue of the Lord Howe Island Stick Insect. It was thought that this species was extinct – lost forever – until one moonlit night a few surviving insects were found on a single bush peeking out of a rock crevice. The*



race was on to save the species, and with the determination and passion of some dedicated people, the Lord Howe Island Stick Insect was brought back from the edge of extinction.

Rohan Cleave's inspiring text and Coral Tulloch's evocative illustrations showcase this amazing insect, and give us hope and proof that we can make a difference."

Dr Jane Goodall, DBE, Founder – The Jane Goodall Institute & UN Messenger of Peace, [www.janegoodall.org.au](http://www.janegoodall.org.au)

**Rohan Cleave** is a zookeeper at Melbourne Zoo, where he has been involved in the Lord Howe Island Stick Insect recovery breeding program since 2003. He now manages the program at Melbourne Zoo.

**Coral Tulloch** is an award-winning illustrator who has worked on close to 60 fiction and non-fiction books for children, both in Australia and internationally.

## From the archives

### Man's Entomophagous Habits

*Published in 'Wings and Stings', Journal of the Victorian Entomological Society, October 1969*

By J.C. le Soeuf

This word, which I regret to state I have now met for the first time, refers to the eating of insects, in other words insectivorous.

Although many of our forebears ate insects with relish, for some reason most of us rather look askance at the thought of eating them nowadays. I refer of course to those of European descent. There are still plenty of those who live in the less caloried parts of the world even today who, of necessity, eat and like various types of insects.

This is for the most part a "scissors and paste" article culled from Bodenheimer, Imms and Burr with some references from Norman Tindale and Ian Common.

Various writers have for centuries suggested that really there is not much reason for not eating insects as they are very much cleaner feeders than many of the present day sources of animal food.

Dealing firstly with moths we find that Pliny recorded that the epicures of Rome used to fatten a grub called *Cossus* on flour and wine. However there is some doubt that this was the larvae of *Cerambyx heros* one of the longicorn beetles. On the Australian scene we have the Witchetty grub, referred to by many writers both anthropologists and entomologists.

The Australian aboriginal had of necessity, to make use of any living thing that was not actually poisonous, to survive at all. This is why his attention was first drawn to this grub. The term witchetty grub belongs, I think, properly to the larva of the Cossid, although there seems to be some suggestion that it sometimes refers to longicorn beetle larvae as well. Cossid larvae tunnel in the branches and trunks of various trees and sometimes in the roots as well. They were either chopped out with axes or withdrawn with a witchetty hook if the hole were too deep.

Mr Jack Eastman, who spent his young days on the Edward River at Morago told me that the local blacks always look for the pink or red sawdust pushed out of the young river gums by the larvae as these would be cossid, while the yellow or white sawdust from the sapwood of the tree meant that the occupant was a longicorn larva which they did not like. Apparently they are quite common in some places as there is a reference to a bucketful being collected in quite a short time along the banks of the Cooper's Creek.



Bardee Grub Moth, *Trictena atripalpis*

The larvae of the hepialid, *Trictena*, is really relished by some aboriginals. They go to a lot of trouble following the hole down sometimes six feet just to get the grub at the bottom. Tindale described it as delicious, tasting like warm cream or the backed skin of pork. There is another writer who compares its taste to rice pudding enriched with eggs. There is one point

which should be remembered, when eating these raw take off the jaws first, they can give the tongue or lips a nasty nip.

Bogong moths have been mentioned as food of the Aborigines for many years. A note by Bennett in 1834 told of the moths collected in crevices in unbelievable numbers, the native making smother fires to suffocate them. To cook them a fire was made on cleared ground and when the earth was sufficiently hot the embers were scraped away and the moths heaped on the hot earth.



Bogong Moth, *Agrotis infusa*

They were stirred until the wings and down were removed. They were then winnowed and either eaten as they were or patted into rissoles of what appeared to be fat. These would last for a week or so, but if they were to be kept longer they were smoked. There was much vomiting at first, but the blacks soon got used to the new diet and fattened exceedingly on it. They assembled from all parts of the country for the feast. Five bushels of moths were gathered from one group of rocks.

In his paper on the Australian cutworms of the genus *Agrotis*, Ian Common states that large populations of the typical form of *A. infusa* migrate in the spring to the highlands of south eastern Australia where they aestivate in small cave and crevices in rock outcrops at altitudes above 4,000 feet. I have only personally seen them on Mt Macedon where they provide a bountiful food supply for more than twenty species of birds.

Caterpillars are mentioned in several places either eaten raw or, if they were hairy, with the hair singed off. One experimenter found that monkeys instinctively avoided aposematic caterpillars. Fried they were found to contain

258 calories. Here are a few suggested recipes for hungry entomologists. Fried soles with woodlouse sauce, Curried chafers, Friccasse of chicken with pupae. Boiled neck of mutton with moths on toast. Cauliflowers garnished with caterpillars and wireworm sauce. Wasp grubs fried in the comb. Gooseberry cream with sawflies.

Caterpillars are eaten in many countries, but what was described as the acme of economy was the eating of the silk-worm pupae after the silk of the cocoon had been used.

As far as beetles are concerned we have the scarab of the Nile valley. It was considered a good fattening food for the womenfolk in a land where rotundity was considered an asset. Churchyard beetles were used for the same purpose. They must have been really keen on their figures to eat these foul smelling insects.

In Mexico they make a deadly beverage of tiger-beetles and a caviare of water bugs is sold in the markets. The larvae of the large weevil *Rhyncophorus palmarum*, known as the palm worm is used extensively in the West Indies. It is roasted on a spit and as it heats is sprinkled with breadcrumbs, salt and pepper and served with orange juice. A tasty spread is also made from palm worms. In Australia we have the bardie grub, *Bardistus cibarius*, a longicorn found in the grass trees, a popular item of diet by both aborigines and settlers alike, in the early days.



Migratory Locust, *Locusta migratoria*

Locusts have been used as food for many centuries and I have no doubt are still available in the various eastern market places. It is recorded that Moses permitted the Children of Israel to eat them and they are frequently mentioned as food by early civilisations. The



world trade in locust flour in 1936 was 3,000 tons available in the Argentine for export as fertiliser. This would represent a fantastic number of grasshoppers. While in some places they are eaten raw in many instances they appear as a salted food capable of keeping for long periods. It would appear that if the legs with their horny spurs are eaten, there is likely to be intestinal blockage.

In their pursuit of knowledge, Dr. Howard and Prof. Riley, founders of economic entomology added cicadas to a stew for breakfast. They added a distinctive and not unpleasant flavour. When cooked in butter they tasted like shrimps. The Greeks also used them as hors d'oeuvre at banquets. They were at their best in the nymphal stage before the last moult. In the adult insect it was the females, full of eggs which were most sought after.

Termites have been widely used as food, in the Ivory Coast they were considered rejuvenating in the same class as tigers' whiskers and maral horns. There has been some research into their suitability as food. From the point of view of calories, it was found that alive they contained 347 and fried 508 calories. This compares well with beef at 127, dried salt fish 203, only being beaten by peanut oil with 598 calories. They were fried and dried in the sun twice before being eaten.



Sugarbag Bees, *Tetragonula carbonaria*, at the entrance to their hive

Honey has of course been a very important item of diet right back to our early ancestry. There are ants which gather honey occurring in both America and Australia. The abdomen is eaten like a strawberry and the rest being discarded. Green tree-ants were also eaten either raw or made into a refreshing drink.

Turning to less likely items of food we find that flies are quite important in some places. In the marshes of parts of America and Mexico, they were collected by the Indians and eaten. Apparently they have a strong smell of bad cheese and are specially sold in Lent. They are sometimes mixed with maize, made into cakes and baked. There are times when gnats appear in clouds on Lake Tanganyika, as they rest on the ground after flying across the lake, they are brushed up, made into flour and baked. Even dragon-flies are caught with bird-lime and their bodies fried with onions and shrimps.



Redgum Lerps, *Glycaspis* species

Lerps which sometimes appear in large numbers attacking the leaves of our gums, were eaten by the aborigines. As I mentioned before these people had of necessity to eat almost anything which happened to be available to them. In my early days of collecting I was a bit taken aback to learn from Norman Tindale that he had seen aboriginal children gathering skipper larvae for tucker.

Perhaps the most unexpected item of food from our point of view is that of eating lice and bed-bugs. Even today it would seem that they are eaten with some relish by some of the nomad tribes of Central Asia. It is the wife's happy duty when her lord has retired to run the seams of his clothes through her teeth cracking the bugs which hide there. If a native wishes to express his pleasure at meeting you, he takes your head in his lap and does a little "nitting" eating any animals he might find with gusto.

I am more than sorry that I cannot produce some of these delectable titbits but I feel that here is a matter which could easily form the basis of gastronomic research among our members.

## Articles of interest

### Beetles Beat Out Extinction

By Dena Smith

*Palaeontology and Archaeology, March 2015*

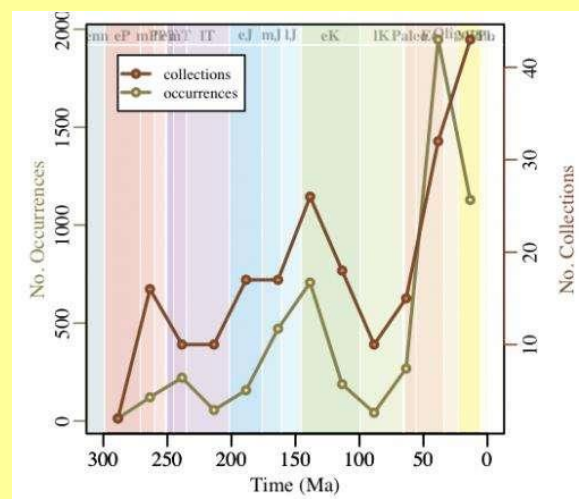
Today's rich variety of beetles may be due to an historically low extinction rate rather than a high rate of new species emerging, according to a new study. These findings were revealed by combing through the fossil record. "Much of the work to understand why beetles are diverse has really focused on what promotes speciation," says lead author Dena Smith, Curator of Invertebrate Paleontology and Associate Professor of Geological Sciences at the University of Colorado Museum of Natural History. "By looking at the fossil history of the group, we can see that extinction, or rather lack of extinction may be just as important, if not more important, than origination. Perhaps we should be focusing more on why beetles are so resistant to extinction." Smith's study with her coauthor, Jonathan Marcot, Research Assistant Professor of Animal Biology at the University of Illinois, will appear in the *Proceedings of the Royal Society B*.

To fully explore the evolution of the insect order, Coleoptera, Smith and Marcot used publications that document the fossil record of beetles from international literature as far back as the early 19th century and open access database projects including the EDNA Fossil Insect Database and the Catalogue of Fossil Coleoptera. The team constructed a database of 5,553 beetle species from 221 unique locations. Given the patchy nature of the data at the species level, they performed analyses at the family level and found that the majority of

families that are living today also preserved in the fossil record.

The study explores beetles as far back as their origins in the Permian period, 284 million years ago. When compared to the fossil record of other animal groups such as clams, corals, and vertebrates, beetles have among the lowest family-level extinction rates ever calculated. In fact, no known families in the largest beetle subgroup, Polyphaga, go extinct in their evolutionary history. The negligible beetle extinction rate is likely caused by their flexible diets, particularly in the Polyphaga, which include algae, plants, and other animals.

"There are several things about beetles that make them extremely flexible and able to adapt to changing situations," Smith says. She points to beetles' ability to metamorphose--a trait shared by many insects--when considering their environmental flexibility. Soft-bodied larvae vary greatly from winged, exoskeleton-ensconced adults. "This means that they can take advantage of very different types of habitats as a larva and then as an adult," she adds. "Adult beetles can be highly mobile and research that has focused on glacial-interglacial cycles has shown that they can move quickly in response to any climate fluctuations."



The study explores beetles as far back as their origins in the Permian period, 284 million years ago. Both authors emphasize that illustrating such a history would not have been possible without the fossil record--an often underutilized resource in exploring the evolution of insects.

"I think people have been hesitant to jump into studying insect fossils because there has been



the misperception that they are so fragile and rarely fossilize," Smith says. "I am hoping that this study demonstrates that the fossil record is quite good and can be used in many ways to study the evolution of this diverse and important group."

Marcot adds, "Not only have these groups gone un-studied, but there are certain things that we can learn from the fossil record that we just can't learn any place else."

Other insect groups might be similar to Coleoptera in terms of their extinction resistance, and Smith hopes that their work will inspire other entomologists to delve into the fossil record of their favorite insect. For now she is actively working to digitize more fossil specimens, paving the way for future studies to be conducted on a finer scale. The project, known as the Fossil Insect Collaborative and funded by the National Science Foundation, is expected to make available more than half a million fossil insect specimens from the major U.S. collections--many with associated images--in a searchable online database.

"Being a curator of a museum collection, I know that there are many species in our cabinets that have not yet been studied and described," Smith says. "Once we are able to bring those specimens out of the cabinets and make them more accessible to the broader research community, I think we will be able to look at species level patterns and other really interested questions about the macroevolutionary history of insect groups."

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## Cooperative Control

With the help of a virus that infects its prey's nervous system, a parasitoid wasp coerces a lady beetle to protect its young

By Sandhya Sekar  
*The Scientist*, February 2015

Twenty days after a fateful bite from a parasitoid wasp (*Dinocampus coccinellae*), a pre-pupa emerges from the bitten lady beetle (*Coleomegilla maculata*) and spins a cocoon between the beetle's six legs. Eventually, the beetle becomes immobile, twitching and

shaking at irregular intervals, grasping the wasp cocoon as if its own life depended on it. To force *C. maculata* into bodyguard duty for its young, the wasp is aided by a virus—*D. coccinellae* paralysis virus, or DcPV—that partially paralyzes the lady beetle, according to a study published today (February 10) in *Proceedings of the Royal Society B*.

Viral mediation of host-parasite interactions are nothing new. However, this study was the first to find "that a virus is involved in the behavioral manipulation by another parasite," said [Nolwenn Dheilly](#) of Stony Brook University in New York, who led the study.

Studying *C. maculate*-*D. coccinellae* interactions in the lab, Dheilly and her colleagues found that the onset of beetle behavioral modification occurred long after the bite and oviposition by the wasp. Moreover, once adult wasps emerged from the beetle-protected cocoons, the beetles recovered from the paralysis, resumed feeding, and even went on to reproduce. To tease apart competing hypotheses on this transient, behavior-modifying viral infection, Dheilly's team scanned the beetle, wasp, and DcPV genomes. The researchers stumbled upon an odd cluster of transcripts that appeared to come from the wasp yet were expressed in the beetle's head.



"At first I was suspicious," said Dheilly. "But then I got very excited when I realized all these transcripts were highly similar to picorna-like viruses of insects."

Picornaviruses are RNA viruses that can be pathogenic to animals and humans. Upon further examination of DcPV, the researchers determined it was related to Iflaviridae—a family of RNA viruses that infect insects—and designated it a new iflaviral species.

Using transmission electron microscopy (TEM) to observe extremely thin sections of wasp, the researchers found that cells lining the insect's oviduct were chock-full of DcPV. The researchers proposed that DcPV is transferred to wasp larvae through the insect's eggs. As eggs hatch and larvae develop, the virus replicates inside the larvae until the adult wasp emerges, carrying the full load from the larvae. They also proposed that DcPV is transmitted from wasp to beetle during the developing wasp's larval stage.

Once inside the beetle, the virus makes its way to the nervous tissues, accumulating maximally in the head. It induces a neuropathy that spreads to the entire nervous system, incapacitating the beetle and inducing the bodyguard behavior. "DcPV is employed as a biological weapon by *D. coccinellae* to manipulate the behaviour of *C. maculata*," the researchers wrote in their paper.

"[DcPV] plays an obvious role in host behavior manipulation, which is spectacular. But it is not known whether this manipulation is required for parasitism success," said Jean-Michel Drezen, who studies parasitoid viruses at the François Rabelais University in Tours, but was not involved in the study. "What is new in this paper is the fact that virus manipulation occurs and we know the mechanism."

The authors also found that, when the wasp larvae transmit virus the beetle, certain genes involved in the beetle antiviral immune response are downregulated. As DcPV accumulates in the beetle, the antiviral response slowly sets in, succeeding in eliminating the virus once the adult wasp leaves its cocoon.

The precise relationships between the host, parasite, and parasitoid virus remain to be determined, noted Sassan Asgari of the University of Queensland, Australia, who was not involved in the work.

"The most accepted hypothesis is that symbiotic viruses may have been a pathogen of the parasitoid's host or the parasitoid itself," said Asgari. "However, over time the virus has become 'domesticated' and established a benign symbiotic relationship with the wasps, in particular if the virus is vertically transmitted."

Eventually, he added, "the wasp maintains the virus in the population and propagates it, and the virus facilitates parasitism by interfering with the host development, immunity or behavior."

*N. Dheilly et al., "Who is the puppet master? Replication of a parasitic wasp-associated virus correlates with host behaviour manipulation," Proceedings of the Royal Society B, doi:10.1098/rspb.2014.2773, 2015.*

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## The 100 Million Year-old Piggyback

*Sciencesdaily.com, March 2015*

Scientists have uncovered the earliest fossilised evidence of an insect caring for its young. The findings, published in the journal *eLife*, push back the earliest direct evidence of insect brood care by more than 50 million years, to at least 100 million years ago when dinosaurs dominated the earth.

The new fossil is the only record of an adult female insect from the Mesozoic, an era that spanned roughly 180 million years. The Mesozoic era was the age of the reptiles and saw both the rise and fall of the dinosaurs, as well as the breakup of the supercontinent Pangaea.



The female ensign scale insect is preserved in a piece of amber retrieved from a mine in northern Myanmar (Burma). The specimen was trapped while carrying around 60 eggs and her first freshly hatched nymphs. The eggs and nymphs are encased in a wax-coated egg sac on the abdomen. This primitive form of brood care protects young nymphs from wet and dry



conditions and from natural enemies until they have acquired their own thin covering of wax.

The behaviour has been so successful for promoting the survival of offspring that it is still common in insects today. Young nymphs hatch inside the egg sac and remain there for a few days before emerging into the outside world.

The findings may even offer an explanation for the early diversification of scale insects. The emergence of flowering plants and ants are thought to have been crucial for the rapid evolution of many new insect species, but they were not yet present during the evolutionary history of the ensign scale insects.

"Brood care could have been an important driver for the early radiation of scale insects, which occurred during the end of the Jurassic or earliest Cretaceous period during the Mesozoic era," says lead author Bo Wang, an associate professor at the Chinese Academy of Sciences.

Fossilised evidence of animals caring for their young is extremely rare, especially in insects. Wingless females were largely immobile, so were less likely to be accidentally buried. A cockroach from a similar period was reported carrying a mass of eggs, but cockroaches often deposit their eggs rather than brooding them. The only other direct evidence of brood care is from Cenozoic ambers, the era that extends to the present and began about 65 million years ago with the extinction of the dinosaurs.

"Although analysis seemed to suggest that ancient insects evolved brood care, this is the first direct, unequivocal evidence for the fossil record," says Wang.

The team have named this new species *Wathondara kotejai* after the goddess of earth in Buddhist mythology and the late Polish entomologist Jan Koteja.

Professor Wang led the international team of scientists from the Chinese Academy of Sciences, the University of Bonn (Germany), the Natural History Museum (London), the University of Silesia, and the University of Gdansk (Poland).

## Australia: Riding on the Insect's Back

By David Yeats  
ANIC Director, CSIRO  
The Conversation, May 2015

As you may have spotted, the title of this article is a cheeky reference to the famous saying that Australia rides on the back of a particular woolly ruminant. The reference dates back to 1894, when the wool industry was one of the primary sources of Australia's prosperity.

Wool was our main export commodity from 1871 to the 1960s. For more than a century, the golden fleece drew pastoral workers and professionals to regional Australia, and sustained many a country town.

It is likely that most people would consider the native birds and animals in the farm shelterbelt to be the main source of agricultural biodiversity. However, the most diverse and important biodiversity is much smaller. And it's invertebrate.

Looking beneath the farmer's feet we would find countless insects and other invertebrates living out their lives, and in so doing providing services that we take freely and for granted.



### Beneficial bugs

While Australia long ago hopped off the sheep's back, insects and other invertebrates still do things that sustain our society. Yes, "sustain". In recent years, agricultural economists have put estimates on the values of some of these insect services to human society.

In one 2009 example, the total economic value of insect pollination of agricultural crops worldwide was A\$220 billion. A sizeable fraction of this pollination occurs in Australia by species such as the European honeybee, and many thousands of native bees and flies.

Insects are a bit like car keys, you only notice them when they are missing. During the mid noughties, honeybees died in large numbers in Europe and the United States, a phenomenon known as colony collapse disorder (CCD). The cause of CCD is complex and not yet fully understood.

But the effects were transparent. Profits from pollinated crops, such as almonds decreased. The prices of some foods increased significantly, because farmers had to pay more for disease-free bees, often importing them from CCD-free Australia.



Another good example is the service that introduced dung beetles provide. Australia's cattle herd was estimated at 30 million in the 1970s, each animal producing 10 pats per day, covering over 2.5 million hectares of pasture each year.

Millions of bush flies (*Musca vetustissima*) also bred in the dung. Overseas these dung pats would have been recycled into soil nutrients by the local dung beetles that buried small chunks of the dung in the soil to rear their young. However, Australia's native dung beetles are adapted to feed on and bury dry, fibrous marsupial dung, and avoid the much more moist cattle dung.

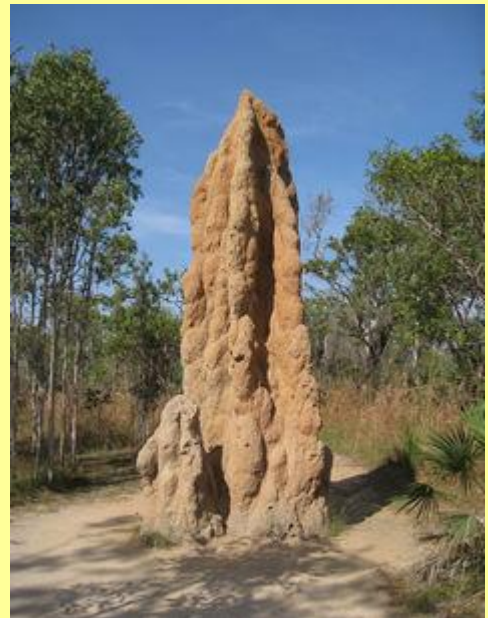
CSIRO introduced dung beetles from Europe and Africa in the 1970s and 1980s that buried cattle dung underground so that it became a

fertiliser for use by grass and other plants. The burrowing activity of the beetles also aerated the soil. And it also provided another important service: controlling the bush fly plague by removing and burying the dung that bush flies were breeding in.

Australia's outdoor café owners probably don't know it, but they owe at least part of their clientele to the silent work of introduced dung beetles working tirelessly in the agricultural districts surrounding our cities, once the source of most of our bush flies.

#### Great engineers

We often have an ambiguous relationship with insects, entire groups are prejudiced because of a few pest species. Termites are an excellent case in point. In most cases we only think of the damage they can do to timber in buildings.



But termites are in fact great soil engineers. They play a key role in the functioning of many tropical and subtropical landscapes, such as those found over much of northern Australia. They decompose wood and grass, and they are also social creatures, living in great colonies that sometimes produce a characteristic mound. Their region of influence in the soil is termed the termitosphere, and this is where termites are busy nutrifying, aerating, moistening and mixing the soil.

Termites are small but numerous, and their biomass can exceed 50 grams per square metre, much greater than mammalian browsers in the same environments. Because termite



mounds are intense, crowded insect cities full of life, growth, decomposition, waste and death, soil nutrient levels are much higher around them – up to seven times higher in one Australian example.

Termite excavations move soil around between layers, and create tiny holes in the soil that allow air and moisture to infiltrate. Termites modify many soil characteristics, improving and increasing the productivity of soils, and they do this free of charge over much of northern Australia. Overall, the positive benefits of the termitosphere are far greater than the costs.

#### Hidden biodiversity

With insects being such a valuable resource, and part of the natural heritage of a first world country such as Australia, you would think that we had a good handle on our insect diversity.

The reality is very different. We have only managed to catalogue around 25% of our insect biodiversity at species level. The remaining 75% cannot be managed well because we don't have the basic information required such as what it is, where it occurs, and what it does.

For example, there are around 260 named termite species in Australia, but this represents less than half the total number, and many of these unnamed species are represented in CSIRO's Australian National Insect Collection. Imagine trying to manage a library without knowing how many books you had on hand, and what they were about.

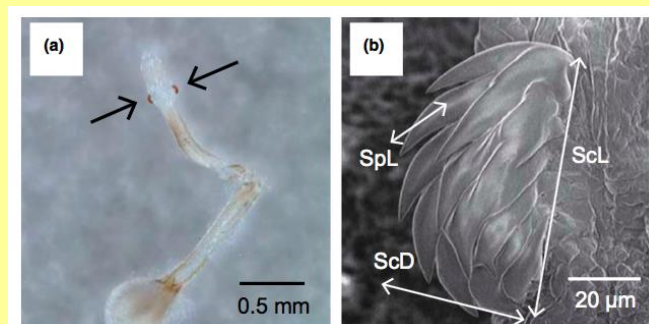
In other areas such as medicine and physics we have learnt the importance of small things: germs, atoms, chemical molecules etc. We gain knowledge in these areas by reducing the system to its basic components and working on the properties of these parts and their interactions.

But in biodiversity science we are still trying to understand and manage ecosystems with only a basic knowledge of a subset of the biological components in the system. Australian ecosystems ride on the insect's back, and we would be better off economically, socially and environmentally if we invested more in understanding our insect fauna.

## Interspecies Competition in Insects Won by Penis Spikiness

By Diane Kelly  
Gizmodo Australia

Insects with nightmarish spiky penises that can harm their mates are really nothing new. But a new study in the *Journal of Evolutionary Biology* has determined that given the right conditions, wielding a nightmarish spiky penis could also harm a *different* species.



The study, led by Daisuke Kyogoku at Kyoto University in Japan, used the spiky penises of two closely related species of seed beetle to test a biological concept called *reproductive interference*. The idea suggests that when two closely related species live in the same place, courtship and sex can sometimes get a little *confusing*. If males from one species court and mate with females from the other species, the mistake may keep either one of the pair from having babies.

The effect of those missing offspring, over the long haul, may help drive the two species apart. It could make them even more different in appearance, it could push apart the calls they use for courtship, or it could let one species outcompete the other one.

Kyogoku's experiment tested whether genital differences could affect competition. The seed beetles they used don't actually live in the same place: *Callosobruchus maculatus* infests cowpeas in Africa, *Callosobruchus chinensis* infests adzuki beans in Asia, so the experiment was something of a theoretical exercise.

Cowpea weevils seem to be better at grabbing food and egg laying sites than adzuki bean weevils, but when both species are housed together in the lab, the cowpea weevils die out. Kyogoku determined that the die-out was the



result of reproductive interference between the two species. The interference, in this case, was the adzuki bean weevil's elongated penile spines.

All male *Callosobruchus* beetles have spiny penises, and eagerly mate with *any* female they run across, regardless of species. Female beetles typically evolve defences to the spikes on males of their own species. But when the researchers examined the effect of cross-species copulation, they found that female cowpea weevils that mated with adzuki bean males had visibly damaged genitalia and were unable to lay eggs even when they were already full of cowpea weevil sperm. Penile spines, the authors conclude, could help drive species apart.

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## A Bug's Life. Museum Victoria's Strangest Insects Come Out to Play

*By Chloe Booker  
The Age, May 2015*

It was all about the bug's life on Sunday at Museum Victoria.

Science on Show saw its most rare and fascinating specimens come out from behind the scene as part of its International Museums Day celebrations.

These included a butterfly collected in China in 1742, which the oldest non-fossilised natural history specimen in any Australian collection.

The museum's scientists were there to explain the stories behind the items and discuss the varied work they do with the collection.

Experts and collections in the fields on palaeontology, marine biology, herpetology, birds and mammals, entomology, live exhibits and mineralogy were included.

The palaeontology department exhibited two items for the first time in Australia. One of these was the skull of a mosasaur, a giant sea-going relative of the goanna that features prominently in the new Jurassic World film.



A Rainforest Mantid (*Heirodula majuscula*), feeding on a House Cricket (*Acheta domestica*). Photo: Paul Jeffers, The Age

Entomologists explained how a 30 centimetre long centipede managed to survive on a diet of bats.

Meanwhile, the mammalogy department staff discussed their research into Victoria's endangered species, including the state's animal emblem, the Leadbeater's possum.



Catherine Andrews, wife of Premier Daniel Andrews, holds a Thorny Devil, natural enemy of the small black ant. Photo: Paul Jeffers, The Age

## Conferences

XXV International Congress of Entomology  
Orlando, Florida, USA  
25-30 September, 2016

### **Entomology without Borders**

Over 300 symposia were submitted from around the world to be considered for the ICE 2016 program, and they are currently being reviewed by the ICE Section Co-conveners. Watch for announcements of final symposia selections to be made next month.

### **New Video Captures the Excitement of ICE 2016**

A new promotional video highlighting the benefits of participating in this exciting event has just been released. The promotional video can be seen here:

<http://ice2016orlando.org/about/promote-ice/promo-video/>

In addition, we encourage you to check out the many other ways that you can help promote the Congress.

### **Announcing \$50,000 in Travel Funding for Students and Early Professionals.**

The Entomological Society of America (ESA) is pleased to announce a travel funding competition to support global participation in ICE 2016 by non-U.S. students and scientists transitioning into the early years of their careers. Sponsored by ESA's Student Transition and Early Professionals Committee (STEP), the competition will award a total of \$50,000 to 25-30 participants to support their travel to ICE 2016, along with complimentary registration for the Congress. Awards will be based on criteria such as the scope and importance of the applicant's research to be presented at the Congress, how the applicant's attendance and participation at the Congress will benefit his or her professional development and the science of entomology, and how the applicant's attendance will contribute to the diversity of attendees at ICE 2016. Eligibility requirements and further details may be found at [C:\Users\Steve\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\AOUUD31A\at http://ice2016orlando.org/esas-student-transition-and-early-professionals-committee-step-travel-funding-competition-for-ice-2016/](http://ice2016orlando.org/esas-student-transition-and-early-professionals-committee-step-travel-funding-competition-for-ice-2016/)

Deadline for submissions is midnight (U.S. Eastern Time), September 1, 2015.

### **Call for Student Debates Teams**

Students are encouraged to showcase their public speaking skills before an engaged international audience during the Congress! All debate team participants will also author a short summary of their position in the Entomological Society of America's publication, *American Entomologist*. Debate teams will be composed of 4-5 individuals from multiple universities, and teams may be composed of individuals from a single country (e.g., Canada) or members from a region (e.g., Team Europe, Team Central America, etc.). Debate teams will be accepted on a first-come, first-served basis. Each debate will be preceded by an introductory speaker (unaffiliated with either team) who will give a 5 minute presentation before the debates and write an introduction for the *American Entomologist* publication. This provides another opportunity to become involved in the debates! Debate topics are on the website. To register a team or for questions about the Debates, contact: [ICE2016studentdebates@gmail.com](mailto:ICE2016studentdebates@gmail.com)

### **Showcase your Products or Services to an Engaged Global Audience through an Exhibit or Sponsorship**

Reach a global audience of over 6,000 entomological scientists and other experts during the Congress where you can build your brand awareness on a global scale, market your top products and services to a focused audience, make new client contacts and cultivate future sales, all while networking and building partnerships. Don't delay—contract now to secure the best booth placement in the hall and best sponsor opportunities.

<http://ice2016orlando.org/exhibits-sponsors/>

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### **Australian Entomological Society Up North and to Asia Beyond**

On behalf of the Conference Chair, Stephen Cameron, and the Organising Committee we invite you to attend the 46<sup>th</sup> AGM and Scientific Conference of the Australian Entomological Society.

The Conference will be held at the Pullman Hotel in Cairns, Far North Queensland, from Sunday 27 to Wednesday 30 September 2015.

**Details** are available on the website <http://www.aesconferences.com.au/>

**Registration and accommodation:** Open  
**Call for abstracts:** open now. Deadline for submissions of abstracts is 31 July 2015.  
**Expression of interest:** available on website.

**Society of Australian Systematic Biologists**  
Invertebrate Biodiversity and Conservation Conference.

New Generation-Next Generation

**When:** 6-9 December 2015

**Where:** The Esplanade Hotel, Fremantle

**Website:** <http://www.sasb2015.org>

**2015 Society of Systematic Biology**  
conference

**When:** June 26–30, 2015

**Where:** Casa Grande Hotel Resort, Guarujá, Brazil

**Website:** <http://www.evolution2015.org/>

**Society for Molecular Biology and Evolution**

**When:** July 12-16, 2015

**Where:** Hofburg Palace, Vienna, Austria

**Website:** <http://smbe2015.at/>

**15th Congress of the European Society for Evolutionary Biology (ESEB)**

**When:** August 10–14, 2015

**Where:** University of Lausanne, Lausanne, Switzerland

**Website:** <http://www3.unil.ch/wpmu/eseb2015/>

**6<sup>th</sup> International Barcode of Life Conference**

**When:** August 18-20, 2015

**Where:** University of Guelph, Guelph, Canada

**Website:**

<http://dnabarcodes2015.org/Entomology>

**Entomology 2015**

Joint Entomology Society of America (ESA), American Society of Agronomy (ASA), the Crop Science Society of America (CSSA) and the Soil Science Society of America (SSSA) conference.

**When:** 15-18 November 2015

**Where:** Minneapolis, Minnesota, USA

**Website:**

<http://www.entsoc.org/entomology2015>

**XVIII. International Plant Protection Congress (IPPC) 2015**

Mission possible: food for all through appropriate plant protection

**When:** 24-27 August 2015

**Where:** Free University Berlin  
14195 Berlin-Dahlem/Germany

**Website:** [www.ippc2015.de](http://www.ippc2015.de)

**Society of Systematic Biology Conference**

**When:** 26-30 June 2015

**Where:** Guarujá, Brazil

**Website:** <http://systbio.org/>

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*Around the Societies*

**The Society for Insect Studies**

Next Meeting: Tuesday 9 June 2015

7.30 pm, Australian Museum

**Topic**

*Allen Sundholm: Recent Entomological Encounters in Australia*

Allen has been a member of this society since its formation, and of its earlier incarnation, the Entomological Section of the Royal Zoological Society of N.S.W. since the 1960's when he began to take an interest in entomology at the age of 15. His interests are mainly with Lepidoptera and Coleoptera, and this has taken him to many parts of Australia, New Zealand, and several countries in Asia. He has photographed many species of beetles alive, many of which had never been photographed alive before. He is on record as having played the major hand in the early 1980's to save from clearing a vast area of Australia's bushland in south-western Australia, some 3 million hectares, an area of mallee, mallee-heath and woodland where many species of Buprestidae (Coleoptera) occur. Allen has combined his entomological travels with a long term survey of the insects he is interested in, beginning in 1979. During this time he has discovered or co-discovered over 30 species of beetles, including 4 species of Buprestidae that have been named in his honour. Allen will be presenting another of his 'entomological slide shows' of imagery resulting from recent research field trips to various parts of Australia. The imagery comprises a mixture of the people he travelled with, the places he visited to find the insects he is researching, and close-ups of some of the insects he managed to find. Most of the close-ups are of live specimens of Australia's beautiful Buprestidae (jewel beetles), some of which have never been photographed alive before.

Not to be missed!



## Entomological Society of Queensland

Next meeting: Tuesday 9 June

Seminar Room, EcoSciences Precinct

### Topic

*Systematics and ecology of the Australian gall-inducing insect genus Cystococcus*

presented by Tom Semple

School of Biological Sciences, University of Queensland, Brisbane, QLD, Australia

Australia is full of bizarre and beautiful insects, some of which definitely fall at the bizarre end of the scale. Despite having no discernible head or appendages, *Cystococcus* has proven to be a fascinating subject for study. This genus comprises gall-inducing scale insects that feed and live exclusively on bloodwood eucalypts. Females spend their entire adult lives inside the galls they induce, and appear to have lost the ability to move, along with legs and everything else. In a remarkable display of intersexual phoresy, immature females are dispersed from their maternal gall by hitching a ride on their much larger, winged brothers. As part of his Honours project, Tom Semple described a third, novel species - *Cystococcus* sp. nov. "*brissi*" using morphological and molecular data. Phylogenetic analysis also revealed geographically structured variation within existing species, suggesting the possibility of additional, morphologically cryptic species. Tom is a student from Lyn Cook's lab at the University of Queensland, and he is this year's ESQ Student Award winner. After graduating halfway through 2014, Tom has continued his work on *Cystococcus* in the Cook lab (and enjoyed every minute of it). However, keen for a cold change, he has recently accepted a PhD position at ANU and will be moving to Canberra later in June.

### Other 2015 dates

**August 11:** Valerie Debus – Boring into borer ecology: patterns of damage and potential drivers in eucalypt plantations

**September 8:** Max Moulds

**October 13:** Mark Schutze – Tephritid taxonomy: new solutions for old problems

**November 10:** David Yeates – Perkins Memorial Lecture: "New phylogenomic perspectives on insect evolution from transcriptome sequencing"

**December 8:** Notes & Exhibits/Christmas BBQ

## Butterfly Conservation South Australia

Dear Member,

This is to remind you that Butterfly Conservation SA has its next public talk Tuesday 2nd June.

The speaker is Associate Professor David Paton AM from the University of Adelaide, who will talk about "Woodland recovery initiative: Restoring habitat for Woodland birds". David is the leader of the Woodland Recovery Initiative project and team. Hear about this important project and work being undertaken to secure biodiversity in the Mt Lofty region.

**Where:** 6:30 pm start and should be finished by 8:30p (including supper)

The Clarence Park Community Centre  
72-74 East Avenue, Black Forest.

Bus route W91/W90: stop 10.

Noarlunga Train service: Clarence Park Station.  
Glenelg Tram: Forestville stop 4, 9min walk south.

**Cost:** Entry by donation (minimum of \$2).  
Bring supper to share, tea/coffee will be supplied.

At the start of the meeting there will be a ten minute presentation on a 'Butterfly of the Month' given by a BCSA committee member.

John Wilson

Treasurer and Membership Officer  
Butterfly Conservation SA Inc.

Phone (618) 8271 3231

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## Butterflies and Other Invertebrates Club

### Planning and General Meeting

**What:** Our planning meetings are informative and interesting. As well as planning our activities we share lots of information. All members are welcome as this activity is also a general meeting of members. Following the meeting we will be walking through the bushland adjacent to the centre.

If you have ideas about invertebrate activities in your area, please come along to the meeting. We would love to hear your suggestions.

**When:** 8th August, 2015 from 9.30 am

**Where:** Downfall Creek Bushland Centre, 815 Rode Road, McDowall, Qld

**Who:** All members are welcome

**RSVP:** Marie-Louise on 0422 970 184 or email nabad@aapt.net.au

*2015 Native Flower Show & Plants Market*

**What:** We will have a display at this event. This show had previously been called the SGAP Spring Flower Show. This year's theme is "Native Gardens are for Wildlife too!"

**When:** 15th and 16th August, 2015

**Where:** Brisbane Botanic Gardens, Mt Coot-tha

#### *Moth Day*

**What:** Looking at the moth family Anthelidae - there will be a formal talk on the History of the Anthelidae with notes on separating out some species. The talk will be followed by participants putting names on specimens in their collections or their photographs, so bring your Anthelidae specimens and photos. For those who wish to stay there will be a BBQ and a light trap in the evening. Bring your own meat - salad and extras will be provided.

**When:** Saturday 22nd August - gather at 1pm – the talk will start at 1.15pm sharp

**Where:** At Peter and Beverley Hendry's place at Sheldon, Redland City, Qld

**Who:** All members are welcome.

**RSVP:** Phone 3206 0048 to book a place - address and directions will be provided

#### **ESV Council:**

<i>President</i>	Patrick Honan
<i>Vice President &amp; Excursion Secretary</i>	Peter Carwardine
<i>Hon Secretary</i>	Vacant
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	Vivienne Curle
<i>Councillors</i>	Peter Lillywhite
	Maik Fiedel
	Steve Curle



Contributions to the ESV newsletter are always welcome.

Contact the President, Patrick Honan, at [phonan@museum.vic.gov.au](mailto:phonan@museum.vic.gov.au)

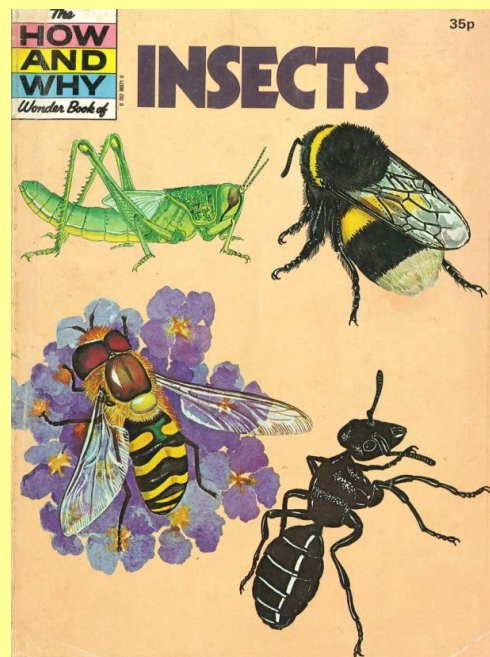
#### **Book Review**

#### **The How and Why Wonder Book of Insects**

*By Robert Gooden*

*Published by Transworld Publishers, London*

Review by Patrick Honan



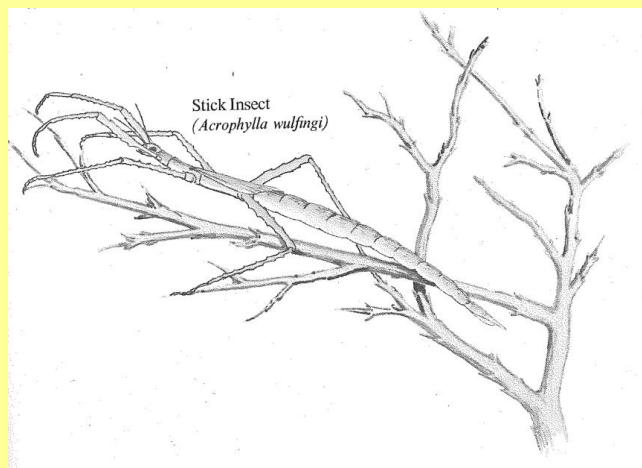
"Insects are an eternal source of interest, beauty, amazement and inspiration. There can be hardly anything more beautiful than the delicate and multicoloured butterflies, their multitude of shapes and their iridescent colours. The peculiarity of form, exaggerated beyond belief in giant chunky beetles or bugs with their eyes at the end of extended stalks, cannot fail to fascinate." So begins the introduction to this edition in the How and Why Wonder Book series, published in 1975, and probably my first ever book on insects.

The cover reads 35p, revealing the book's English origins, with 65c scratched in pencil inside the front cover (these days they sell for about \$10 each on eBay). There were 74 Wonder Books published from 1960 into the 1970s, 'Insects' being the seventh in the UK series, which mirrored the US version at about the same time. Every book contained exactly 48 pages, and many were translated into German under the title 'Was Ist was'.

As an introduction to the world of insects for a budding entomophile, it did an excellent job. Most entomologists, amateur or otherwise, remember their early books with great fondness, marvelling at the pictures of bizarre species from darkest Africa, Asia and South America, as well as species commonly found in our own backyards (in this case British backyards).

Like many of my early insect books, this copy has my drawings and scrawls in the margins, pictures carefully cut out, and notes typed on a now-extinct Olivetti typewriter slotted into the pages. In those days, insect books were few and far between, particularly Australian insect books. Although Tillyard and others (see previous ESV Newsletters) were producing marvellously detailed books on Australian insects since the 1920s and even earlier, they were clearly directed at the adult entomologist – the How and Why Wonder Books targeted the demographic between these tomes and the pre-school generic animal books.

Many of the drawings in this book are simple and not particularly useful for identification. The picture of *Acrophylla wulfingi*, for example (see below), could equally describe more than half the 150 or so Australian stick insect species.



In this the 40th year of its publication, the contents of this book stand up well, covering topics such as insect structure, taxonomy, abundance, defensive devices, the relationship between insects and humans, and keeping, preserving and observing insects.

Insect husbandry has improved significantly in the intervening period, but the principles are all there in this book: "Most insects need food and

attention every day...Proper attention and absolute hygiene are essential and cannot be overstressed." These days an enormous range of enclosures are available for invertebrates, even in Australia, but when this book was published the suggested enclosures revolved around the glass tank and the discarded shirt box. Anti-mould additives for soft food, such as Nippagen, recommended for fruit fly food in the insect care section, are still being used today.

Interestingly, the recommended method for sourcing insects – "The most convenient way of obtaining stocks of living insects is by buying them" – has only been a reliable or even possible method in Australia for less than a decade.

Of the dozens of insect species from around the world depicted in this book, only two or three could be considered Australian, and many of the scientific names have changed and the common names have become archaic. And much of the book is a nightmare to the pedantic entomologist – scientific names are misspelt or not italicised, trivial names are missing or capitalised. But this criticism would probably not be noticed by your average five year old entomophile.



'Katydid' is originally an American name, based on the 'Katy did, Katy didn't' call of the 'Common True Katydid', *Pterophylla camellifolia*, in New York State. But before the 1750s even in the US this group of insects were still known as grasshoppers. The term 'katydid' is now universal, but apparently in the 1970s Tettigoniids

were still referred to as 'grasshoppers' in the UK.

In addition to Gooden's obvious admiration and appreciation of insects, scattered through the book are reassuring tips about conserving them: "When you collect insects do not take specimens you do not really want. It is



unnecessarily wasteful to kill a moth, only to find it has a chunk out of its wing and it has to be thrown away.”

The audience for the How and Why Wonder Books were ‘young people’, but this book includes many rather complex words (eg unimaginable, conglomeration, magnitude) as well as technical terms (eg tympanum, ganglia, trachaeoles (sic) and venation). These days children’s book are graded by reading level, with accepted terms that can be included or excluded depending on the accepted wisdom for each level – ‘Insects’ has a mixture of words and concepts that would fail on most reading levels.

Other entomological editions in this series were ‘Butterflies and Moths’, and ‘Ants and Bees’, both groups to which a budding entomologist can relate. Many people remember ‘The Very Hungry Caterpillar’ as their first insect book, which is still popular today and has developed a second life as a parody on T-shirts.



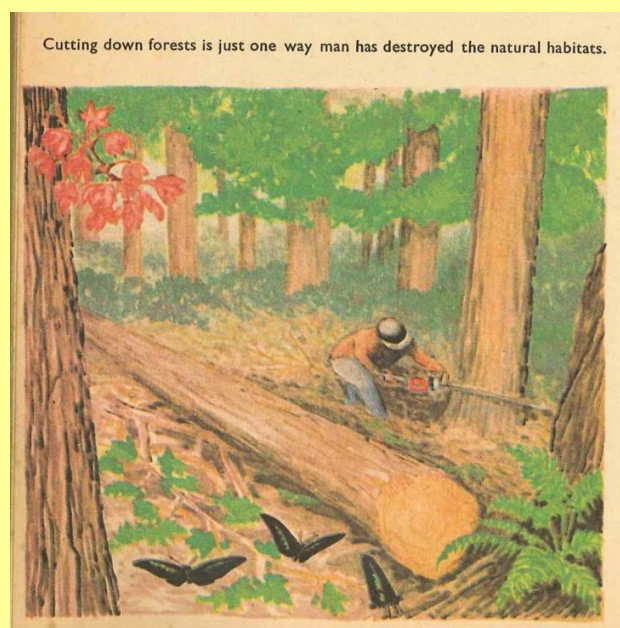
Dr Maurice Burton, Curator at the British Museum of Natural History from 1927 to 1948, also wrote a series of books that had an impact on naturalists of a certain age. He published 28 natural history books but the one that stood out was ‘Encyclopaedia of Insects and Arachnids’, also 1975, which for many years was the best source of information on insects and spiders available in many Australian regional libraries.

In the final section of ‘The How and Why Wonder Book of Insects’, on “The Effects of Insects on Man”, Gooden outlines all the ways humans benefit from them – honey, beauty, the

balance of nature, scientific and medical knowledge, and design ideas. Some of his comments are prescient, others as yet unfulfilled but reflecting the concerns of the 1970s – “Silk has for centuries been produced by the Silkworm and provided the finest cloth available. We may yet depend on this again if shortage of oil prevents sufficient manufacture of man-made fibre”.

Gooden expands on ideas of biomimicry (without using the term), that are still in vogue today. “Did the Dragonfly have nothing to do with the development of the helicopter? A good many ideas and lines of enquiry have stemmed from what we learn from insects and I have no doubt that we have yet a great deal more to discover from them”.

He finishes on a salutary and still relevant note, given it was written more than 40 years ago: “Conservation of habitats and wildlife has started a few decades on the late side and we have to catch up a good deal...”



But the criticisms outlined here are minor compared to the many happy hours I spent gazing at the pictures and imagining the creatures in real life. A far greater range of insect books are available for young entomophiles today, each much more relevant and informative than this one, but I think most people remember their first book(s) with enduring fondness.

Contributions to the ESV Newsletter and Bulletin are always welcome. Contact: Patrick Honan [president@entsocvic.org.au](mailto:president@entsocvic.org.au)