



17 July 2015 Ken Walker (kwalker@museum.vic.gov.au) Museum Victoria. Edition 17.

Hi All – What a week for scientific discovery and imagery. The 5 billion kilometre trip by NASA’s New Horizons satellite launched 9 years ago just took my breath away. Now every planet in our galaxy has been visited – an amazing achievement to curiosity and basic research. There is a saying about research “Basic research cannot be premediated.” Grant funding is now extremely competitive and difficult to receive - researchers must describe in minute detail what they intend to achieve, where it will be published, the impact factor of the journals in which they will publish and so on. Mostly gone now is time allowed to follow research rabbit holes – most of which end in dead ends but just now and again something completely unexpected is achieved. Like the researcher studying corals who become part of a team which developed a new form of human sunscreen lotion. Or, the accidental discovery of Teflon by Roy J. Plunkett at the DuPont laboratory in 1938. Plunkett accidentally found a substance that was heat resistant, chemically inert and that most other substances would not adhere to it. Plunkett later told his student audiences, his mind was prepared by education and training to recognize novelty. Plunkett was awarded the Philadelphia’s Scott Medal in 1951 which became the first occasion for the introduction of Teflon bakeware to the public: each guest at the banquet went home with a Teflon-coated muffin tin. The rest is history.

I love an insect with a scientific name longer than the insect itself!

Please meet *Ephippitytha trigtiduoguttata* an immature mottled katydid or 32-spotted katydid. Obviously, the spots develop as it matures. By the way, notice how I put the common names in lower case. That's the rule when using common names in text except when the common name includes a noun such as Kershaw's brown or the Australian admiral (butterflies). Quaint hey! This rule is often broken.

What a tongue twisting species name – it's a hoot! Thank goodness Australia's grasshopper expert, David Rentz, was able to name it. I should have asked him to pronounce it !!

The 3 green rings across the thorax look intriguing.



Photo by Wilma McNabb

For Praying mantis – it's all in the forelegs.

Praying mantis forelegs are diagnostic and recognisable. They are called “raptorial” and when held at rest, they appear to be in the “praying position”. But, did you know there is more to forelegs than catching prey? They have a survival reason.

Praying mantis specimens would make a wonderful meal for a vertebrates such as birds or lizards or even small mammals. One technique used by animals to judge the size of other animals by the looking at the distance between their eyes. The further apart the eyes are the larger the animal.

Now, praying mantis eyes are fairly close together so they use subterfuge to appear to have a larger head by having false eye colour patterns on the inside of their forelegs. When challenged by a predator, the praying mantis will rear back on their hind legs and spread their forelegs apart displaying the false eye patterns on the inside of the forelegs. Sometimes it works and sometimes it doesn't – that's nature.

There are many other insects that use false eye patterns – especially butterflies. Whenever a bird attacks a butterfly, it will always attempt to bite the head to quickly depatch its prey. Many nymphalid butterflies have obvious eye spots positioned on the periphery of their wings. We have many a nymphalid specimen in our collection that have distinctive triangular bird beak shaped pieces missing out of their wings. If the ruse works just once and it is a female who lays 100+ eggs then the false eyes have done their job. Lycaenid use a different technique to confuse birds where to bite the butterflies head. These butterflies have “tails” on their hindwings that look just like antennae and they wiggle these tails to attract the attention of birds to bite the wrong end. Amazing adaptations for survival.



Photo by Linda Rogan



Photo by Reiner Richter



Photo by Ken Walker



Photo by Linda Rogan



Photo by David Rentz

Of course, mantis are great predators!



Photo by Suzanne Jones

And, mantis love to show off and pose for the camera!!



Photo by Nerissa Turner



Photo by Lily Kumpe

However, did you know that not all insects with raptorial forelegs are all praying mantis? Over time, evolution finds ways to evolve what best suits an organism's survival and sometimes evolution produces the same functionality more than once – but it does so independently. Having similar looking functions does not necessarily mean that two or more organisms are descended from a common ancestor. The technical term for these phenomena is convergent evolution and they are the bane of a taxonomist's research. A classic case that tends to confuse people is the lacewing Neuroptera group Mantispidae. The mantispids have well developed raptorial forelegs similar to those found on praying mantis.

Here is an image of a typical mantispid lacewing and you can clearly see the raptorial forelegs. But, if you look at the head and its wing venation then you will find many reasons to separate mantispids from mantis.



Photo by Dane Wimbush.

Finally on this topic, here are some images of lycaenid butterflies with tails on their hind wings that resemble antennae.












Photo by John Caldow.



Photo by Ross Field

Did anyone see the report this week by Birdlife Australia titled: **“Magpies, kookaburras and willie wagtails among common Australian birds 'starting to disappear.’”**

There are lots of great records for these birds on BowerBird – so keep an eye out for these birds and record them when you see them.

<p>Erica Siegel</p> <p>Laughing Kookaburra - Dace...</p>  <p>0 stars, 1 report, 1 photo, 0 comments</p>	<p>Erica Siegel</p> <p>Laughing Kookaburra - Dace...</p>  <p>0 stars, 1 report, 1 photo, 0 comments</p>	<p>Ken Walker</p> <p>Tame kookaburra looking fo...</p>  <p>1 star, 1 report, 0 photos, 0 comments</p>
<p>Adam Edmonds</p> <p>Kookaburra Darebin Parkla...</p>  <p>0 stars, 1 report, 1 photo, 0 comments</p>	<p>Daniel Heald</p> <p>Laughing Kookaburra</p>  <p>0 stars, 1 report, 0 photos, 0 comments</p>	<p>Adam Edmonds</p> <p>Laughing Kookaburras Bruc...</p>  <p>0 stars, 1 report, 1 photo, 0 comments</p>
<p>Robert Bender</p> <p>Kookaburra Dacelo gigas</p>  <p></p>	<p>Robert Bender</p> <p>Laughing Kookaburra</p>  <p></p>	<p>Ken Walker</p> <p>Kookaburra</p>  <p></p>

Anna Lanigan

Magpie-lark



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Anna Lanigan

Australian Magpie



0 0 1 0 0

Anna Lanigan

Australian Magpie



0 0 1 0 0

Anna Lanigan

Australian Magpie



0 0 1 0 0

Anna Lanigan

Magpie-lark



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Anna Lanigan

Australian Magpie - Westme...



0 0 1 0 0

Daniel Heald

Magpie Moth



0 0 1 1 0

Daniel Heald

Magpie-lark



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Erica Siegel

Australian Magpie - Cracticu...



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Anna Lanigan

Magpie-lark - Westmeadows



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Tamara Leitch

Magpie Moth



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David Akers

Nyctemera amicus



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Anna Lanigan

Willie-wagtail



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Anna Lanigan

Willie Wagtail - Attwood



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Anna Lanigan

Willie Wagtail



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Adam Edmonds

Willie Wagtail Wilson Reserv...



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Anna Lanigan

Willie Wagtail



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Anna Lanigan

Willie Wagtail



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Anna Lanigan

Willie Wagtail - NJW



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Anna Lanigan

Willie Wagtail



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Anna Lanigan

Willie Wagtail - Strathmore



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Anna Lanigan

Willie Wagtail



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Anna Lanigan

Willie Wagtail - Strathmore



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Anna Lanigan

Willie Wagtail



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Things in spoons ...

A teaspoon of Asian gecko eggs!



Photos by Lyndie Malan

A Southern Pygmy Perch (alive, photographed and released!)



Photo by Gippsland Lakes - Mountains to the Sea

More of my AP (Aesthetically Pleasing) moments ...



Sheer delights. Photos by Belinda Hansen

Member's passions really shine through

This recent BowerBird record brought a smile to my face.



In a remote WA location, on a flat gibber plain, there was a flash of green in the middle of the image which turned out to be an *Eremophila* plant in flower.



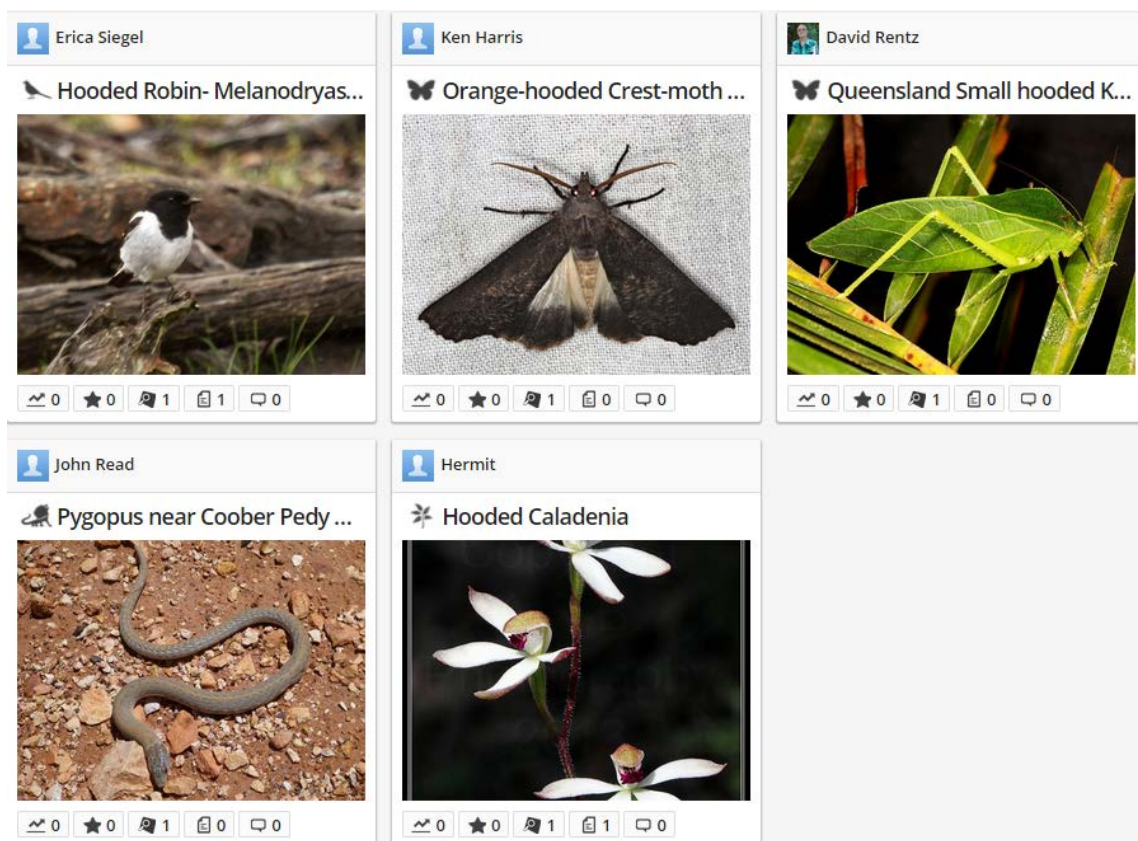


Close up images showed it was *Eremophila attenuata*. The record carried this comment: "It has taken us nearly 10 years to find this species which hasn't been seen or collected since 1976." This species has a Priority 1 conservation status in WA.

Photos and text by Dr Bevan Buirchel.

Have you ever just “played” with the BowerBird dataset?

As a scientist, I sometimes goof off by playing with arbitrary combinations of data – I like to look for data patterns. This type of goofing off allows me to explore lateral entry points into unrelated datasets. Initially, there are no concrete reasons for asking the queries but later on I often find that I do discover a purpose for such seemingly non-sensible queries. It’s just fun that may find a purpose. This is also a great way to test the robustness of the dataset. I sometimes like “playing” with the BowerBird dataset using common names. For example, I queried on the common name “Hooded” and out of over 25,000 BowerBird records, I received these five interesting results.



The snake’s common name is the “Hooded scaly foot”. Try querying for the terms “Red”, “Green” or “Blue”. You get an amazing return of disparate records all linked by these random terms. You will soon see patterns to the returned records.

To be a good taxonomist, you need to be a good detective!

Remember last week's "Favourite Image of the week"? Jean and Fred Hort found this prickly caterpillar feeding on lichen on a WA granite outcrop. Peter Marriott placed it in the family Arctiidae but could not find any matching images on the web.



Museum Victoria's archives are full of all sorts of published and unpublished paraphernalia – a cornucopia of historical dead-ends and discoveries. This week Peter contacted me suggesting he had found a species name for Jean and Fred's caterpillar – from the Museum archives. An ALA map shows this species has been recorded near Jean and Fred's sighting:



Not a bad match indeed and well done

“Senior Detective” Peter Marriott – gotta love those “moth-ers”.

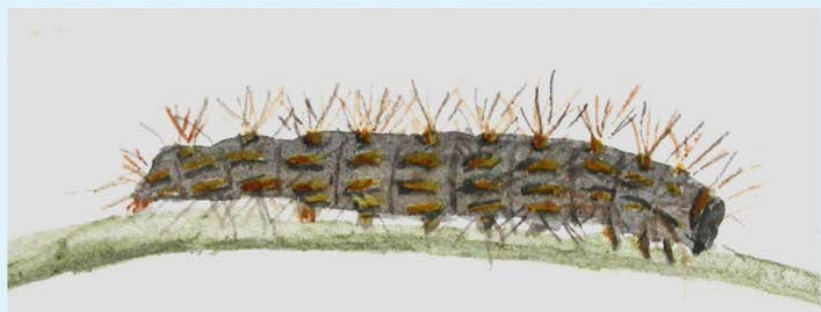
Castulo doubledayi Newman, 1857

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♂

Adult and larvae
from an unpublished
manuscript by
E. Anderson held in
the Melbourne
Museum archives.
The work was
developed between
1888 and 1910.



BowerBird's recognition of NASA's amazing Pluto images.

What an amazing feat of science, engineering, maths, physics and more to get a satellite to travel 5 billion kilometres and take pictures of a frozen "dwarf" planet from 12,500 kilometres away. We honour that achievement with this moth from Kuranda whose image is on BowerBird and scientific name is:



Conogethes pluto
(species)

Taxonomy: Animalia: Arthropoda: Insecta: Lepidoptera: Pyralidae: Conogethes: pluto

Common Names: Moths, Pyralids, Snout moths

However, this moth was named by Butler in 1887 after the Greek God Pluto rather than the planet Pluto which was not discovered until 1930 – but what the heck! I'm just wingin' it.



Photo by David Rentz

Your weekly fungal fix.



Hydnum repandum — Photo by David Akers.



Mucronella pendula - Photo by Matt Campbell



Australoporus tasmanicus - Photo by Matt Campbell



Slime mould – Photo by David Akers

Nothing is off-limits to BowerBird fungal photographers!



Photo by Matt Campbell

Matt commented: “Growing on what appears to be canine faeces (too small to be cat or fox and there is at least one dog that sometimes visits the property). Discs averaging 2 to 3mm. Irregularly shaped and with a distorted margin. Forgive me for not getting closer to this one but it did not look inviting. The small violet coloured shapes appear to be Springtails. They look identical to the grey Springtails I often find on fungus other than for their colour.”

Notice it's not the canine poo that Matt wants to avoid, it's the fungus. That's cool with me.

Then I photographed some horse poo fungus



Panaeolus papilionaceus - Photo by "Anonymous" – actually ... it was me.



More coprophilous fungi (Poo-fungi) – Photo by Graeme Cocks



Cortinarius archeri — Photos by Judy & Rob Peters

Favourite image for this week.

This marine polychaete worm was submitted by Dane Wimbush photographed near Fraser Island, Qld. What I loved about this record was Dane's description of how they collected the worm:

"This worm swallowed a bait, hook & all, then disgorged it."



Photo by Dane Wimbush

Museum Victoria just happens to have one of Australia's two polychaete experts in our Marine Department – Dr Robin Wilson. Robin identified the worm to the family Amphinomidae and made this comment:

"Common name: fireworm. If you allow one to touch your skin you will know why it is called a fireworm!"

We all tease Robin by saying – *The only good polychaete worm is the one on the end of a fish hook!* He takes such ribbing well. Speaking of polychaetes, here are some other BowerBird polychaete images:



Sepulid Tubeworm - Photo by Daniel Heald

And, this image series showing polychaete worms emerging from their sand burrows to filter feed.





Myxicola infundibulum - Photos by Jan Carey



Taxonomy: Animalia: Annelida: Polychaeta: Phyllodoce:
Polynoidae – Photo by Audrey Falconer



Tracks often seen in wet beach sand - Taxonomy: Animalia:
Annelida: Polychaeta: Scolecida: Orbiniidae – Photo by Ken Walker

Image photographer correction update.

Last week, in the pollinator story I incorrectly attributed an image's authorship for this wonderful *Amegilla* bee image with orchid pollinia. The correct attribution should have been to Jenny Thynne. My sincere apologies to you Jenny.



Photo by Jenny Thynne

Have you ever seen a real, fabled “bees-whiz”?

I work at Museum Victoria as a professional taxonomist and my research subject is native Australian bees. I am currently doing an update on a group of bees I revised back in 1995 – An endemic Australian subgenus – *Lasioglossum (Chilalictus)* (Family Halictidae). Since that publication, I have found several potentially new species that need to be confirmed as new species, then described and their names added to the Australia’s rich fauna of endemic Australian bees.

This week, I have been examining a series of specimens collected in 1973 near Coolgardie in WA. The males have a unique hair pattern on the underneath of their abdomen which alerted me to their potential new species status. This afternoon I dissected and examined the male genitalia to confirm the new species status. This process involves me relaxing a single male specimen overnight in a high humidity chamber. Then using scissors used by an ophthalmologist eye surgeon (ie. very small), I cut off the last 3 abdominal segments which contain the male genital capsule. I then prepare a mixture of 10% KOH (potassium hydroxide) in water which I pour into a test tube and add the abdominal segments. I place the test tube into a beaker of water and boil the water for 30 minutes. Hot KOH is extremely caustic so you do not want it spurting out of the test tube. By placing the test tube with KOH into boiling water, the KOH itself will never boil because the 10% KOH water mixture has added an impurity to the water which raises its boiling point so the KOH will never boil in a boiling water bath. The hot KOH dissolves all of the muscle tissue holding the genital capsule in place between the abdominal segments.

Once boiled, I put the abdominal segments through 2 water washes to remove the KOH, then a single wash in Glacial Acidic Acid which removes the water and then I place the abdominal segments onto a drop of glycerine on a glass slide. The using minuten pins (pin diameter is 0.056mm in diameter) stuck onto the ends of match sticks, I tease apart the abdominal segments to expose and view the genital capsule. I examine the exposed male genital capsule under both a binocular and compound microscopes. For the new species description and publication, I will either do a line diagram or use an image of the genital capsule.

Examination of the genital capsule this afternoon has confirmed the Coolgardie specimens are indeed a new and undescribed species.

I thought I would share with you an image of the new species' genital capsule. You can now say that you have truly seen a real "bees-whiz" – hence the Australian expression – Smaller than a "bees-whiz".

And, what a thing of complex beauty is the genital capsule.

The view below is the ventral view of the capsule.



Notice in the bottom right corner the black line scale bar measuring 2 thousandths of a millimetre. To put that into perspective, the “tube” running across the bottom of the image is a strand of my head hair that I sacrificed from my not-so-hirsute head. Compare my hair strand to the thousands of hair strands on the top (gonostyli) of the bees-whiz. These are all needed on the male bees-whiz so that the female bee can “recognises” the correct mate and allow mating – we call it the “lock and key” mechanism. I am always amazed how something so small can be so complex.

I have spent my working life looking down microscopes and peering into a world that most people do not know exists. I have always felt very privileged to work in the micro-world and to see the wonders and intricacies of the micro-sculpture of insects.

As always from BowerBird .. that's your lot for this week.

Haveagoodweekend all Happy photographing ...

Cheers – Ken

(If you wish to leave this email list, please contact me directly at
kwalker@museum.vic.gov.au – else share with your friends)