

# Victorian Entomologist



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News Bulletin of The Entomological Society of Victoria Inc.

# THE ENTOMOLOGICAL SOCIETY OF VICTORIA (Inc)

## MEMBERSHIP

Any person with an interest in entomology shall be eligible for Ordinary membership. Members of the Society include professional, amateur and student entomologists, all of whom receive the Society's News Bulletin, the Victorian Entomologist.

### OBJECTIVES

The aims of the Society are:

- (a) to stimulate the scientific study and discussion of all aspects of entomology,
- (b) to gather, disseminate and record knowledge of all identifiable Australian insect species,
- (c) to compile a comprehensive list of all Victorian insect species,
- (d) to bring together in a congenial but scientific atmosphere all persons interested in entomology.

### MEETINGS

The Society's meetings are held at the Activity Room Ground Floor, Museum Victoria, Carlton Gardens, Melway reference Map 43 K5 at 7:45 p.m. on the third Tuesday of even months, with the exception of the December meeting which is held earlier in the month. Lectures by guest speakers or members are a feature of many meetings at which there is ample opportunity for informal discussion between members with similar interests. Forums are also conducted by members on their own particular interest so that others may participate in discussions.

### SUBSCRIPTIONS

Ordinary Member	\$35	
Overseas Member with printed bulletin		\$65
Country Member	\$31 (Over 100 km from GPO Melbourne)	
Student Member	\$23	
Electronic (only)	\$20	
Associate Member	\$ 7 (No News Bulletin)	
Institution	\$40(overseas Institutions \$80)	

Associate Members, resident at the same address as, and being immediate relatives of an ordinary Member, do not automatically receive the Society's publications but in all other respects rank as ordinary Members.

**LIFE MEMBERS: P. Carwardine, D. Dobrosak, I. Endersby, R. Field, T. New, K. Walker.**

**Cover and logo design** by Ray Besserdin 2017

**Cover photo:** *Delta bicinctum* pair still at their overnight roost in Warby-Ovens National Park, Peechelba East. Photo by Reiner Richter. See article on pp. 51.

**Minutes of Entomological Society of Victoria**  
**ANNUAL GENERAL MEETING and general meeting**  
**Tuesday 16 April 2019 19:45 Melbourne Museum**

**Attendance:** Ross Field, Linda Rogan, Anthony Kurek, Daniel Kurek, Ben Kurek, Josh Grubb, Julia McCoey, Ian Endersby, Lyn Meredith, Carol Page, Francesco Martoni, Stuart Lay, Maik Fiedel, Martin Lagerwey, Frank Pierce, Sharon Mason and Peter Marriott.

**Guests:** Aimee McKinnon, John V. Lenagan, Michaela Kuen.

**Apologies:** Ray Besserdin, Robin Sharp, Peter Carwardine.

**Opening Item:** Peter Marriott welcomed all to the meeting and introduced Ross Field, the speaker. Ross has been a member of the Entomological Society of Victoria since 1972. He is also the author of *Butterflies Identification and life history*.

His topic was “**Monarch migration in North America:**” See p. 47.

**Michaela Kuen**, honours student from Monash University gave a brief and enthusiastic presentation of her research project and requested help from members in acquiring the necessary insects.

**President's report:** While no formal report was presented, Peter wanted to express his pleasure in seeing the Society progress to its present level with such a diversity of ages including many enthusiastic young people. Ian was thanked for his many additional contributions over a long time. Peter expressed his admiration of the friendly and enthusiastic committee and their contributions.

**Previous AGM minutes:** Annual General Meeting 17 April 2018 as printed in VE June 2018 Vol. 48 no. 3 p.45

Moved: Martin Lagerwey                      Seconded: Josh Grubb

**Financial report:**

Presented as per VE April 2019 p. 42-43.

Associations Incorporation Reform Act (2013) a copy of Schedule 1, Re. 15 Form 1 signed by two council members was presented and the Submission of financial statements to annual general meeting was signed by Julia McCoey.

Moved: Josh Grubb

Seconded: Peter Marriott

**Editor's report:**

The ongoing assistance with proof-reading by Ian Endersby and Carol Page make the Bulletin much better than it would be without this help. So thank you Ian and Carol. The efforts of Ray Besserdin who addresses and posts the printed Bulletins are also greatly appreciated.

I thank all contributors to the Bulletin this past year allowing us to cover a wide range of taxa including moths and butterflies, beetles, bees and wasps and even spiders. The new contributors are particularly welcomed. This includes the sustained and well reported effort of 22 nights of light trapping by new member Daniel Kurek.

Also thanks go to those who present at members' nights and general meetings as these are also important contributions to the Bulletins.

I strongly encourage all members to contribute over the coming year so that the Bulletin can continue to reflect the diverse interests and skills of our membership. Contributions can range from short snippets, observations and photos up to scientific articles. Please let me know what ideas you have for future contributions.

**Election of council and officers:**

As retiring president, Peter Marriott declared all offices vacant.

As only one nomination for each of the following was received, they were all declared elected:

President: Julia McCoey

Secretary: Lyn Meredith



Newly elected President Julia McCoeoy with other members at the April AGM.  
Photo Carol Page

Treasurer: Josh Grubb

Editor: Linda Rogan

As there were fewer than eight nominations for Council, the following were declared elected: returning councillors were Maik Fiedel, Peter Carwardine, Ray Besserdin and new councillors welcomed were Sharon Mason and Martin Lagerwey. Peter Marriott now serves as immediate past president.

### AGM concluded and General meeting opened

Peter Marriott handed over to new president Julia McCoeoy.

Linda Rogan rose to express heartfelt thanks to Peter Marriott for his many years serving as president and in so many other important capacities for the Society.

**March Mantis Month** – Julia showed some photos of the mantises reported by members via facebook. The most commonly spotted was the false garden mantis, *Pseudomantis albofimbriata*. Multiple *Orthodera ministralis* were also spotted. Other species seen were the Australian Stick Mantis, *Archimantis latistyla*, and the Purple-winged Mantis, *Tenodera australasiae*. Thanks to all who contributed their photos.

Due to time limitations business from the general meeting was deferred to the next general meeting.

**Next meetings are listed on the back cover of the Bulletin.**

Meeting closed.



Andrew Arnold, in Ballarat, sent in this photo of *Orthodera ministralis* making a meal of *Heteronympha merope merope* first removing its head and then devouring its body while clasping the prey with its tarsal spines.

**It will take more than a wall to stop these immigrants!  
Monarch migration in North America**



Clusters of Monarchs at the reserve.

Ross began by inviting us to share his experience of one of the world's greatest natural wonders involving invertebrates; the migration of the monarch butterflies.

Ross and his wife Petrina were lucky to be participants on one of the last tours led by Dr Thomas Emmel. Thomas was a founding director of the McGuire Center for Lepidoptera & Biodiversity but, sadly, is recently deceased.

A short video by Ross and Petrina showed marvellous clusters of monarchs in the cool of the morning later exploding into flight, filling the air with butterflies. Also shown was a short video from National Geographic. This highlighted how the butterflies can freeze to death where (illegal) logging has opened the adjacent forest. The intact forest has a blanketing effect and is less prone to frost. Although illegal logging has largely stopped, half the forests have already been cleared and land owners get only small compensation to offset the income that would come from logging.

Ross pointed out that there are three main populations with separate over-wintering sites:

The Mexican population is the largest with 14 known sites and these butterflies are derived from breeding areas east of the Rocky Mountains,

The California population, including the Pismo Beach colony, derives from breeding areas west of the Rocky Mountains, The Florida populations derive from breeding areas in southeast of the United State and they mix with local populations which remain reproductive.

In the US there was an awareness of monarch migrations in the 1940s and some reserves were established as early as 1960s. However the over-wintering sites of the vast

majority of monarchs remained a mystery until 2 January 1975. That day Catalina Aguado and her then husband Ken Brugger found a large roosting site in Oyamel forest after an extensive period of self-funded searching. They had been spurred into the search by Norah and Fred Urquhart who later covered some expenses after Aguado and Brugger's find. The location was kept secret but clues included in the cover story for National Geographic in August 1976 resulted in the re-finding and revelation of the site to the wider world by Dr Bill Calvert and John Christian in collaboration with Dr Lincoln Brower in 1977.



Dr Ross Field at the entrance to the El Rosario Monarch Reserve



Ross' tour visited the El Rosario and the Sierra Chincua sites in Mexico. The entry fees (about \$2.60 US) were minimal and included a walk through a pathway lined with tourist stalls, then the option of a 45 minute hill climb or a horse ride for \$5 to the actual overwintering sites. Being with Dr Emmel allowed a slightly closer approach to the clusters.



Colourful tourist stall along the pathway at El Rosario

The monarch mating amongst the overwintering generation (butterflies that matured in the previous September – November) occurs in late February and the butterflies begin leaving their over-wintering sites in late February/early March. They head north into Texas, where egg laying occurs and the first generation develops on the spring flush of milkweed. Northern movement of new generations of monarchs continues through the summer with breeding eventually occurring in south-eastern Canada. The butterflies returning to Mexico will be three generations removed from the previous migrating monarchs.

Although monarch numbers remain high there has been a reduction to less than 30% in the size of overwintering colonies compared to the mid 1990s (Table 1).

The main causes of population decline include logging in the Oyamel forests (largely stopped now), decline in milkweed plants in agricultural fields which is due to the use of glyphosate spraying of genetically modified crops and dry conditions caused by global warming which reduces milkweed growth.

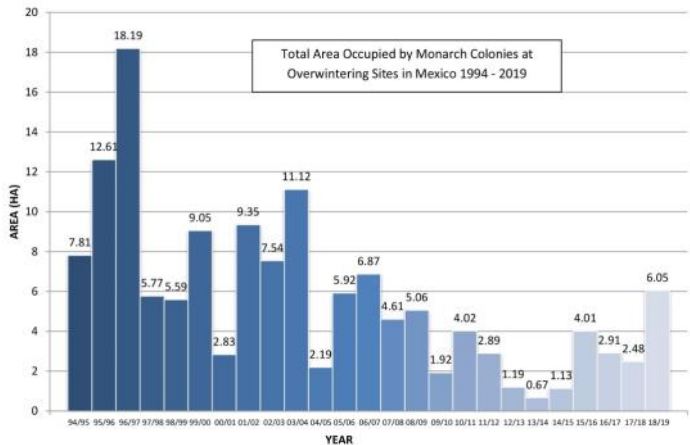


Table 1

Ross also took the opportunity to visit the largest over-wintering site in California which is at Pismo Beach. This site is free to enter and well managed by volunteers.

Ross finished by noting that the decision about the listing of the monarch butterfly *Danaus plexippus plexippus* by the US Fish and Wildlife Service is to be made in June 2019.

Thanks to Ross for sharing this incredible experience with us.

## Minutes of the Entomological Society of Victoria Council Meeting Tuesday 21 May 2019 Melbourne Museum

**Attendance:** Julia McCoey, Martin Lagerwey, Lyn Meredith, Linda Rogan, Peter Marriott, Peter Carwardine, Maik Fiedel, Sharon Mason

**Apologies:** Joshua Grubb, Ray Besserdin

Our newly elected council President Julia opened the meeting with a reminder of the EntSocVic objectives and purpose. She thanked Peter M for his copious past service to the society and for continuing on the council and then welcomed new council members enthusiastically.

**Previous minutes:** Minutes of the EntSocVic Council 19 March as printed in VE49 no.2 p. 40.  
M: Peter Marriott/ S: Martin Lagerwey

**Treasurer's report:** Treasurer was an apology for this meeting.

**Editor's report:** Members reminded the closing date for Bulletin articles is the third Friday of January, March, May, June, July, September and November. The editor thanked all contributors to the bulletin allowing us to cover a wide range of taxa. All new contributors are particularly welcomed including new members Daniel and Anthony Kurek.

Next year will start volume 50 of the *Victorian Entomologist*. Some historical material will be included whenever space allows.

All members are urged to contribute to the *Victorian Entomologist* so the diverse interest and skills of our membership will be reflected. Contributions can range from short snippets, observations and photos up to scientific articles. Please let the editor know what ideas you have for future contributions. Linda will be an apology for the July Council and possibly August general meeting.

### **General Business:**

**Future meetings:** Ideas for future speakers include orchid pollinators, peacock spiders *Maratus* sp. Other ideas are being followed up. The August excursion will be indoors at the Museum live exhibits. The website will be updated accordingly. Members are encouraged to share ideas about speakers and excursions with council. Lyn to ask Yarran Dheran Nature Park for end of year excursion potential.

**Officers and Council for 2019:** Martin Lagerwey was invited by Linda Rogan to serve as our Vice President as per our constitution. Martin accepted. Councillors are happy to note that all offices on the Council are now filled.

M: Linda Rogan S: Peter Marriot.

Council will be providing a short bio of each council member in future 2019 Bulletins.

**Great Otway National Park Lepidoptera book:** Peter M distributed the book of the moth bio scan that occurred in 2018 and 2019. 800 species are in the book with a full index. Publication will be sold for \$5 for non-members and be free to our members. Peter thanked the Museum for the finances to print this book.

**Website:** Josh Lagerwey is continuing as the webmaster – thankyou Josh. Julia suggested that council develop a new council role as society media officer. This could create a solid base for the future maintenance of facebook, twitter and website. Creating a new council role that is to be elected would need to be addressed in the 2020/21 AGM.

(Continued on page 68)

## The wasp that ate the caterpillar – stories of research, and a call for help!

Erinn Peta Fagan-Jeffries <[erinn.fagan-jeffries@adelaide.edu.au](mailto:erinn.fagan-jeffries@adelaide.edu.au)>

When I started my PhD a few years ago, studying tiny black wasps, I'm not sure what I thought the most exciting parts would be... jet-setting off to conferences, maybe? Publishing my first scientific paper? Finally submitting my thesis? Whatever I thought back then, I certainly never dreamt the most exciting part of my research would be waiting for the postman to deliver packages to my little office at Adelaide University.

I'm a postdoctoral researcher, and I work on a subfamily of parasitoid wasps called the Microgastrinae. Parasitoids are a particular style of parasites that generally kill their hosts to complete their lifecycle (unlike, say, head lice – which may go through multiple generations on the same host). These wasps are very small (around 3 mm long), and generally black or brown in colour, although a few species sport rather dashing orange legs or markings. The group is incredibly diverse – global estimates of species richness reach 40,000 potential species, with only around 2,700 described. In Australia, we have about 120 described species, but this is likely only a fraction of the true diversity. Due to their rather small size and cryptic morphology (it's very hard to find characters that reliably tell species apart), they haven't been well studied. Add to this a general lack of taxonomic knowledge of parasitoid wasps in Australia (I could count on one hand the number of employed taxonomists working on wasps in the country) and you've got a super diverse group of animals just waiting to be explored and better understood.

All species of wasps in the subfamily parasitise caterpillars; normally, the female wasps oviposit into early instar lepidopteran larvae, and the wasp larvae then hatch out inside and slowly consume the flesh of the caterpillar. They can remain inside munching away for several instars of the caterpillar before they chew their way out, form their



Cocoons of the wasp *Cotesia urabae* near the dead caterpillar hosts, *Uraba lugens* (the gum-leaf skeletoniser)



A microgastrine wasp (*Cotesia glomerata*) sitting on top of a bunch of cocoons. Photo taken by James Dorey (who you may know from his fantastic 'Bees of Australia: A Photographic Exploration' book!)

own cocoons and eventually emerge as adult wasps. Some species are solitary (=one egg per caterpillar) and others are gregarious (=many eggs per caterpillar). I've seen clusters of literally hundreds of microgastrine cocoons that have come out of one caterpillar!

If you are rearing caterpillars in the future and have wasp parasitoids emerge, or you're connected to a school or community group who may wish to be involved in a malaise trap project which I am developing, please contact me at [erinn.fagan-jeffries@adelaide.edu.au](mailto:erinn.fagan-jeffries@adelaide.edu.au).



## Wasp Observations in Northern Victoria

Reiner Richter reiner@rnriid.au

In vol.49 no.2, I discussed some dragonfly observations from trips to the lower Ovens River and the Murray River downstream of Yarrawonga in summer 2018-2019. This article will cover wasps from these trips.

At some locations where there is tall grass I have seen numerous insects including wasps, roosting. Although they sleep in other spots they are quite easy to spot against the pale grass. Common species included the Orchid Dupe or Dusky-winged Ichneumonid *Lissopimpla excelsa* (Figure 1). Males of this species are attracted to *Cryptostylis* sp. orchids that emit the same pheromones as the female wasps and pollination occurs by pseudocopulation. There are many other species in the Ichneumonidae family with males and females usually not appearing significantly different (apart from an often long ovipositor in some of these species) but on these trips only a few were seen.

Many female insects have a long ovipositor at the end of their bodies which is used to lay their eggs into something (such as larvae or pupae in the case of wasps). Some wasps are capable of inflicting a painful sting in us humans – these are usually species that hunt living creatures which must be disabled quickly. It is worth remembering only female wasps can sting as this is with a modified ovipositor. What they catch is actually food for their larva as the adult wasps in most species feed on flowers, which is where they are most often observed during the day (but photographing them there while busy feeding is more challenging).

A well known wasp family are the Spider Wasps



Figure 1. Ichneumonidae  
*Lissopimpla excelsa*  
Miepoll.



Figure 2. Pompilidae *Ferreola handschini*  
Miepoll.

(Pompilidae). Some of these get quite large (ones that prey on huntsman spiders) and many sport some orange coloration as a warning to potential predators to indicate they can have a nasty sting (I know, I accidentally stood on one during these trips). A fairly commonly encountered species was *Ferreola handschini*, which is mostly black with unusual orange “shoulders” (so is at least relatively easy to identify) (Figure 2).

Wasps in the family Crabronidae hunt other insects, including catching flies in flight, so they are often very swift and agile flyers, and are also similarly hasty when feeding at flowers. They can feature vivid yellow eyes and among the more well known are the *Bembix*



Figure 3. Crabronidae *Bembix* sp.  
Burramine.



Figure 4. Bembicinae subfamily  
Burramine.

sand wasps, a genus with about 90 species in Australia. These dig nesting chambers in sand, when it is often easiest to photograph them. The second sand wasp pictured was a lot smaller (Figures 3, 4).

Probably the family containing the most familiar wasps (including the invasive European Wasp) is Vespidae, which includes Potter Wasp (Eumeninae) and Paper Wasp (Polistinae) sub-families (among others). The bulletin cover features *Delta bicinctum*, a not uncommon potter wasp but I had never seen a pair together. These were photographed in the morning where they had roosted in the grass overnight but they were already starting to get fidgety with my big black camera pointing at them.



Figure 5. Vespidae *Deuterodiscoelius* sp.  
Eldorado.

Smaller but with a similar waist (petiole) to *Delta*, the attractive black and yellow *Deuterodiscoelius* species is not one I've seen before and one that hasn't been photographed much (Figure 5). It too was in the morning before it had warmed up. Also pictured are two black potter wasps with differing amounts of orange at the end of the abdomen but that otherwise look quite similar to each other (Figures 7, 8).



Figures 7, 8. Two Vespidae in the Eumeninae subfamily Burramine.



Figure 9. Vespidae *Polistes erythrinus* Burramine.

Paper wasps build honeycomb nests hanging from vegetation, rock overhangs and artificial structures. *Polistes humilis* is widespread and common in south-eastern Australia (including Melbourne) but inland I also found *Polistes erythrinus* (Figure 9), which is dark brown and significantly larger.

The family Sphecidae goes by several common names including Thread-waisted Wasps. This includes the Slender Mud-daubers of which two species are relatively abundant in Victoria. *Sceliphron laetum* (Figure 10) is generally more yellow than *Sceliphron formosum* (Figure 11) (especially the antennae) and they have different patterns on their back.



Figure 10. Sphecidae *Sceliphron laetum*  
Burramine.



Figure 11. Sphecidae *Sceliphron formosum*  
Peechelba East.



Figure 12. Thynnidae sp. mating pair  
Burramine

Another family are Thynnid Wasps (Thynnidae) (Figures 12, 13, 14) where the females are wingless as they spend most of their time burrowing underground looking for insect larvae to host their offspring. The sting of these is said to be quite painful. Probably the most well known is the so called Blue Ant but there are many more species. Members show significant sexual dimorphism, the female is usually significantly smaller than the male and many males take them to the flowers for feeding. One in this family that I thought I saw quite often was a black one with yellow mouth parts however when I started to collate some images for this article I realised there were at least two species. One has dark legs and black shaded wings while the other has red legs and reddish wings (Figure 14). Before I noticed this I usually just photographed the first one at a site and therefore may have missed the other species (so I now pay more attention). Thynnid Wasps used to be grouped as a subfamily under Flower Wasps (Tiphidae). Many males in this family are tricked into mating with orchids that emit the same pheromone as the female wasp.





Figure 13. Thynnid wasp  
Beechworth



Figure 14. Thynnid wasp, red legs and wings  
Peechelba East

Both sexes in at least most Flower Wasps are winged, as are those of the similar family Scoliididae. Particularly inland I have regularly encountered the 15mm long (body length) males of the Yellow Flower Wasp *Radumeris tasmaniensis* but less commonly the quite large female (Figures 15, 16). Both of them appear amazingly hairy. Males are also tricked into mating by the deceptive *Calochilus campestris* beard-orchid.



Figures 15-16. Thynnidae *Radumeris tasmaniensis* female left male right  
Burramine.

So many different wasps, Australia has thousands of species. I saw perhaps a few dozen so one wonders where all the others are hiding. Many of these wasps are difficult to identify. I am only able to get to family with most of them. If any reader is expert enough to identify more, it will be appreciated. A lot probably look very similar and be distinguished by concealed microscopic features.

For all the observations I records during these three trips have a look at the following iNaturalist project which I created for them and identify any observations if you can:  
<https://www.inaturalist.org/projects/rr-2019a>



# Moth fauna (Lepidoptera) near Wye River, Victoria; comparison between an unburnt site and a site burnt in a wildfire

Marilyn Hewish, Peter Marriott, Cathy Powers, Ken Harris, David Mules and Dean Hewish

## SUMMARY

Surveys were conducted comparing the moth fauna at an unburnt site and a site burnt in a wildfire approximately three years previously (25 December 2015) near Wye River. The sites showed differences in species and family composition. There was greater species diversity in the family Geometridae at the burnt site than at the unburnt site. More Oecophoridae species were found at the unburnt site but the difference between sites was less marked. Though the study was limited in scope, it suggests that the food-plants of moth larvae play a role in determining the response to fire at the three-year point. Moth species with foliage-feeding larvae may be attracted to the dense, eucalypt sapling regrowth observed at the burnt site (e.g. moths in the family Geometridae and the Helena Gum-moth Saturniidae *Opodiphthera helena*). Litter-feeding species may be reduced until the litter layer builds up (e.g. family Oecophoridae). Surveys at additional sites and longer term studies starting soon after a wildfire are needed to confirm and extend these findings.

## INTRODUCTION

A series of Bioscan biodiversity surveys has been conducted by Museums Victoria (MV) and Parks Victoria (PV) in various Victorian National Parks since 2011. As part of this programme, Lepidoptera survey teams from the Entomological Society of Victoria have carried out intensive moth and butterfly surveys. These surveys have produced important information on Lepidoptera, particularly moths, including new species for the state and significant range extensions (e.g. Hewish et al., 2014a).

Bioscan surveys were conducted in the Great Otway National Park over spring 2018 and summer 2019. The first Lepidoptera surveys were held on 29 and 30 October 2018. During preparatory discussions, PV Rangers Katrina Lovett and Jani Demetrious suggested that it would be interesting to compare moth fauna at an unburnt site and a site burnt in the December 2015 Wye River wildfire. The Rangers chose the sites: a forest easement off Grey River Road west of Kennett River (unburnt) (Figures 1, 2) and Bird Track through forest west of Wye River (burnt) (Figure 3).

As far as we know, this is the first time such a comparison, focussing on moths, has been made in Victoria. The study was necessarily limited in scope, restricted to two nights by time constraints. Moth surveys were conducted on the nights of 29/30 and 30/31 October 2018.

## METHODS

### Light-traps

Light traps (250W mercury vapour lights shining on vertical white sheets and a Hitachi 8-watt long-wave ultraviolet light on a smaller sheet) were used to attract moths on two nights: 29/30 Oct. and 30/31 Oct. 2018. The light traps were set up at dusk, checked through the night and early morning and shut down at sunrise. Each moth species was photographed. Where possible, significant specimens were collected and lodged as voucher specimens in the Museums Victoria Entomology collection.

On the first night, 29/30 October 2018, one team surveyed the unburnt site and another team the burnt site. On the second night, the teams swapped sites. Thus each site had two surveys on consecutive nights, each conducted by a different team.

Using this method, a species list for each site could be made. Quantitative results on numbers of individuals of each species could not be obtained, because of the high numbers of moths,

movement over the sheets and, probably, movement away and back again. However numbers were estimated for the large and conspicuous Helena Gum Moth *Opodiphthe-  
ra helena*.

### Sites

Apart from their fire history, the sites were chosen to be similar in habitat and aspect. The wildfire passed through the burnt site on 25 December 2015, and so the surveys were conducted approximately three years after the fire.

#### Unburnt site, Grey River Road

(lat. -38.674520° long. 143.845620°) This was a ridge easement bordered by forest with a dense and varied understorey. The sheets were oriented roughly north-west and north, facing downslope. Surveys were done using two mercury vapour lights and one ultraviolet light on 29/30 Oct. 2018 (P. Marriott, K. Harris, D. Mules) and one mercury vapour light on 30/31 Oct. 2018 (M. Hewish, C. Powers, D. Hewish).

#### Burnt site, Bird Track (3-year succession)

(lat. -38.639680° long. 143.882750°) This was a ridge track bordered by forest with an understorey dominated by a dense regrowth of eucalypt saplings of even age (three years).

Visual observations indicated that the numbers and variety of other shrubby plants was reduced, crowded out by the eucalypts. The sheets were oriented roughly north-west, facing downslope. Surveys were done using one mercury vapour light on 29/30 Oct. 2018 (M. Hewish, C. Powers, D. Hewish) and two mercury vapour lights and one ultraviolet light on 30/31 Oct. 2018 (P. Marriott, K. Harris, D. Mules).



Figure 1. Unburnt open forest along Grey River Road

### Identifying the species photographed and collected

Species lists were made for each individual survey. Only species identified to at least generic level were used in the analysis.

If species had been previously encountered by the authors, they could be found among more than 1000 species covered in the *Moths of Victoria* (MoV) book series (Hewish et al., 2014b, 2016; Kallies et al., 2015; Marriott, 2011, 2012a, 2012b, 2015; Marriott et al., 2017) or among Victorian moth photographs in a personal computer database maintained by P. Marriott (more than 2900 species). For unrecognised species, searches were mounted in the Museums Victoria collection and the Australian National Insect Collection (ANIC; through E.D. Edwards, reference photographs taken by the authors, and the CSIRO/ANIC website Australian Moths Online). Other sources used were reference books (Common, 1990, 1994, 1997, 2000; Horak and Komai, 2006; Matthews, 1999; Robinson and Nielsen, 1993) and reputable internet sites (e.g. Australian Moths Online; Atlas of Living Australia; BOLDSYSTEMS Public Data Portal; BOLD SYSTEMS Taxonomy Browser).

Peter Marriott and Cathy Powers co-ordinated the identification process. Nomenclature follows the Australian Faunal Directory website (AFD).

## Analysis

For site comparison, the species lists in consecutive surveys at each site were combined. This compensated for the differing numbers and types of light traps, observer differences and variation in weather on the two nights. Because of the limited sampling, no statistical analysis was justified (R. Marchant, pers. comm.).

## RESULTS

### Species diversity

The burnt site had a higher number of species over two nights (132) than the unburnt site (113).

### Site overlap and specificity

The combined species count for all four surveys (unburnt and burnt) over two nights was 175. Of these, 70 species were detected at both sites (40%), 43 at the unburnt site only (25%) and 62 at the burnt site only (35%).

### Family composition at unburnt and burnt sites

Table 1 shows the numbers of species recorded in each Lepidoptera family, comparing the unburnt and burnt sites. No marked difference was detected in the numbers of Lepidoptera families recorded at the unburnt site (21) and the burnt site (23).

Most families were represented by only a few species and differences are hard to discern.

However there was greater species diversity in the family Geometridae at the burnt site (42 species). At the unburnt site, there were only 27 species of Geometridae. In confirmation, geometrid moths made up a moderately high proportion of the species unique to the burnt site (20 species, 32%). There were many fewer geometrid moths among the species unique to the unburnt site (5 species, 12%).

The 20 geometrid species found exclusively at the burnt site were:

- subfamily Ennominae, *Didymoctenia exsuperata*, *Ectropis calida*, *Nisista serrata*, *Nisista* undescribed species sp. (2) and (4) (number codes from MoV Book 5), *Psilosticha attackta*, *Scioglyptis chionomera*;
- subfamily Larentiinae, *Chloroclystis filata*, *Chloroclystis metallospora*, *Epicyme rubropunctaria*, *Eucymatoge scotodes*, *Microdes* species (4) and (5) (MoV3), *Xanthorhoe anaspila*;
- subfamily Sterrhinae, *Scopula optivata*, *Idaea proleta*;
- subfamily Geometrinae, *Heliomystis electrica*, *Maxates* sp. (1) (MoV4), *Prasinocyma semicrocea*;
- subfamily Oenochrominae, *Gastrophora henricaria*.

A small difference can also be seen in the family Oecophoridae, though in this family there were more species at the unburnt site (27) than at the burnt site (21). Oecophorid moths made up a moderately high proportion of the species unique to the unburnt site (17 species, 40%). There were fewer Oecophorid species unique to the burnt site (11 species, 18%).

The 17 oecophorid species found exclusively at the unburnt site were:

- subfamily Oecophorinae, (*Leptosaces*) *schistopa*, *Acanthodela erythrosema*, *Arachnographa micrastella*, *Atheropla decaspila*, *Atheropla* undescribed species, *Barea semicausta*, *Heliocausta oecophorella*, *Oxythecta lygrosema*, *Pellopsis aerodes*, *Philobota archepepa*, *Phloeocetis* undescribed species, *Thema endesma*, *Thema stasiastica*, *Tortricopsis pyroptis*;
- subfamily Stenommatinae, *Agriophara* undescribed species;
- subfamily Stathmopodinae, *Stathmopoda melanochra*;
- subfamily Xyloryctinae, *Telecrates melanochrysa*.



Figure 2. Varied shrub layer in unburnt forest, Grey River Road



Figure 3. Dense eucalypt regeneration, burnt forest, Bird Track





Figure 4. Geometrid species found only in burnt woodland, *Heliomystis electrica*.



Figure 5. Geometrid species found only in burnt woodland, *Scioglyptis chionomera*.



Figure 6. Geometrid species found only in burnt woodland, *Nisista* sp. (2) (species code from MoV Part 5).

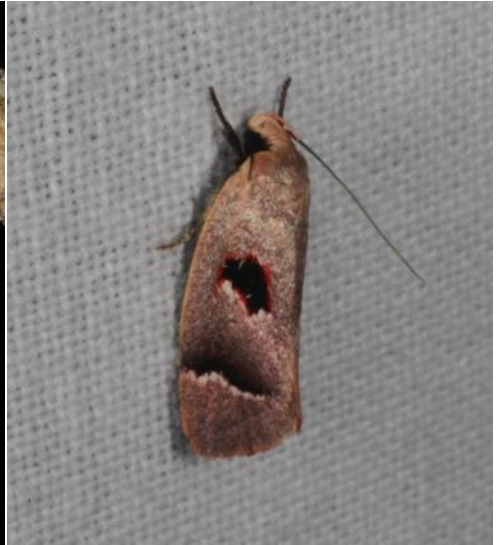


Figure 7. Oecophorid species found only in unburnt woodland, *Acanthodela erythrosema*.



<b>FAMILY</b>	<b>Species at unburnt site</b>	<b>Species at burnt site</b>
Tineidae	1	1
Gracillariidae	1	1
Yponomeutidae		1
Plutellidae	1	1
Oecophoridae	27	21
Depressariidae	1	1
Elastichidae	1	1
Cosmopterigidae	2	2
Gelechiidae	3	1
Cossidae	2	1
Tortricidae	6	10
Pterophoridae	1	1
Thyrididae		1
Pyralidae	2	6
Crambidae	2	5
Geometridae	27	42
Lasiocampidae	2	2
Anthelidae	1	3
Saturniidae	1	1
Notodontidae	3	2
Nolidae	5	3
Erebidae	15	15
Noctuidae	9	10

**Table 1: Number of species in each Lepidoptera family**

**Helena Gum-moth *Opodiphthera helena***

Over two nights, the numbers of Helena Gum-moths at the light-traps differed at the two sites: up to seven on one sheet at one time at the burnt site but no more than two at the unburnt site.

**DISCUSSION**

Though limited in scope, these surveys produced promising preliminary results. They indicate that a future, longer term study into the effects of wildfire on moth populations is warranted.

Species and family diversity were high at both the unburnt and burnt sites, indicating that the burnt area was of value for the moth fauna three years after the wildfire. Surveys earlier in the succession, before regrowth, would presumably show few moth species. Some moths may pass through. However, they would be unlikely to become established as there would be limited food sources for larvae, and few sheltered and concealed sites for egg-laying and resting of larvae and adults. Subsequently, as regeneration progresses, surveys could follow the recovery.

The higher number of species overall at the burnt site may seem surprising. This increased diversity largely reflected the higher numbers of species in the family Geometridae. Though the Bird Track site was called the “burnt site”, it was three years since the Wye River fire. The woodland was recovering, with a dense and extensive regrowth of sapling eucalypts. In the first few years of regrowth after fire, there are additional food sources available to insects, including moth larvae, in epicormic growth and sapling regrowth, providing softer foliage for feeding.

The results suggest that there are differences in species composition at the two sites as there was only 40% overlap. It is reasonable to assume that some of the 43 species unique to the unburnt site would have been present at the burnt site before the fire, but the habitat post-fire is no longer suitable for them. Similarly, some of the 62 species unique to the burnt site may have come into the area to take advantage of favourable changes in habitat and/or food supply.

The most striking difference between the unburnt and burnt sites was the number of species in the family Geometridae: 27 and 42 respectively. In assessing the suitability of the environment for different moth species, it is probably more important to consider the needs of the larvae than the adults, as a species can become established in an area only when breeding occurs. The larvae require suitable food-plants. Some can use many food sources; others are more selective. Larvae of many Geometridae species are foliage-feeders (Common, 1990; Hewish et al., 2014b, 2016; Marriott, 2011, 2012b). The food-plants used by some of the 20 species of Geometridae unique to the burnt woodland are known. Many of these feed on eucalypt and/or wattle foliage, especially new growth (*D. exsuperata*, *G. henricara*, *H. electrica*, *N. serrata* and *P. semicrocea*) (Common, 1990; Hewish et al., 2014b, 2016; Marriott, 2012b). In woodland regenerating after fire, the extensive, epicormic growth and dense stands of eucalypt saplings provide ample food. The young, soft foliage may attract females about to lay eggs because it provides suitable food for their larvae.

Like many Geometridae species, Helena Gum-moths (*O. helena*) larvae also feed on eucalypt foliage (Marriott, 2012a). More individual Gum-moths were found at the burnt site than the unburnt site. They may also be taking advantage of young, eucalypt regrowth.

There was a small difference in the numbers of Oecophoridae species, with more at the unburnt site (27) than the burnt site (21). This may or may not indicate a real difference. Only a more extensive study can tell. However, it is of interest as many Oecophoridae species are associated with eucalypt forests and woodlands, where the larvae feed in leaf litter. There are several litter-feeding species among the oecophorid genera unique to the unburnt woodland: for instance, *Thema* species, *Philobota* species and *Stathmopoda* species (Common, 1990). In a severe wildfire, litter would be destroyed, along with the larvae living in it. As leaf litter builds up during regeneration, Oecophoridae would presumably return. This may be a slow process. The litter layer may build up only when the foliage cover is extensive and the dense sapling regrowth has thinned out. Litter-feeding Oecophoridae larvae are important in recycling nutrients and maintaining forest health. They also prevent the excessive build-up of leaf litter, thus reducing the intensity of fires (Zborowski and Edwards, 2007).

It would be worth carrying out further studies to see if there are any changes at the burnt site in numbers of species in the family Erebidae subfamily Arctiinae tribe Lithosiini: eight species at the unburnt site and five at the burnt site. Many Lithosiini species are lichen feeders (Common, 1990; Marriott, 2015). Lichens are slow growing. If surveys are repeated at these sites in years to come, it would be interesting to see if lichen regrowth correlates with increasing numbers of Lithosiini species.

There is much to be discovered about the life histories of many Victorian moths, particularly their food-plants. There is valuable information in Common (1990) and McFarland (1979). Stephen Williams from Eppalock, Victoria, is conducting a study of life histories, many of which have been published in the *Victorian Entomologist* (e.g. Williams, 2012) and the *Moths of Victoria* field guides (Hewish et al. 2014a, 2016; Kallies et al, 2015; Marriott, 2011, 2012a, 2012b, 2015; Marriott et al., 2017). Further work will assist in interpreting future studies on moths and fire.

Our study suggests that the diversity of foliage-feeding species in the family Geometridae increased in the burnt woodland because of changes in habitat. The recovery from wildfire may bring about fundamental changes in the suite of species and families over time. The recovery may not develop as a simple increase in numbers of the species present before the fire. Presumably the species composition will come to resemble that of the unburnt woodland at some future point in the succession.

The species lists from the Wye River surveys are an incomplete representation of the moth fauna at those sites. They were compiled over only two nights. Many Lepidoptera species have restricted flight times and the suite of species present differs at different times of year. Surveys at other times of year may confirm the differences we noted between the unburnt and burnt sites and reveal others.

Though this study was very limited in scope, it produced intriguing results and avenues for speculation and further work. It indicated that further, more detailed studies on the effect of wildfires on moth populations would be worthwhile, preferably beginning as soon as possible after the fire and continuing for several years.

## ACKNOWLEDGMENTS

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- the pre-survey and field organisers of the Bioscan, Genefor Walker-Smith (MV), Jani Demetrious (PV) and Katrina Lovett (PV) for access, assistance and valuable support throughout the study
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- Axel Kallies and Ted Edwards for assistance with identification
- Stephen Williams for information on larval food-plants
- Richard Marchant for advice on data analysis
- and Museums Victoria and the ANIC, Canberra (CSIRO), for access to their reference collections, and the Curators, Collection Managers and Honorary Fellows, Ken Walker, Peter Lillywhite and Catriona McPhee (MV) and Ted (E.D) Edwards and Marianne Horak (ANIC) for their generous assistance.

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All photos, M. Hewish

## A Brief Overview of the Mistletoe Moth (*Comocrus behri*)

Anthony Kurek, anthonykurek@gmail.com

### Introduction

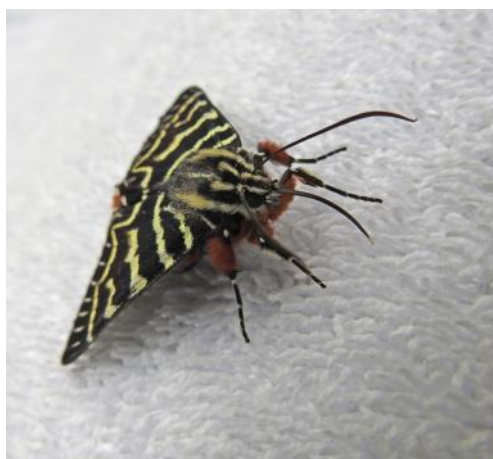
On a recent road trip to Wollongong in January 2018, my two sons and I stopped overnight in Holbrook, NSW. I remember that day because it was so hot, 40 °C, and we couldn't wait to try out the pool at the hotel. Following our swim the towels were hung outside to dry and that's when we had a visitor: a Mistletoe Moth. The photos we took were uploaded to the iNaturalist website after we got home, and then the moth was forgotten.

Our interest in moths really started at the end of 2018, following the end of year trip with the Victorian Entomological Society to Organ Pipes National Park. While organising all our moth photos on our home computer, I remembered our encounter with the Mistletoe Moth in Holbrook and realised it had been our first-ever moth photo. I was moved to write a short article about the Mistletoe Moth and the person who first described it back in 1847.

### The Mistletoe Moth

The Mistletoe Moth (*Comocrus behri*) is a large diurnal moth of the Noctuidae family that is native to Australia. It was first described by George French Angas in 1847. It can be found throughout mainland Australia and is common in southern regions, but has been observed as far north as the Cobourg Peninsula in the Northern Territory and Mackay in Queensland, and as far west as Exmouth in Western Australia (ALA a).

Adult moths have a black body with orange stripes underneath and a scarlet tuft at the end of their abdomen. Their wings are black with five strong white bands across the forewings. Between the outer line and the edge of the wing are seven white lines following the veins. They have a wingspan between 5-7 cm, with the females being larger than the males. Their legs are black and have white rings along their length (Marriot, 2016; Herbison-Evans, 2019). Males display what is known as 'hill topping' behaviour, where they fly to the highest spot on the landscape so that females know to congregate there for mating (CSIRO, 2019). Adult moths are most commonly seen in summer (Marriot, 2016). They feed on *Eucalyptus* sp. flowers' nectar and can be seen during the day hovering around mistletoe species such as *Amyema miquelii*, *Amyema melaleucae* and *Amyema cambagei* growing on Casuarina and Eucalyptus trees (ALA a).



Figures 1, 2. Mistletoe Moth *Cocomus behri* photos by Daniel Kurek





Figure 3. Mistletoe Moth *Comocrus behri* caterpillar Photo Peter Marriott

Mistletoe Moth caterpillars are black with numerous white spots and stripes, and grow up to 6 cm in length. The head, legs and tail of the caterpillars are orange, and they have a pair of red protuberances on the back towards the tail end. When disturbed, the caterpillars are observed to rear up, lifting their head and thorax (Marriot, 2016; Herbison-Evans, 2019).

There is another moth that looks very similar to and is sometimes mistaken for the Mistletoe Moth. This moth is the Grapevine Moth (*Phalaenoides glyciniae*). Like the Mistletoe Moth, the Grapevine Moth is also day-flying (diurnal), with adults having black fore wings crossed by a bold white or cream stripe and black rear wings with a thin white margin. The body of the moth is predominantly black, with red stripes around the abdomen and a red tuft at the tip. The wingspan can be up to 5 cm (ALA b).



Figure 4. Mistletoe Moth *Comocrus behri*-  
Photo Daniel Kurek



Figure 5. Grapevine Moth *Phalaenoides glyciniae*-  
Photo Donald Hobern

## Who Was George French Angas?

George French Angas (1822-1886) was a naturalist and painter who was born on the 25th April 1822 in Newcastle upon Tyne, England. He was the fourth child and eldest son of a prominent merchant and banker George Fife Angas and his wife, Rosetta French. He was educated at Tavistock Grammar School in Devon where he showed an early interest in natural history and drawing. However, despite this, upon completion of his education he was required to work in his father's London office. He only remained there for about a year, after which he left and studied for a short time under Benjamin Waterhouse Hawkins, a natural history artist. In 1841 he went on a sketching tour of the Mediterranean, and upon his return published a book of lithographs in 1842 entitled "*A Ramble in Malta and Sicily in the Autumn of 1841*" (Morgan, 1966).

He set sail for Australia in 1843 aboard the *Augustus* and arrived in Adelaide in January of 1844. He remained there for six months, at which point he made a sudden decision to sail to New Zealand. He returned to South Australia in January of 1845 and remained there for a further six months before returning to England in September of that year. In 1847 he published two folios of hand coloured lithographs, "*South Australia illustrated*" and "*The New Zealanders illustrated*", as well as the "*Savage life and scenes in Australia and New Zealand*", which chronicled his travels and observations in both Australia and New Zealand. "*South Australia Illustrated*" contains 60 lithographed plates that depict subjects such as scenery, insects, butterflies and flowers (Morgan, 1966).

During his time in South Australia Angas travelled first with William Giles (1844) to the region around the mouth of the Murray River, and later with Governor (Sir) George Grey (1845) to Kangaroo Island and Port Lincoln (Morgan 1966, Long 1990). While in New Zealand he also travelled widely and made an important contribution to the preservation of knowledge of Maori culture, producing a valuable record of the Maori way of life (Long 1990). Angas travelled to Africa in 1848 where he spent two years in Natal and the Cape. Upon his return to England he published a third folio of lithographs in 1849 entitled "*The Kafirs Illustrated*" (Long, 1990).

He married Annie Alicia Moran in Monkstown, Dublin, Ireland, on December 27th 1849, and together they emigrated to South Australia in 1850 (Long, 1990). They had four daughters together. In 1853 George was appointed secretary to the Australian Museum in Sydney, a position he held until 1860. Whilst there he supervised the work of classifying and arranging the first public collection of Australian specimens, especially shells (Morgan, 1966). The Angas family returned to England in February 1863, and George spent the rest of his life in London, where he was an active member of the Linnean Society and of the Zoological Society. He died in London on October 4th 1886. (NLA, 2019)



Figure 6. George French Angas, circa 1870

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### **Acknowledgements**

Figure 5. *Phalaenoides glycinae* by Donald Hobern, available at <https://www.flickr.com/photos/dhobern/3177393973/in/set-72157607370176625/> under a Creative Commons Attribution 2.0.

Figure 6. State Library of South Australia, B 22851, George French Angas, Portrait Collection, available at <http://collections.slsa.sa.gov.au/resource/B+22851>.

### **Special Thanks**

Special thanks to Anthony Duffield from the State Library of South Australia who provided a free high quality copy of Figure 6, which would normally have cost \$22.00 AUD.

(Continued from page 49)

Julia raised discussion of facebook and twitter accounts and the cross posting issue. She also suggested arranging a cover image photo competition for facebook where the facebook group members can submit their own photos and achieve voting on the page. Martin was keen on a photo of the katydid which is our logo, for the website.

**New Nametags for members:** Deferred for Ray Besserdin's input.

**Le Souëf Memorial Award:** Council plans to resume presentation of the award at the Christmas break up 2019. A sub-committee of Linda, Julia, Peter M and Sharon was determined. Award nominee submission details to be advertised in the August bulletin with submissions acceptance expected to be received until 30th Sept.

**EBSCO item:** Paperwork completed and contract will be reviewed in three years.

Discussion occurred around meetings and who will liaise with speakers /presenters.

Birthday cake was enjoyed and happy birthday was sung to Peter Carwardine who was celebrating his birthday at this meeting.

Meeting closed.

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Thanks to Ray Besserdin, Ian Endersby and Carol Page for assistance in producing the *Victorian Entomologist*.

### CONTRIBUTIONS TO THE VICTORIAN ENTOMOLOGIST

The Society welcomes contributions of articles, papers or notes pertaining to any aspect of entomology for publication in this Bulletin. Contributions are not restricted to members but are invited from all who have an interest. Material submitted should be responsible and original. The Editor reserves the right to have articles refereed. Statements and opinions expressed are the responsibility of the respective authors and do not necessarily reflect the policies of the Society.

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Contributions may *preferably* be E-mailed to Internet address: [editor@entsocvic.org.au](mailto:editor@entsocvic.org.au) or posted to the Hon. editor in **Microsoft Word for Windows** with an enclosed hard copy. Tables should fit an A5 page with 1 cm borders i.e. 12.5cm width x 18cm height as a maximum size and complex tables should be in .pdf format. Preference will be given to articles with 5 or fewer pages of solid text and articles longer than this will be returned to the author for reconsideration. The main text of the news bulletin is prepared in 9 pt font Source Sans Pro (please do not use fixed point paragraph spacing). The deadline for each issue is the third Friday of each odd month.

**Notice to contributors to ESV Bulletin regarding the EBSCO database.** All Bulletins will be listed in the EBSCO database. Also future Bulletins when they reach sufficient age. If for reasons unforeseen, in part or in full, any contribution does not meet an author's approval for inclusion, please notify council so we may block your work from appearing in the EBSCO database.

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The *Victorian Entomologist* is printed at ImpactDigital

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## DIARY OF COMING EVENTS

Next Meeting Members' presentations  
Tuesday 18 June 2019

**Note 7:45 pm start**

Members' presentation nights are a popular way to present your entomological interests and projects participation to other members. In general presentations are brief allowing as many as possible to be presented on the night. Please notify [secretary@entsocvic.org.au](mailto:secretary@entsocvic.org.au) about what you will present.

### General Meetings:

Month	Date	Planned event
August	20	Exclusive back of house tour breeding area for the museum Live Exhibits.
October	15	TBA
November	30 (Saturday)	End of year excursion details to follow.

Council Meetings are held at the Museum Victoria at 5:00 pm on the following Tuesdays in 2019:  
July September November



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