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This month's member spotlight is Ross Rickard. Ross is Assistant Director (Principal Entomologist) with DAFF and supervises a team of quarantine entomologists on the frontline of preventing invasive arthropods entering Australia.

Dinah Hales has provided a wonderful expose' on two insect related exhibitions at the Chau Chak Wing Museum at Sydney University and at the Powerhouse Museum which focus on the naming of butterflies and the links to Greek mythology, and of Indian fabrics, some of which are adorned with beetle elytra. Both exhibitions are currently open to visitors.

Dinah has also called on an ex-student, David James to provide an interesting perspective on monarch butterflies both here and overseas. David is Associate Professor with the Department of Entomology at Washington State University in the US. David also provided some historical news clippings of his earlier work here.

For this edition some great photos have been provided by Ambrose Lunnon and Sonia Stace with a link to the youtube channel "Adventures with Ambrose".

We continue providing hyperlinks to entomological stories and research that may be of interest to members.

Kind Regards

Garry Webb Thomas Heddle

Circular editors

Member Profile

Ross Rickard

Ross Rickard graduated with an entomology honours degree in Agricultural Science from the University of Sydney in 1999. After graduating I began working at the federal agency known back then as the Australian Quarantine and Inspection Service (AQIS), as a junior entomologist (Professional Officer Level 1 (PO1). As you may be aware, AQIS has had a number of name changes over the years (AQIS, AFFA, DAFF, DAWE and now back to DAFF -Department of Agriculture, Fisheries and Forestry). Over those years, I worked my way up the ladder and I am currently the Assistant Director - Principal Entomologist for the department, based in Sydney.

My daily activities include managing a small team of entomologists who are required to identify a broad range of taxa intercepted from imported goods and conveyances (vessel and aircraft). Other tasks include overseeing the provision of risk-mitigation advice which goes along with the identifications made by the team of entomologists that I manage in Sydney. My team and I also provide training to biosecurity officers, so they are able to recognise high priority pests such as khapra beetle, brown marmorated stinkbug (BMSB), Asian citrus psyllid, spongy months, giant African snail and various others in the Top 40 and can quickly inform the entomologists if they think they have detected these.

It has been a thoroughly enjoyable career with the department. I have been involved with many hundreds of inspections of vessels and aircraft, and a wide array of goods (flowers, fruit, vegetables, and another food stuffs, new and used vehicles, yachts, timber, machinery and breakbulk, bulk commodities such as grains and fertilisers, even parts of a World War 1 tank that was dug out of a field in France). I have conduct many inspections of Ro-Ro vessels at ungodly hours looking for BMSB and other exotic stinkbugs, conducted other vessel inspections looking for spongy moths, visited multiple sites in response to khapra beetle detections in fridges and baby highchairs, flew to Argentina in response to *Hylesia* moth egg masses being detected on vehicles, responded to detections of exotic mosquitoes at seaports and airports, identified a multitude of pests in various goods pre-border, border and post border and coordinated response activities to these detections. I have also commented on many internal technical documents and packages such as training materials for biosecurity officers, fumigation, and other treatment methodologies (including heat treatment, cold treatment, irradiation, and oxygen deprivation etc), work instructions and pest guides etc. I also flew to New Zealand to conduct fumigation trials for burnt pine longicorn beetle some years ago and to the UAE for a few months to assist with improving their biosecurity system.

Over the years, I have had the pleasure of collaborating with some great entomologists and technical experts including;

- Graham Goodyer – Ex NSW DPI – now retired.
- Bruce White – Ex NSW DPI Apiarist – now retired
- Prof Gerry Cassis – UNSW

- Dr Margaret Humphries – Ex Sydney Uni
- Dr Harley Rose - Ex Sydney Uni
- Dr Fred Macdonald - Ex Sydney Uni
- Dr David Rees – Ex CSIRO and ex DAFF
- Bob Eldridge – Ex NSW Forestry
- Dr Angus Carnegie – NSW DPI Forestry.
- Alan Flynn – MAF New Zealand Biosecurity
- Dr Jan Van Someren Graver – Ex CSIRO (sadly deceased)
- The guys from Institute Of Clinical Pathology And Medical Research (ICPMR) / Westmead Hospital (Dr Cameron Webb, Dr Stephen Doggett, Dr Richard Russell (retired)).
- Any many others.

It has been a great career and I am not finished yet. I still enjoy imparting my knowledge and helping others as much as I can and doing all that I can to protect this great country of ours from incursions of new pests. One day, I will retire, and it is best to continue to pass on as much knowledge as possible, so others can take up the mantle. When I retire, I am looking forward to focusing on my other varied interests and hobbies. I have owned half a dozen Leyland P76's over the years, so I must be somewhat eccentric.

Cheers Ross Rickard

Butterflies, Names and Beetles

Dinah Hales

Two exhibitions on at present at the Chau Chak Wing Museum and at the Powerhouse Museum have inspired some random thoughts on butterflies and the names of insects, and also on the use of iridescent beetle wings in textiles, jewellery and other extravagant decorative purposes.

Our travelogue is through the ancient Greek myths in the form of a wonderful butterfly exhibit currently showing at the Chau Chak Wing Museum at the University of Sydney. The exhibition closes in October, so do try to find time to see it before it's too late. The theme of the exhibition relates the names of butterflies to the Greek heroes from Ulysses on through the Trojan wars, and they are arranged in such a way that the travels of the various named characters can be followed. Pottery from the Nicholson Collection from early Greek times is part of the exhibition as well, when it shows images of parts of the story. Just by the way, the exhibition a little hard to find. Look between the cafe and the toilets on Level 2.

One of the exhibition cases. Photos by author, used with permission of Candace Richards, Chau Chak Wing Museum.

It would be well worth watching the video lecture https://www.youtube.com/watch?v=xfsxFgz6uhk before going to see the exhibition. In it, Jude Philp talks about Linnaeus, the history of collecting and classification, and the Macleay Collection, while Candace Richards talks about the concept and production of the exhibition from the mythographic and archaeological side.

Most of the butterflies in the exhibition were named by Linnaeus in the genus *Papilio* (Latin for butterfly), though some have since been transferred to other genera, and subspecies have also been recognised, often continuing the Greek naming tradition. Post-Linnaean

species with names fitting the theme make up the remainder. The specimens are from the Macleay Collections, now part of the Chau Chak Wing Museum, and represent a time when international collecting and exchange were uncontrolled. Hence, species from all continents appear in the exhibition and it's a rare opportunity to see them all together.

I was intrigued by this emphasis on Greek names, especially as they are in the form of proper names and have nothing to do with characteristics of the insects. Could this have followed a tendency in pre-Linnaean times to give butterflies classical names? It seems unlikely, and the only possible candidate I found was the meadow argus, a British butterfly with spots on its wings that might have been thought of in terms of the hundred eyes of Argus, slain by Hermes.

Was the commitment to Greek mythological proper names for butterflies continued by post-Linnaean taxonomists? Certainly, it was to some extent. *Papilio plexippus* moved to the newly-coined genus *Danaus* Kluk 1802, Danaus being the mythological king of Argos, and Plexippus being one of his sons-in-law, killed by his wife at the command of Danaus. The relationship seems rather unfortunate. *Papilio aegeus* was described by Donovan in 1805, Aegeus being the mythological founder of Athens. The genus *Pelopidas* Walker 1870 shows a move from the mythological to the historical, as Pelopidas was a Theban soldier and diplomat. I thank Michael Braby and Ted Edwards for advice on the use of Greek proper nouns as names for butterflies. Both told me that there was no ongoing tradition. Ted suggested a detailed source: Emmet, A.M. 1991. *The scientific names of the British Lepidoptera. Their history and meaning.* Harley Books, Colchester.

Many older people will remember the Argonauts broadcast on ABC radio. Children were invited to join and send contributions of writing, painting or questions, and so on. On joining you were given a "ship name and number", the ship names being drawn from Greek mythology. I was Palamedes 10. Each day an expert on some aspect of science or the humanities had a 10 minute slot and I was very chuffed when Jeffrey Smart ("Phideas") commented favourably on my rather ordinary artwork. But, in the present context, yes! there is a butterfly *Papilio palamedes* Drury , much like *P. aegeus* but with blue spots instead of red. It is found in south-eastern USA. Palamedes has an association with the Trojan Wars: he was sent to get Ulysses/Odysseus to help fight against the Trojans after the abduction of Helen, and tricked him into doing so. But Ulysses recognised the trick and in turn set up false evidence against Palamedes who was then seen as a traitor to the Greeks and was killed.

***Troides helena* (L.). Helen, married to the Spartan king Menalaus, was abducted by Trojan prince Paris, or was perhaps a willing participant, eloping with him.**

Greeks (Ajax and Achilles) to the left, Trojans to the right. *Papilio paris* (bottom right) is named for Paris, whose flight with Helen to Troy was the reason for the Trojan Wars. The white butterfly is the endangered *Parnassius apollo*: the god Apollo fought on the Trojan side.

Maybe Linnaeus, faced with the task of naming the whole of the life on earth, found it easier to adopt a theme for each group, and the butterflies got the Greek heroes. An interesting and humorous paper by Jóźwiak *et al.* gives examples of present-day taxonomists dealing with large numbers of new species. It is quite common for them to choose a non-classical theme. See https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4524282/ for their light-hearted account of naming fads.

I recently read a book by Swedish palaeontologist Mats Eriksson, who has two passions: extinct polychaetes and Death Metal music. You guessed it: he names his new fossil polychaetes after musicians in that genre. English entomologist G.W. Kirkaldy thought he had solved the problem at the generic level - he named new genera of leafhoppers *Ohchisme*, *Marichisme*, *Polychisme*, etc. Looks like Greek and partly is Greek, but his joke was in the pronunciation: Oh kiss me, etc. This did not go down well with the establishment

in the early 1900s. A couple of years ago the aphid *Sarucallis kahawaluokalani* (Kirkaldy) turned up in Australia. I wondered about the name and whether Kirkaldy was up to his old tricks when he described this species from crape myrtle in Hawaii; but have not been able to get a translation. I do rather resent it every time I have to write it. Compact: no. Euphonious: yes. Memorable: mainly for being too long.

Ron Cherry has also written about insect names from Greek mythology. The names he discusses often show some connection between the characteristics of the insects and the personage they are named for, unlike Linnaeus's butterflies. See https://academic.oup.com/ae/article/43/4/212/2474560?login=false

Post-Linnaean butterflies seem to have more Greek names than one would expect. I found a listing of them: www.aurelianbooks.com/library_names.php . By the way, the name aurelian refers to a Latin phase among butterfly enthusiasts. They were sometimes called aurelians, and the name came from the Latin name for a butterfly pupa, aurelia, because of its golden sheen. The Greek term chrysalis is in more common use today but the meaning is still about the golden colour. To return to the list, it gives a very brief meaning of each Greek name and could be helpful for taxonomists working on other groups, if they want to remain classical. Of course, they could instead follow the now well-established pathway of using names from popular culture. As well as Eriksson's polychaetes, examples are *Agra schwarzeneggeri* (a small beetle with thickened thighs), *Kaikaia gaga* (leafhopper), *Opulama rupaul (iridescent fly), Scaptia (Plinthina) beyonceae (horse fly said to have golden buttocks). Among the aphids, we have Macrosiphoniella sunshine, Macrosiphum clum, Macrosiphum dewsler* and *Macrosiphum garyreed.* American entomologist Andy Jensen had a hand in all these names. Dewsler was his dog, and Gary Reed his mentor. As in *Papilio ulysses*, the Ulysses butterfly, the species names are proper nouns in apposition with the generic name. They are deliberately not modified to sound classical. Sunshine is just sunshine but could be pronounced in a Latin or Greek way??. As to *clum*, Andy says it was a personal reaction to some of the very long names he'd recently published and is derived from the first letters of the hostplant, *Clematis*. Another point of interest about this name is that the author stated that it was to be regarded as a random collection of letters without gender. If the species ends up in another genus with a different gender, the specific name remains *clum* (not *clus* or *cla*). Thanks to Andy Jensen for answering my questions.

The second part of this contribution is inspired by a new exhibition at the Powerhouse Museum, concerned this time with Indian fabrics. As an entomologist and volunteer in the Textile Centre, I was interested in the piece shown in our Zoom briefing - part of a strip of gauze-like fabric decorated with iridescent beetle wings. You can see it at *https://collection.maas.museum/object/15979#&gid=1&pid=5* and others in the collection can be found by going to MAAS collection and searching beetle wings. One piece is a small bag decorated with peacock feather as well as beetle wings, taking us unexpectedly back to the meadow argus, because after Argus was slain, his hundred eyes were taken to decorate the tail of the peacock....

The custom of using beetle wings for decorating clothing dates back in India at least to the 1500s and there were similar traditions in south-east Asian countries. At the Mughal court in Jaipur, for example, the Indian upper class wore clothing and shoes heavily embellished with gold thread embroidery incorporating jewels and the wings of jewel beetles. The British and other Europeans were impressed by the beauty of the Indian garments, and a fashion arose for Indian-style embroidery on western-style clothing. This developed further into a more western style of embroidery using beetle wings, for example a dress in the Victoria and Albert Museum, *https://collections.vam.ac.uk/item/O1387342/dress/ and a wonderfully sinister costume worn by Ellen Terry as Lady Macbeth: https://www.tate.org.uk/art/artworks/sargent-ellen-terry-as-lady-macbeth-n02053* .

Beetle wings are used in jewellery and widely advertised online, either as finished jewellery or the raw materials. *Sternocera aequisignata* (Buprestidae) "green-legged metallic beetle" is most commonly used. It is a large beetle, up to 50 mm long. The most extravagant usage is in an art installation in the Royal Palace in Brussels, where artist Jan Fabre has used 1.4 million wings (or pairs of wings?) to line the entire ceiling of the Hall of Mirrors, and coated the chandeliers in the same material. The placement of the wings is precise and gives recognisable forms such as animals. See https://bugunderglass.com/ceiling-made-jewel-beetles/ . This installation incited not only wonder, but also outrage at the killing of so many of these magnificent insects. Commercial purveyors - and users - claim that the beetles are ethically harvested by the ton as human food and the elytra are a by-product sold for artwork and jewellery. Is this green-washing? I read an account of the life cycle of another member of the same genus, *S. ruficornis,* ("red-legged metallic beetle") http://www.rdi.ku.ac.th/KU_Journal/Sciences/doc/KU35%282%29.pdf . The species occurs in dry dipterocarp forests in South East Asia and the life cycle takes approximately two years including a pupal stage lasting up to 15 months in the soil. The larva feeds on roots of bamboo, *Arundinaria pusilla*. The author, writing in 2001, writes that "since they are edible and their wings are made into jewellery……. their numbers have declined". It would be surprising if they could withstand heavy predation pressure by human and non-human enemies as well as climate change, with a lifecycle dependant on stability of a sub-soil environment.

During this work, it has been distressing to find, when you enter a butterfly or beetle name into a search engine, that the majority of hits are for specimens or parts of the insects for sale. I have not so far discovered what restrictions, if any, are placed on their import to this country. Export of Australian insects has for many years been subject to close restriction, partly to prevent the loss of holotypes to overseas institutions. https://www.dcceew.gov.au/environment/wildlife-trade/non-commercial/research gives information for non-commercial export, e.g. to consult an overseas expert on identification. CITES lists *Ornithoptera* and *Troides*, and *Parnassius apollo* under Appendix II. *Ornithoptera alexandrae* falls into Appendix I (more highly endangered). Two examples of the latter species were sold at auction in 2019 for 8750 euros.

Once long ago, I was invited to give a talk at one of the local entomological societies. One of the agenda items was "Sightings and Captures". After my talk, the chairman launched into a speech in which the main theme was "..... the last thing we want is professional entomologists!" This seemed unkind in the circumstances, but eventually I realised that it was not directed at me personally, but referred rather to people who catch insects for sale. The then-chairman now has a long record in Yowie research, and a reward was offered by a newspaper for the capture of a Yowie (by a professional yowie catcher?).

It seems, though, that "professional entomologists" have found an ally in the Internet for making money out of insect specimens. Should the Society have a policy on this?

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Also on the subject of things old and glorious, Dinah found this gem on the internet

https://www.jigidi.com/jigsaw-puzzle/ojibh3sk/archaeologists-locate-the-skull-of-a-canadian-mosquito/

Insights into the Decline of Western USA Monarchs from Australian Research

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An Englishman and Monarchs in Sydney

In February 1976, I arrived in Australia from the UK and by May I had begun my career as an aspiring entomologist working for the NSW Department of Agriculture at Rydalmere, as a Technical Officer (Scientific). Working for Dr Vic Edge on spider mites, I was soon distracted by butterflies especially the Wanderer, which to me was the holy grail of butterflies. It was the largest butterfly in my boyhood Observers book of British butterflies but I had never seen one! Sydney, though, seemed full of them!

In 1978, I discovered new overwintering sites of Wanderers at Picton and Wallacia, each with thousands of butterflies roosting on eucalypts and melaleucas. I then talked to the inspirational Courtney Smithers at the Australian Museum and started doing simple ecological studies on overwintering Wanderers. This led to my first ever scientific paper (James 1979).

Thesis Opportunities

In 1979 Drs Andrew Beattie and Murray Fletcher encouraged me to do a part-time Masters on Wanderer biology and ecology which I thought was a great idea! So, I went to see Dr Dinah Hales at Macquarie University to see if she would supervise me. Happily, she said yes, and my Wanderer studies took off in earnest.

In fact, there was so much to learn about Monarch biology in NSW, that I soon found myself tackling studies on physiology, behavior and ecology. My research was taking on PhD proportions so I asked Dr Hales if I could maybe convert to a PhD? Professor Lincoln Brower, the world's foremost Monarch researcher from Florida, attended my seminar to justify transition from MSc to PhD (he was coincidentally in the country), and happily the conversion was approved.

Monarch have Adapted to Australian Conditions

So, what did my PhD achieve? Well, it resulted in 12 peer-reviewed scientific papers on the ecology, physiology and behavior of overwintering Monarchs in NSW, which kick-started my entomological research career and helped me move transition to entomologist with NSW Agriculture. My work showed that Australian Monarchs since their arrival, just over a century prior to my work, had developed significant physiological adaptations to their new

environment. Most of these adaptations appeared to be a consequence of living in the more benign NSW winter climate compared to say the frozen wastes of North Dakota in the US.

For example, reproductive dormancy in Australian Monarchs is not a rigid physiological diapause as it is in North American Monarchs. Instead, the dormancy is flexible allowing rapid reproductive changes when environmental conditions allow. Similarly, reproductive dormancy in Australian Monarchs is induced more by post-eclosion temperature than by declining daylength. Daylength is the reliable environmental cue you use if you really do have to leave for the winter. If there is a possibility of survival and continued breeding in winter (as there could be in inland NSW), then maybe post-eclosion temperature is an appropriate cue.

Another significant finding was that Monarchs wintering in Sydney not only roosted non-reproductively at overwintering sites, some also formed winter breeding populations. This differed from the studies of Courtney Smithers, 15 years earlier, in which he found no evidence of winter breeding in Sydney. Ultimately, my PhD was a fascinating study of the Monarch's remarkable adaptations to a new environment.

Rekindling Monarch Research in the Western US

I rekindled my love affair with the Monarch when I joined the faculty at Washington State University in 1999. Washington sees Monarchs during summer after their migration from California during spring, but they are rarely common. Or at least they haven't been since the well-documented decline in North American Monarch populations from the mid-1990s onward. I was surprised to learn that the migration biology of Monarchs in the Northwestern US, was poorly known compared to the the eastern US. Consequently, I set up a tagging program that reared and tagged more than 15,000 Monarchs over the past decade. Many of these were reared by inmates at the Washington State Penitentiary in a program aimed at improving the mental health of prisoners (https://news.cahnrs.wsu.edu/article/wsu-monarch-butterfly-project-underway-with-help-from-washington-state-penitentiary-offenders/). Thanks to this program, the details of Monarch migration in the Pacific Northwest are now known (James et al. 2018, James and Kappen 2021).

A Change in Overwintering Strategy

Most recoveries of Monarchs tagged In Washington or Oregon are made at overwintering sites in California, where they remain until early spring in reproductive dormancy. Since 2017 we began to get a few tagged individuals in Californian backyards laying eggs, suggesting that not all migrating PNW Monarchs ended up in overwintering colonies (James, 2018). Then in 2020, all of our recoveries were found in gardens or associated with milkweed patches. None were found at overwintering sites. The autumn of 2020, as Monarchs were migrating into

California, was the warmest on record for the west coast and I theorized that these migrants responded by becoming reproductive (James 2021). The overwintering population in California in 2020/21 was the lowest ever recorded. Just 1899 individuals were counted down from ~ 30,000 in 2019/20. However, in 2021, autumn temperatures in California were average and the overwintering population shot up to 247,237!

Western US Monarchs Showing NSW Traits

So, what happened in 2020/21? Basically, I think western US Monarchs did what NSW Monarchs do every year. Some overwintered non-reproductively while others overwintered as breeding populations. Because breeding Monarchs cannot be counted like non-breeding Monarchs can (hanging in clusters from trees), the western Monarch population in winter 2020/21 was severely underestimated. Calculations show it is impossible for the tiny 'official' population of 1899 butterflies to have increased to almost 250,000 within one breeding season. The uncountable winter breeders of 2020/21 must have been more numerous than the counted non-breeding Monarchs and participated in the population turnaround.

Logically Assessing the Future of Monarchs in the Western US

Logical as this all seems to me, with the benefit of researching NSW monarchs four decades ago, other Monarch scientists are still scratching their heads and wondering how it happened?! Some of these scientists are adamant that the western US Monarch is on a downward spiral to extinction. The official population in 2020/21 was below the theoretical level (30,000) from which avoidance of extinction supposedly becomes impossible.

What is in store for western US Monarchs in the future? The climate in California has warmed significantly in recent decades and this trend seems likely to continue. Monarchs will continue adapting to this 'new normal', just as they did living in Australia. In years when autumn temperatures are significantly above the long-term mean (as they were in 2020), it is likely that most migrants when they reach California, will become reproductive and form winter-breeding populations. A study conducted in winter 2020/21 showed that winter breeding populations in the south bay area of San Francisco were successful (James et al. 2021), so winter-breeding is unlikely to be an ecological trap even at this latitude. In these years the counts at the traditional overwintering sites will be low.

In years when autumn temperatures are close to the long-term normal, the migrants will not break their reproductive dormancy when they reach California and will continue on to overwinter in large numbers at the traditional coastal sites.

An Update on NSW Monarchs?

Although overwintering of NSW Monarch has not been studied since my studies of the 1980's, anecdotal information suggests substantial non-reproductive colonies still occur in some winters (James and James 2019). However, there also appears to be winters when few colonies are seen. I think it is time for someone to revisit the status of Monarch overwintering in NSW and hope this will be done soon!

It is interestingly cool to have my first serious entomological research come back to 'haunt' me at the far end of my entomological career… in a good and useful way.

Finally, I must thank Andrew Beattie and Murray Fletcher for encouraging me in those long-gone days of 1978 and to Dinah Hales for guiding me so well though my PhD research.

References

James, D. G. (2021). Western North American monarchs: Spiraling into oblivion or adapting to a changing environment? Animal Migration 8: 19-26.

James, D. G. and Kappen, T. A. (2021). Further Insights on the Migration Biology of Monarch Butterflies, *Danaus plexippus* (Lepidoptera: Nymphalidae) from the Pacific Northwest. Insects 12: 161 https://www.mdpi.com/2075-4450/12/2/161

James, D. G., Easton, K. K., Schaefer, M. C. and Carl, A. (2021). First population study on winter breeding monarch butterflies *Danaus plexippus* (Lepidoptera: Nymphalidae) in the south bay area of San Francisco, California. Insects 12 (10) 1946. https://www.mdpi.com/2075-4450/12/10/946

James, D. G. and James, T. A. (2019). Migration and overwintering in Australian Monarch butterflies, *Danaus plexippus* (L.) (Lepidoptera: Nymphalidae): A review with new observations and research needs. Journal of the Lepidopterists Society 73(3): 177-190.

James, D.G. (2018). Do some fall migrants from the Pacific Northwest augment winter breeding populations of Monarch butterflies in southern California? Journal of the Lepidopterists Society 72, 244-247.

James, D.G., Kappen, L., Russell, T., Harryman, B., Bly, C., James, T. S. and Seymour, L. (2018). Citizen scientist tagging reveals destinations and routes of migrating Monarch butterflies (*Danaus plexippus* (L.)) from the Pacific Northwest. Journal of the Lepidopterists Society 72, 127-144.

James, D.G. (1984). Overwintering biology of the Monarch butterfly, *Danaus plexippus*, in Sydney, New South Wales. Ph.D. Thesis, Macquarie University.

James, D.G. (1979). Observations on two overwintering clusters of *Danaus plexippus* (L.) (Lepidoptera: Nymphalidae) in the Sydney area during 1978. Australian Entomological Magazine, 5, 81-85.

Studies for master's degree taking wing

MR James holding a chrysalis of the Wanderer butterfly.

MANY thousands of Wanderer butterflies will be released in the coming months in a scientific attempt to find out more about their ecology.

This will be done by Mr David James of Glossodia during his research for a degree of master of science.

As part of the study Mr James will breed and release many thousands of Wanderers – also known as Monarchs – each carrying a small wing tag.

Anyone finding a butterfly with the tag is asked to telephone the number on the tag so that he can collect information on the butterfly's movements and other aspects of its life.

How many of us think of butterflies as fragile and short-lived creatures?

Unlike many other butterflies, Wanderers are rarely troubled by hungry birds. This is because they contain poisons and birds soon learn to associate them with a very unpleasant taste.

The male Wanderer has a remarkable sexual appetite in contrast to the female who appears to spend most of her time avoiding sexual encounters.

Other species of butterflies often indulge in a little romanticism during courtship, with the male showering the female with aphrodisiacs during their pre-nuptial flight. The male Wanderer, however, has dispensed with such refinements and on sighting a female will literally knock her to the ground and rape her.

"Females roughly treated"

Not many people realise one Australian butterfly can live for more than six months fly hundreds of kilometres and indulge in aberrant sexual activities, said Mr James.

Known as the Wanderer or Monarch, it is a familiar butterfly to most people with its striking reddish-orange, and black coloration.

The Wanderer caterpillar is also a very imposing creature, banded with yellow, black and white, and carrying two pairs of whiplike feelers.

It feeds only on milkweed or cotton bush before it changes into a beautiful green and gold chrysalis. After about two weeks the adult butterfly hatches and begins its active life.

Male Wanderers are not fussy as to whom they assault and will perpetrate their sexual brutality on other males, and even other types of butterflies.

Victims of Wanderers sexual attacks often end up very much the worse for wear, with broken legs and crumpled wings.

In autumn, some Wanderers fly long distances to congregate at certain places where they remain for much of the winter. During this time they are mostly inactive, preferring to rest on the branches of trees and bushes.

DAVID James with one of his 3000 Chrysalises.

STUDENT HOPES SOARING

SOME time this week 1000 brightly colored butterflies will take to the air above Burnside Homes in North Parramatta and head off towards the north east.

Each of the butterflies will carry on one of their orange and black wings a tiny tag bearing the telephone number of the Department of Agriculture's research station at Rydalmere.

During the next two weeks two other 1000 batches of butterflies, the common Wanderer variety, will be released in other parts of Sydney.

The behavior of the 3000 butterflies will provide the basis for a university science thesis by David James, a Department of Agriculture technician.

David, who is studying for a Master of Science degree in his spare time, hopes people will find the butterflies and telephone him with information about their flight paths.

ill allow him to come up with a comprehensive picture of the Wanderer's migration and breeding habits.

David made similar releases last yea when he began his work on the thesis, bu received only 200 replies.

However, that was enough to provid some interesting information.

He learned that most of the butterflie head in a north easterly direction and ca travel up to 35 kilometres.

Scientists are now investigating th viability of making petrol from the sap the milk weed, the staple diet of the Wand rer caterpillar.

Rare butterflies released

Sydney researcher, Mr David James, releases some of his rare Wanderer butterflies in Orange yesterday as part of his study into their migratory habits.

Mr James, who released about 900 butterflies yesterday, hopes they will make their way back to the east coast in the next few months.

He believes the rare insects migrate to the east in the winter months to escape the cold of the highland and tableland areas of

The study is part of a doctorate degree in science which he is doing at Macquarie University.

It is a part time course. He works at the Department of Agriculture's Biology and Chemical Research Institute.

The butterflies he released yesterday were all bred in captivity.

They have all been wing tagged and anyone finding any of them in the next few weeks should contact Mr James on the number shown

He said he hoped for calls people in centres east of Ora

He hoped to release about insects in Orange but had trouble hatching several hu of them.

The Orange release wa second of three releases o tableland and highland are NSW.

Last weekend he released at Tidbinbilla, near Canberra next weekend will release a fi 1500 on the southern high

Happy Wanderers

Mr David James releases 100 of the Wanderer butterflies he has tagged to study their migration.

Checking where Wanderers go

Mr David James, of Macquarie University, NSW, has spent hundreds of hours labelling and tagging the beautiful black-orange wings of 10,000 Wanderer butterflies.

It is a job not recommended for Guinness pour straight — the tags include telephone number and identification of each individual butterfly, and are part of his Ph.D study into the migratory habits of the insect.

The Wanderer is one of the few butterflies known to fly many hundreds of kilometres in search of warm weather. American researchers using similar methods to Mr James have discovered butterfly routes from Canada to Mexico and back.

Most of the 10,000 butterflies have been released around Sydney but yesterday Mr James set free 1,200 at the Cotter Dam, close by the Tidbinbilla Reserve in the ACT.

He plans to release another 2,500 during the next three weeks.

The butterflies are expected to find the cooler weather of the ACT less favourable than coastal Sydney temperatures and fly northwards in search of warmth.

Mr James said they had been known to fly 60 kilometres a day and he predicts they will take between one and two weeks to appear in the Sydney area.

People finding tagged Wanderers are asked to contact Mr James on (02) 6200979 or post the butterfly to the Australian Museum in Sydney.

Long - distance callers

If an orange and black butterfly, like the one held here by four-year-old Joe James, comes to rest in your garden, get its phone number. About 900 of the Wanderer butterflies were released yesterday near Lake Parramatta by Joe's father, Mr David James, 27, a laboratory technician. He is studying their winter life for a thesis and each butterfly carries a tag showing Mr James's phone number. Thousands more of the tagged butterflies are to be released in coming weeks. They have been known to travel up to 5,000 kilometres

New Entomological Research

(**Right Click** on the titles (or **CTRL Right Click**) to see the full articles)

How ancient seafarers and their dogs helped a humble louse conquer the world

This is the story of how a parasitic, skin-chewing insect came to conquer the world. For more than a century, scientists have been puzzled as to how an obscure louse native to Australia came to be found on dogs across the world. *Heterodoxus spiniger* evolved to live in the fur of the agile wallaby. Despite little evidence to back the idea, many researchers believed it was linked to people from Asia bringing the dingo to Australia in ancient times. Perhaps people later took dingoes infested with this parasite back home, where it spread to local dogs, and onwards from there. But when we approached the question again using the most up-to-date information, my colleague Peter Contos and I came up with a completely different explanation – one that better fits what we know of ancient migration and trade in the Asia-Pacific region. As we report in the journal Environmental Archaeology, this louse probably originated not in Australia but in New Guinea, an island with a long history of intimate connection with seafaring Asian cultures.

Do earwigs really live in our ears?

As a kid, you might have first encountered earwigs as a kind of playground mythological creature. Although the tiny, wriggling insect lives in the same wood-chip hideouts as pill bugs and other creepy crawlies, the story goes that if you're not careful, it will take up residence in the deep recesses of your ear canal. The legend, it turns out, isn't confined to the playground. A surprising number of medical journals, entomologists, and ethnographers have written about the earwig, and tend to trace the name back hundreds or thousands of years. Depending on who you read, it either comes from a myth of central European or Old English origins where earwigs "crawl into the ears of sleeping persons," and from there, the brain, perhaps to cause insanity. But while accounts in medical journals emphasize the scattered reports of earwigs in their namesake organ, entomologists stress that the idea makes very little sense, given what we know about the animals.

Monarch butterflies join the Red List of endangered species, thanks to habitat loss, climate change and pesticides

On July 21, 2022, the International Union for the Conservation of Nature placed the migratory monarch butterfly on its Red List of threatened species and classified it as *endangered*. Monarchs migrate across North America each year and are one of the continent's most widely recognized species. The Conversation asked Oklahoma State University biologist *Kristen Baum*, who has studied pollinators for more than 25 years, to explain the listing's implications for the monarch butterfly in the U.S. The IUCN is a network of public, private and nonprofit organizations that work to conserve nature worldwide. The Red List, which was developed in 1964, provides a standardized approach for assessing the extinction risks of species. Listing the monarch butterfly d raws attention to its status and to areas where more research is needed to understand factors contributing to its decline. The IUCN listing applies to the migratory subspecies of the monarch butterfly, or *Danaus plexippus plexippus*. There are two migratory populations: one east and one west of the Rocky Mountains.

Less Than 10% of Mosquito Species Spread Human Disease

Of all the species of mosquitoes on Earth, the exact number of species relevant to human health is unknown. This poses challenges in understanding the scope and breadth of vector–pathogen relationships and how resilient mosquito vector–pathogen networks are to targeted eradication of vectors. To try to solve this problem, Don Yee, Ph.D., BCE, and students in his lab in the School of Biological, Environmental and Earth Sciences at the University of Southern Mississippi embarked on an extensive literature survey to document medically important mosquitoes. Their findings, reported in June in *Parasites & Vectors*, estimate for the first time how many mosquitoes are medically important across the world. "To date no scientific investigation has been made to count the mosquito species involved in the spread of human pathogens that cause disease," says Yee. "We performed an extensive literature survey to determine the associations between mosquito species and their associated pathogens of human medical importance."

Zombie fly fungus lures healthy male flies to mate with female corpses

Entomophthora muscae is a widespread, pathogenic fungus that survives by infecting common houseflies with deadly spores. Now, research shows that the fungus has a unique tactic to ensure for its survival. The fungus 'bewitches' male houseflies and drives them to necrophilia with the fungal-infected corpses of dead females. After having infected a female fly with its spores, the fungus spreads until its host has slowly been consumed alive from within. After roughly six days, the fungus takes over the behavior of the female fly and forces it to the highest

point, whether upon vegetation or a wall, where the fly then dies. When the fungus has killed the zombie female, it begins to release chemical signals known as sesquiterpenes. "The chemical signals act as pheromones that bewitch male flies and cause an incredible urge for them to mate with lifeless female carcasses," explains Henrik H. De Fine Licht, an associate professor at the University of Copenhagen's Department of Environment and Plant Sciences and one of the study's authors.

Insects harbor over a thousand genes from microbes, which help them survive

Hundreds of millions of years ago, microbes and plants might have given insects an evolutionary advantage by passing genes to them through horizontal gene transfer. In a study published in the journal *Cell* on July 18, researchers report that more than 1,400 genes across 218 insect species, including butterflies and moths, that originated from bacteria, viruses, fungi, and plants. The study argues that these genes might have been essential for insect evolution by allowing them to develop beneficial traits in mating behavior, nutrition, growth, and adaptation to environmental changes. Horizontal gene transfer (HGT) is fairly common between microbes. For example, bacteria use this mechanism to transmit antibiotic-resistance genes between species, but scientists more recently have been systematically looking at the phenomenon between insects and microbes or plants.

These stunning insect close-ups reveal dazzling bug complexity

Arthropods are the most diverse group in the animal kingdom. Among them, the evolutionary record holders are the insects, thanks to their ability to adapt to many different ecosystems both in water and on land. The versatility of arthropods is due in large part to chitin, a substance that forms their hard outer covering as well as their wings and other flexible parts. Like cellulose, the building block of plant cell walls, chitin is made of glucose molecules, but it also contains nitrogen, producing a firm structure.
(Warning: you may need to sign up)

Study Shows Flies, Cockroaches Do Not Transmit Coronavirus

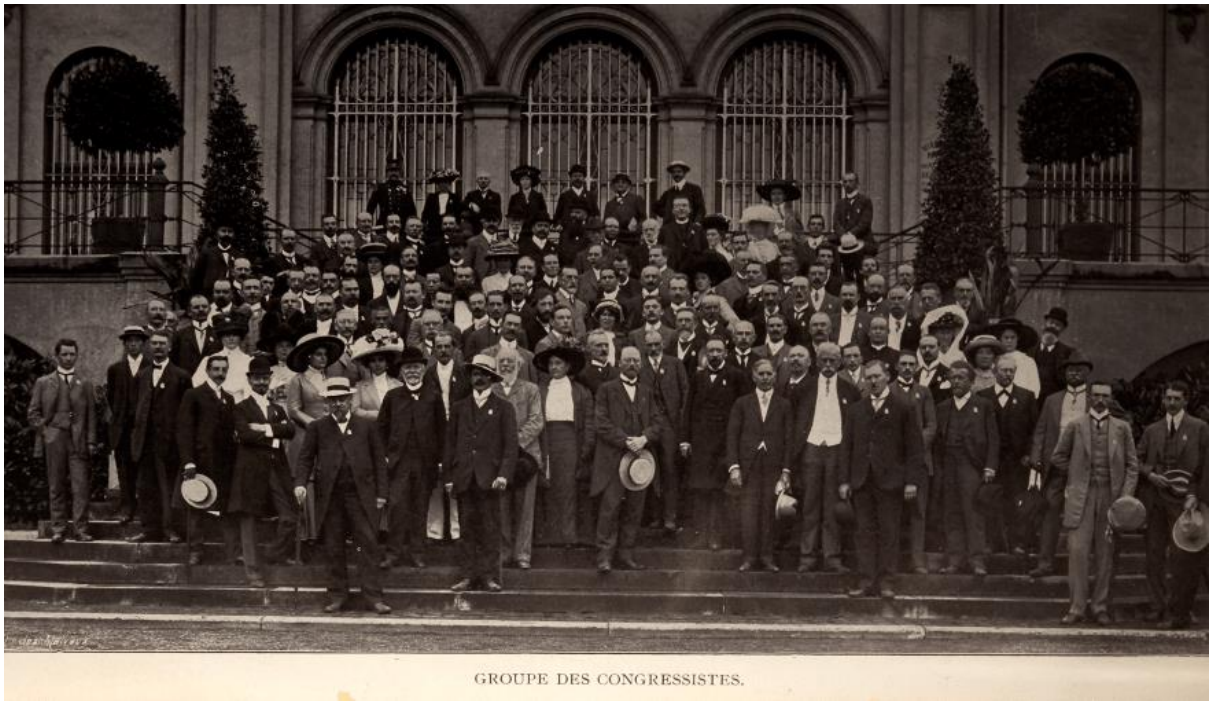
Ever since the arrival of the COVID-19 pandemic in 2020, scientists and public health officials have looked for the various ways the disease could be transmitted. While airborne transmission is the most significant form of transmission, the virus (or at least viral RNA) has been observed on surfaces and can infect domestic dogs and cats as well as humans. But many have also wondered: Could insects also transmit the virus? Insects reside in nearly every home, and some do transmit pathogens, so it's a fair question. But, so far, studies show that SARS-CoV-2 does not replicate in insects (including mosquitoes and biting midges, which carry other disea ses). That leaves the question of mechanical transmission, in which non-biting flies can carry viruses or other pathogens on their mouthparts or bodies. So, to see if common household insects could mechanically transmit the coronavirus that causes COVID-19, a team from Texas A&M University looked at house flies and cockroaches at homes in Texas where resident people or pets had been infected. Their results, published May 30 in the *Journal of Medical Entomology*, found that none of the insects tested had the virus or its RNA.

How insect 'civilisations' recast our place in the Universe

When looking to other creatures for signs of intelligence, insects are rarely the most obvious candidates, but as the historian Thomas Moynihan writes, it wasn't always so. What can the early-20th Century fascination with bug societies tell us about our own? It is 1919, and a young astronomer turns a street corner in Pasadena, California. Something seemingly humdrum on the ground distracts him. It's an ant heap. Dropping to his knees, peering closer, he has an epiphany – about deep time, our place within it, and humanity's uncertain fate. The astronomer was Harlow Shapley. He worked nearby at Mount Wilson Obser vatory: peering into space. With help from colleagues like Henrietta Leavitt, Annie Jump Cannon, and Cecilia Payne-Gaposchkin, Shapley went on to "measure" the Milky Way. Their work revealed that we don't live at our galaxy's centre, and that there are many other galaxies besides.

The International Congress of Entomology: 122 Years and Counting

In 1908, two years before the first International Congress of Entomology would take place in Brussels, Belgium, Henry T. Fernald, head of the Department of Entomology at the University of Massachusetts–Amherst, published an essay in the journal *Popular Science Monthly* to mark 75 years of economic entomology in America (Fernald 1908). Titled “The Future of Economic Entomology,” the essay set out to review past accomplishments of the field and to “consider its future possibilities.” Today, “future possibilities” are called “grand challenges,” and most of those Fernald identified 112 years ago sound eerily familiar. He noted that “the development of speedy commerce has enabled many of the most serious pests of foreign lands to … establish themselves here … developing destructive powers greater than in their native land.”



Dark Extinction Has Scientists Worried. Here's What They're Doing About It

If — *when?* — the African elephant goes extinct in an estimated two decades, there will be mourning and memory and tribute. People will post photos of themselves at the circus as kids. They'll mimic the noises those long trunks made for their own children and grandchildren. Science fiction often features human attempts to counter the cultural brunt of such extinctions, imagining worlds with robotic approximations of pets and zoo cages filled with taxidermy. These fictions of species loss generally assume that even as species die out, they will be chronicled and remembered, and that people will know what they have lost. Most species, however, will disappear without a record, much less a eulogy. The looming big-ticket extinctions of elephants, rhinos and right whales are stark outliers in the story of species death on Earth. Modern estimates put the number of plant, animal and insect species on our planet at nearly 9 million (though it could be many more), with about 86% yet to be discovered. And while the mechanisms of natural selection have always caused some species to die off at a gradual pace, known as the background extinction rate, human-driven climate change has sent this rate skyrocketing. The result is a phenomenon known as "anonymous extinction" — the demise of undiscovered species humans never even knew existed, let alone had a chance to save.

How One Entomologist Has Created Community for LGBTQ+ Scientists

As a museum scientist, Lauren Esposito, Ph.D., knows quite well how shining a light on something new or unfamiliar can open people's eyes to the beauty and diversity of the natural world. So, perhaps it's no surprise that Esposito, an assistant curator and Schlinger chair of arachnology at the California Academy of Sciences, understood how visibility could make similar advances in opening minds within the scientific professional community—visibility, in this case, of STEM professionals identifying as lesbian, gay, bisexual, transgender, or queer. In 2018, Esposito, along with three colleagues at the Cal Academy, launched 500 Queer Scientists, an online campaign to share the stories of LGBTQ+ professionals in STEM. It started with 50 stories, grew past 500 in just days, and is now closing in on 2,000 stories from scientists across STEM fields sharing who they are and the science they love. Looking back, Esposito, who identifies as queer, says, "It's just been quite inspiring for many, many people, telling them that it is OK to bring your full identity to science. In fact, it benefits the science in doing so." In honor of Pride Month, *Entomology Today* spoke with Esposito to learn more about her science career, why she's a fan of amblypygids, her experience in creating a grassroots social advocacy community, and how the entomology community has made strides in welcoming LGBTQ+ scientists—and where it has room to grow.

Photo Corner

All Society member are encouraged to submit any entomological photographs of interest together with a short (or long) description of your observations.

The following photos were submitted by Ambrose Lunnon and Sonia Stace

You can explore Ambrose' Youtube channel "Adventures with Ambrose" here: https://www.youtube.com/c/AdventureswithAmbrose

Blue-banded bees

Snake Mantid

Planthopper

Robber Fly

Bee Fly

Redlined Looper Moth

Pink bellied Moth

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