

OBJECT: To foster an interest in nature

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GPO BOX 249
CANBERRA ACT 2601

FIELD NATURALISTS' ASSOCIATION OF CANBERRA INC.

FIELD NATTER

MEETING—Thursday 4 October 2018

7:30 pm Australian National University

Jan Anderson Seminar Room, R.N. Robertson Building, Biology Place, ANU, ACT
details back page

Timor Leste

Speaker: Rainer Rehwinkel

Rainer Rehwinkel is a naturalist with experience in Australia (both temperate and tropical), in South-eastern Asia (gained from numerous trips to Borneo, Peninsula Malaysia and Vietnam) and also sojourns to Papua New Guinea and Java. Earlier this year, he was offered an opportunity to visit Timor Leste, accompanying an Australian Election Monitoring Volunteer. During his two week stay in Timor Leste, Rainer had opportunities to not only partake in the amazing atmosphere of the election culture of one of the world's youngest democracies, but also to do some exploring of the wildlife and vegetation of our near-northern neighbour. His talk at Canberra Field Naturalists will focus on the fascinating similarities and differences in the biodiversity of Timor Leste compared to the various countries surrounding it.



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Curious Kids: Do butterflies remember being caterpillars?

27 August 2018

Michael F Braby, Associate Professor, Australian National University. Republished under Creative Commons licence.

This is an article from Curious Kids, a series for children.

Q: We have caterpillars at home. I would like to know whether they will remember being caterpillars when they are butterflies. – Evan, age 5, Bristol, UK.

Dear Evan,

I think it is highly unlikely that a butterfly or moth remembers being a caterpillar. However, it may well remember some experiences it learned as a caterpillar.

That fact in itself is especially amazing because inside the pupa (or chrysalis), the caterpillar actually turns to liquid as it transforms into a butterfly or moth (the adult stage).

The transformation from the pupa to the adult is the most dramatic change in the life cycle of a butterfly, and scientists refer to this change as metamorphosis. During metamorphosis, the body tissues of the caterpillar are completely reorganised to produce the beautiful adult butterfly that emerges from the pupa.

Scientists have known for a long time that caterpillars can learn and remember things when they are caterpillars, and adult butterflies can do the same when they are butterflies. However, because of metamorphosis, we were not sure if an adult butterfly could remember things it learned as a caterpillar.

This ability to remember caterpillar experiences as an adult was tested in a study by a team of scientists at Georgetown University in the United States of America.

The researchers trained the caterpillars to dislike the smell of ethyl acetate, a chemical often found in nail polish remover.

They did this by giving the caterpillars little electric shocks every time they smelled the chemical. Soon, these caterpillars were trained to avoid that smell because it reminded them of the electric shock.

They let the caterpillars transform into adult moths, and then tested the moths again to see if

they still remembered to stay away from the ethyl acetate smell.

And guess what? Most of them did! The scientists had shown that the memories of avoiding the bad smell experienced as a caterpillar had been carried over into the moth stage.

The study showed that memory, and therefore the nervous system, stays during the complex transformation from the caterpillar to the adult moth. So while a moth or butterfly may not remember being a caterpillar, it can remember experiences it learned as a caterpillar.

More weird and wonderful butterfly facts

The main purpose of a caterpillar's life is to eat food and grow bigger. The adult butterfly or moth, however, is mostly concerned with finding a mate, flying to a new area and searching for suitable plants on which to lay its eggs.

Most caterpillars eat leaves of plants, but some eat other foods like flowers or fruits. Some eat very strange foods, such as ants or insects.

Dr Daniel Rubinoff, a scientist who studies butterflies and moths, recently reported a very unusual diet from Hawaii. The caterpillar of a particular species of moth ate only the soft tissue of a snail!

Unlike a hungry caterpillar, which grows quickly and increases in size, the adult butterfly never grows. It always stays the same size.

However, for the butterfly to survive and live long enough to mate and lay eggs, it must drink. The favoured drink for butterflies is nectar from flowers, which is rich in sugars to give energy. But some butterflies also drink the moisture from sand, especially along the banks of creeks or rivers.

A few species in the tropics even drink the moisture from rotting fruit or animal poo to extract essential nutrients.

Thank you for sending in this very interesting question.

Yours sincerely

A/Prof Michael F Braby

The invisible colours protecting birds from overheating

By Dr Iliana Medina and Associate Professor Devi Stuart-Fox, University of Melbourne

The world is getting hotter and just like humans, animals and plants need strategies to cope with rising temperatures. But it's birds that are especially vulnerable to overheating.

They are small, they have very high metabolic rates and are mostly active during the day. Yet many of them are found in arid regions that in summer can reach temperatures close to 50°C with extremely high solar radiation levels.

But now, research, published in *Nature Communications*, has found that some birds use a neat trick of the light to keep cool, and researchers are working towards uncovering the feather nano-structures that makes this trick possible.

Colours and temperature

You are probably familiar with the fact that colours can alter the temperature of a surface. Light colours, like white or yellow, reflect light and as a result absorb less energy than dark colours. Energy absorbed from sunlight is converted into heat, which is why wearing a black t-shirt in a harsh Australian summer is a bad idea.

But there is much more to this story, at a very small scale, than meets the eye.

The colours that we see are a result of the light reflected within a narrow range of wavelengths – what we call the visible spectrum. But sunlight also spans wavelengths that we cannot see. Humans can't see ultraviolet wavelengths, which many other animals can see.

But there's one set of wavelengths that elude all of us – these are near infra-red (NIR) wavelengths. And understanding how bird feathers interact with these wavelengths is important, not just for birds, but also for humans through the potential for improvements in thermal efficiency.

Reflecting the heat

Research at the School of BioSciences at the University of Melbourne suggests that some Australian birds can control their temperature and avoid overheating by reflecting near-infrared wavelengths of sunlight.

Researchers collected information on 90 species of Australian birds and found a very strong link between living in hot, arid regions and reflecting a higher proportion of near-infrared light.

Researchers in the field of animal colouration have largely ignored near-infrared light, because it isn't easy to measure and there's no evidence that animals can see these wavelengths.

Because these wavelengths are invisible, they don't affect camouflage or sexual attractiveness, which are very important in the animal world. This means that many animals can control their temperature by altering reflection of near-infrared light without compromising their ability to hide or attract a mate.

The orange chat (*Epthianura aurifrons*), which lives in the hot and dry area of central Australia, is a good example.

Males have a bright orange-yellow crown and breast to impress females, while females are a well-camouflaged mottled grey and brown.

Yet both sexes, irrespective of their colour, reflect a remarkably high proportion of near-infrared sunlight – this is particularly noticeable from their crown and back, which is often exposed to the sun. This might allow these small desert birds to forage for longer to get enough food to survive without overheating.

Adapting to climate

Across the 90 bird species studied, reflection of near-infrared light correlates with climate, so birds in hot, dry climates, like the orange chat, tend to reflect more of this light.

Those in cooler climates, species like the familiar superb fairy wren (*Malurus cyaneus*), or the white-eared honeyeater (*Lichenostomus leucotis*), tend to absorb more of this light. If we could see infra-red light, the birds from hot climates would have paler feathers than the birds living in cooler climates.

Interestingly, only the dorsal feathers – those on the back and head – showed this relationship to climate. The same effect isn't seen in the ventral feathers on the underside of the bird.

This makes sense because the dorsal surfaces are more exposed to direct sunlight. It is further evidence that natural selection has favoured NIR reflectivity and isn't just a coincidence that's come about as a side-effect of some other feature of feathers.

We also found that small birds had much higher near-infrared reflectivity than large birds.

So why small birds, and how much does it actually improve a bird's chances of survival?

Preventing water loss

To understand this, we developed biophysical models looking into how reflecting near-infrared light benefits the birds through reducing water loss as a result of evaporative cooling. This is the main way birds prevent overheating – like sweating – but the water is mostly lost from the lungs.

We fed our model with weather data from the Simpson Desert in South Australia. This extreme environment, which has similar harsh conditions to Arizona in the USA, is home to more than 100 bird species.

At temperatures above 40°C, we found that small birds can lose more than 10% of their body weight every hour through dehydration. If they don't have ready access to water, this dehydration could kill them in just a couple of hours.

By increasing reflection of near-infrared light, our models suggest that smaller birds (weighing around 10 grams) lose up to two per cent less of their body weight per hour. But these benefits are less for larger birds (one kilogram), who save only 0.1 per cent.

To put the result for small birds in human terms, a 60 kilogram person would avoid losing 1.2 kilograms of water each hour by having a highly reflective skin. In extreme environments, this could be the difference between life and death.

Birds that lose more than 10% of their weight from water loss during a day are unlikely to survive.

White feathers, barbs and the future

We wanted to know more about how this NIR reflectivity works, so we looked at white feathers from 50 bird species.

By focussing on white feathers that have no pigment, we could isolate the specific micro-structures that produce high NIR reflectivity. We found that the feathers that reflect most NIR light, regardless of their visible brightness, are those with barbs – these are branches from the main shaft – that are round rather than flattened and have very closely packed branching filaments or barbules.

So, what does this tell us? Well, it's a step in understanding how birds cope in a warming climate.

Photographer discovers beauty of night time miniature marine world

ABC Illawarra By Justin Huntsdale

What started as a fascination with capturing photos of the highly venomous blue-ringed octopus has led one man to a world of fascinating miniature marine life living under our noses.

Jumping into the frigid Pacific Ocean for a winter night dive in search of creatures that generally want to hide from you sounds like a tough gig.

However, Stanwell Park photographer Matty Smith is used to suffering for his art, whether it be wrangling a large and uncomfortable camera along with all his dive gear, the chill of stripping off a cold wet suit in the dark in July, or risking a sting from a shy but deadly creature.

“How it started was I wanted to get a great shot of a blue-ringed octopus, so I asked around where they might be, and a few people suggested Wollongong harbour,” Mr Smith said.

“So I did a night dive there with a mate and we found one straight away.

“As soon as I saw one, how amazing they look, how they flash blue and how well the pictures came out, I was hooked.”

The internationally-renowned ocean photographer, who shot to fame through his over/under photography of bluebottles, has moved on to an octopus with a sting capable of killing 26 adults within minutes.

“The really colourful things are the most poisonous,” Mr Smith said.

“Although they’re deadly, you’d be really unlucky to get a fatal bite.

“They’re really shy and they want to hide more than anything, so you have to be quick before they disappear under a rock.”

Finding and photographing tiny creatures

Having dived extensively along the south coast of New South Wales where he lives, Mr Smith has developed a good knowledge for the ocean landscape.

Meet the blue-ringed octopus

One of the most venomous creatures in the ocean, it can kill 26 adults within minutes.

Can grow up to 20 cm long. They have eight ‘arms’, two of which get raised in defence when threatened.

The octopus pulses its blue rings before injecting venom with a bite.

They live in shallow rocky areas from Australia to Japan.

And while most of his dives recently have been at night, with the help of an underwater light, he has a high success rate finding the shy octopus.

“When you get your eye in, the more practice you get, the more you spot,” he said.

“They always look like a funny shaped stone so to the untrained eye, you’d probably swim past it, but when you figure out where they like to hide, you can spot them.”

Mr Smith said the blue-ringed octopus looks like a brown gum leaf resting on the ocean floor, but when disturbed, it absorbs water to make itself look bigger and raises its ‘arms’ in defence.

“You normally get two or three photos and then they jet away,” he said.

Discovering a world of tiny creatures

Mr Smith wanted to get a portfolio of shots of blue-ringed octopuses but in doing so, found a world of small and fascinating creatures.

Some of his recent subjects include cuttlefish, prawns, a rose petal bubble snail, pyjama squid, the southern pygmy squid, and tube anemones.

It’s often not until he gets the images home and onto the computer that he notices the intricate details of the creatures he photographs.

“They look beautiful but small, but when you get a sharp picture and you can see the detail, colours, texture and eyes, they look incredible,” Mr Smith said.

He said photographing them at night helped add to the mood and showed off the vibrancy of the colours, but lighting them correctly took time to perfect.

“I like to shoot [direct] the light and focus it into a narrow beam, much like putting a spotlight on an actor on the stage,” he said.

“It’s a specialised and fairly difficult lighting style to pull off, but with practice it works well.”

Magpies can form friendships with people - here's how

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Can one form a friendship with a magpie – even when adult males are protecting their nests during the swooping season? The short answer is: “Yes, one can” – although science has just begun to provide feasible explanations for friendship in animals, let alone for cross-species friendships between humans and wild birds.

Ravens and magpies are known to form powerful allegiances among themselves. In fact, Australia is thought to be a hotspot for cooperative behaviour in birds worldwide. They like to stick together with family and mates, in the good Australian way.

Of course, many bird species may readily come to a feeding table and become tame enough to take food from our hand, but this isn't really 'friendship'. However, there is evidence that, remarkably, free-living magpies can forge lasting relationships with people, even without depending on us for food or shelter.

When magpies are permanently ensconced on human property, they are also far less likely to swoop the people who live there. Over 80% of all successfully breeding magpies live near human houses, which means the vast majority of people, in fact, never get swooped. And since magpies can live between 25 and 30 years and are territorial, they can develop lifelong friendships with humans. This bond can extend to trusting certain people around their offspring.

A key reason why friendships with magpies are possible is that we now know that magpies are able to recognise and remember individual human faces for many years. They can learn which nearby humans do not constitute a risk. They will remember someone who was good to them; equally, they remember negative encounters.

Why become friends?

Magpies that actively form friendships with people make this investment (from their point of view) for good reason. Properties suitable for magpies are hard to come by and the competition is fierce. Most magpies will not secure a territory – let alone breed – until they are at least five years old. In fact, only about 14% of adult magpies ever succeed in breeding. And based on extensive magpie population research conducted by R. Carrick in the 1970s, even if they breed successfully every single year, they may successfully raise only seven to eleven chicks to adulthood and breeding in a lifetime. There is a lot at stake with every magpie clutch.

The difference between simply not swooping someone and a real friendship manifests in several ways. When magpies have formed an attachment they will often show their trust, for example, by formally introducing their offspring. They may allow their chicks to play near people, not fly away when a resident human is approaching, and actually approach or roost near a human.

In rare cases, they may even join in human activity. For example, magpies have helped me garden by walking in parallel to my weeding activity and displacing soil as I did.

One magpie always perched on my kitchen window sill, looking in and watching my every move.

On one extraordinary occasion, an adult female magpie gingerly entered my house on foot, and hopped over to my desk where I was sitting. She watched me type on the keyboard and even looked at the screen. I had to get up to take a phone call and when I returned, the magpie had taken up a position at my keyboard, pecked the keys gently and then looked at the 'results' on screen.

The bird was curious about everything I did. She also wanted to play with me and found my shoelaces particularly attractive, pulling them and then running away a little only to return for another go.

Importantly, it was the bird (not hand-raised but a free-living adult female) that had begun to take the initiative and had chosen to socially interact and such behaviour, as research has shown particularly in primates, is affiliative and part of the basis of social bonds and friendships.

Risky business

If magpies can be so good with humans how can one explain their swooping at people (even if it is only for a few weeks in the year)? It's worth bearing in mind that swooping magpies (invariably males on guard duty) do not act in aggression or anger but as nest defenders. The strategy they choose is based on risk assessment.

A risk is posed by someone who is unknown and was not present at the time of nest building, which unfortunately is often the case in public places and parks. That person is then classified as a territorial intruder and thus a potential risk to its brood. At this point the male guarding the brooding female is obliged to perform a warning swoop, literally asking a person to step away from the nest area.

If warnings are ignored, the adult male may try to conduct a near contact swoop aimed at the head (the magpie can break its own neck if it makes contact, so it is a strategy of last resort only). Magpie swooping is generally a defensive action taken when someone unknown approaches who the magpie believes intends harm. It is not an arbitrary attack.

When I was swooped for the first time in a public place I slowly walked over to the other side of the road. Importantly, I allowed the male to study my face and appearance from a safe distance so he could remember me in future, a useful strategy since we now know that magpies remember human faces. Taking a piece of mince or taking a wide berth around the magpies nest may eventually convince the nervous magpie that he does not need to deter this individual anymore because she or he poses little or no risk, and who knows, may even become a friend in future.

A sure way of escalating conflict is to fence them with an umbrella or any other device, or to run away at high speed. This human approach may well confirm for the magpie that the person concerned is dangerous and needs to be fought with every available strategy.

In dealing with magpies, as in global politics, de-escalating a perceived conflict is usually the best strategy.

Farm worker who poisoned 406 wedge-tailed eagles in east Gippsland jailed and fined

A New Zealand man has been jailed for 14 days and fined \$2,500 for poisoning 406 wedge-tailed eagles at three remote properties in Victoria's east.

The farm worker pleaded guilty to killing the protected birds at Tubbut in east Gippsland between October 2016 and April 2018, saying he was under pressure from his boss to increase lamb survival rates.

The eagle carcasses were found hidden in bush and scrub on three separate farms spanning 2,000 hectares.

The farm worker alerted authorities to his actions in May 2018 after a verbal argument with his boss. He provided investigators with two diaries detailing the methods used and a hand-drawn map showing where the eagle carcasses were hidden and where the chemicals were stored.

Three different chemicals were used to kill the eagles, but most of the eagle deaths were caused



by the chemical Lannate injected into the necks of lambs.

Editor's note: The magistrate would have jailed the offender for three months if he hadn't turned himself in, but even that seems a light sentence given the huge destruction of these magnificent birds.

Spring in Canberra continues

Spring is the time for new life; plants; insects; birds. In the past few weeks I've noticed the gradual increase in insects, both at home and in nature reserves, though still not a lot at present. While the Pinnacle Nature Reserve still seems rather devoid of flowering plants, Black Mountain and Gossan Hill have plenty of *Caladendia fuscata* and *Cyanicula caerulea* orchids in flower, but I'm still hoping to find others.



Birds, on the other hand, have started their nesting in earnest. I've discovered two nesting hollows for Gang Gang cockatoos. The Spotted Pardalotes at the botanic gardens have once again nested at the same



site as for the last five or six years (at least), and the Collared Sparrowhawks are once again visiting their nest from last year at the gardens.

At the Pinnacle Nature reserve I've found three possible nesting hollows for pardalotes. The hollow used by the Striated Pardalotes for several years, but abandoned for the last couple of years, seems to be hollowed out again. A few weeks ago I observed both a male and female Spotted Pardalote at another hollow and last weekend, by chance, perhaps identified a further nesting hollow quite close to the old Striated Pardalote hollow. On this occasion I also witnessed mating Nankeen Kestrel quite close

to the Kama property residence at the Pinnacle, so hopefully they have a nest nearby.



At the botanic gardens the water dragons are beginning to emerge from their winter hibernation, though still not plentiful in sight, and this week I spotted my first McLeahys Swallowtail butterfly.



Alison Milton

Activities

1, 2, 8, 9 September 2018: 10 am to 4 pm. Open days Illawarra Grevillea Park, Bulli

The park is located at the rear of the Bulli Showground, Princes Highway, Bulli

3–4 November, 8:30 am–4:30 pm Weed swap – volunteers needed

Corkhill Bros, Mugga Lane, Symonston and Canberra Sand and Gravel, Parkwood Road, West Belconnen. Environmental weeds removed from gardens and yards are exchanged for hardy native species paid for by the ACT Government. Volunteers work 2–3 hour sessions. Each plant has an ANPS label with detailed growing information... this means that quick reading, enjoying meeting people and promoting the virtues of native species are the skills volunteers need! We need 20 volunteers for this weekend so please volunteer. Contact Rosemary Blemings rosemary@blemings.org ph. 6258 4724.

11–15 November 2018, Synergy Building, CSIRO, Canberra: 12th Australasian Plant Conservation Conference 2018 – ‘Moving House – A new age for plant translocation and restoration’

Early bird registrations are now open for this week long conference about moving and translocation of threatened plants in Australia including new approaches, politics of moving and collaboration.

Saturday 13 October 2018; 9.30 am sharp to 12 noon or later, Black Mountain Ramble

Celebrate the spring flowering on beautiful Black Mountain with a social ramble for wildflower lovers in the tradition established by Nancy Burbidge, and continued by George Chippendale. Discover the surprising diversity of tiny orchids, bush peas, wattles and billy buttons on easy bush tracks with experienced guides and good company. All springs are not the same. The pattern remains but timing and abundance will vary with the weather. Friends of Black Mountain welcomes all comers, be they experts or those who have never slowed down to see the somewhat cryptic diversity. We plan several guides, with helpers, who will take different directions. BYO morning tea, hat, sunblock and stout shoes. Bookings essential to ensure we have enough guides. Contact friendsofblackmountain@gmail.com or Linda 0437 298 711

Water-rats breaking the ice

The Australian water-rat (or rakali) is an adaptable species that is known to occupy a very wide range of aquatic habitats. A new record for how high it can occur in mountainous regions has been recently established as a result of some fascinating observations from Kosciuszko National Park. These have been shared with the Australian Platypus Conservatory (APC) by Dr Ken Green, who has worked for the past 40 years to document the plants and animals found at elevations above 1500 metres.

It was believed that the previously recognised ‘mountaineering record’ for the species was around 1500 metres, set at Lake Catani in Mount Buffalo National Park in Victoria. However, Dr Green reports that in November 1998 he observed a water-rat swimming in Betts Creek at 1740 metres. Then, in mid-June 2009 he noted an

animal at an even higher elevation – 1900 metres at Blue Lake, where ice is known to freeze to a depth of a metre or more. On this particular day some early ice had formed in the water but, unperturbed, the water-rat was seen to be both swimming in the water and walking over nearby ice and snow on land.

Dr Green’s observations are among more than 100 new rakali records for the ACT and nearby areas that have been received since the APC launched its community-based survey for this species (funded by the Wettenhall Environment Trust) at ANU in early August. You can assist this project by reporting rakali sightings via the APC website (www.platypus.asn.au), or by emailing the details of when and where you saw a water-rat to platypus.apc@westnet.com.au



Field Naturalists' Association of Canberra Inc.

Who are the Field Naturalists?

The Field Naturalists' Association of Canberra (FNAC) was formed in 1981. Our aim is to foster interest in natural history by means of meetings and regular field outings. Meetings are usually held on the first Thursday of each month. Outings range from weekend rambles to long weekends away. Activities are advertised in our monthly newsletter. We emphasise informality and the enjoyment of nature. New members are always welcome. If you wish to join FNAC, please fill in the member application below and send it in with your subscription to the FNAC Treasurer at the address below.

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MEMBERSHIP APPLICATION OR RENEWAL

Family name: First name:

If a family membership, please include the first names of other members of the family:

.....

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How did you hear about FNAC? Please circle: FRIEND? OTHER? Please specify: