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treasure**
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the *Sydney Cove*

**Devastating
cyclones**
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destructive

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caves**
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Workshop fee does NOT include Airfares and Accommodation.
Your own arrangements will need to be arranged via
www.australiangeographic.com.au/whitsundays

The Workshop covers landscape, aerial and portrait photography skills, as well as digital processing and printing, plus you'll learn all of this from 3 of Australia's best photographers in their field.



Peter Eastway G.M. Photog. APPL. Hon FAIPP. HFNZIPP. FAIPP

Sydney-based photographer Peter Eastway is a Grand Master of Photography and a two time winner of the AIAPP Australian Professional Photographer of the Year. Known best for his landscape and travel photography, he has worked in most areas of the profession and also loves sport, studio still life, portraiture and wildlife Photography.



Bruce Pottinger M. Photog 1. APPL. Hon FAIPP

Master of Photography and an Honorary Fellow of Australian Institute of Professional Photography. Bruce is the managing director of L&P Digital Photographic, one of Australia's leading professional supply houses. He is also our technical boffin and what he doesn't know about cameras probably isn't worth knowing!



Frances Mocnik

Frances Mocnik has contributed to Australian Geographic for the past 20 years and was awarded the Australian Geographic Society medal for the Pursuit of Excellence in 2006. She holds a Master of Fine Arts degree in photography and exhibits internationally.



True Colours Photo Workshop in the Whitsundays – Itinerary

TRAVEL DAY Tuesday 26 April 2016

3.30 – 4.30 pm	Orientation
	Check in, grab the schedule and get ready!
6.30 - 8.00 pm	Reception Dinner
	Don't dress up - we're all very casual.

DAY 1 Wednesday 27 April 2016

5.30 – 7.00 am	Sunrise Shoot
	No sleeping in - we're up and at it!
7.30 – 8.30 am	Breakfast
	A sumptuous meal at our wonderful venue.
9.00 – 1.00 pm	Long Exposure Seascape Shoot
	Learn long exposure techniques with ND filters (Bring your ND filters with you).
1.00 – 2.30 pm	Lunch
	And a little time off as well.
2.30 – 5.00 pm	Expert Raw Processing - Classroom
	Bruce Pottinger shows how he uses Capture One - tips and tricks for ultimate image quality.
	IMAGE LAB - Classroom processing
5.00 – 8.00 pm	Free Time
	We suggest you grab dinner at one of the local restaurants.
8.00 – 10.00 pm	Night Photography Shoot
	We will make the most of the weather to shoot the stars, the moon or the town.

DAY 2 Thursday 28 April 2016

5.30 – 7.00 am	Sunrise Shoot
	We'll set out for a second morning location!
7.30 – 8.30 am	Breakfast
	Another great meal at our wonderful venue.
9.00 – 1.00 pm	Fill-Flash Location Portrait Shoot
	Shoot like the Australian Geographic professionals with outdoor fill-flash techniques.
1.00 – 2.30 pm	Lunch
	And a little time off as well.
2.30 – 5.00 pm	Developing Creativity - Classroom
	Peter Eastway looks at how editing your photos can expand your creativity.
	IMAGE LAB - Classroom processing
5.00 – 8.00 pm	Free Time
	Take a break or take a walk with your camera.
8.00 – 10.00 pm	Dinner & Audio Visuals
	Peter and Frances will present and talk about some of their favourite images and shoots!

DAY 3 Friday 29 April 2016

7.30 – 8.30 am	Breakfast
	Another great meal at our wonderful venue.
9.00 – 1.00 pm	Aerial Shoot
	We will take turns in the helicopter for some amazing aerials, while those who are waiting can process their photos in our classroom ImageLab.
	IMAGE LAB - Classroom processing
1.00 – 2.30 pm	Lunch
	And a little time off as well.
2.30 – 5.00 pm	Photos For Publication - Classroom
	Whether shooting for a magazine or a photo book, Frances Mocnik will share her skills.
	IMAGE LAB - Classroom processing
5.00 pm	Free Time
	Take a break or take a walk with your camera. Dinner is up to you, but get to bed early!

DAY 4 Saturday 30 April 2016

6.00 – 7.00 am	Breakfast
	Another great meal at our wonderful venue.
7.30 – 4.30 pm	Hill Inlet/Whitehaven Shoot
	We can't miss out on the jewel in the Whitsundays, so we'll spend the day on the water and the white, pearly beaches!
1.00 – 2.30 pm	Lunch
	Lunch packs will be provided as we won't be returning until around 4.30.
4.30 – 7.30 pm	Free Time
	Take a break or take a walk with your camera. Dinner will be ready soon!
7.30 – 9.30 pm	Dinner & Audio Visuals
	Now it's your turn to show Frances, Bruce and Peter what you have done - a delegates' audio visual!

TRAVEL DAY Sunday 1 May 2016

7.00 – 9.00 am	Breakfast
	Our final breakfast.
9.00 am	Departures
	The event has concluded, but it's up to you whether you travel home or extend your holiday!

REGISTER NOW

www.australiangeographic.com.au/whitsundays



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Our skilled photographers are normally hidden behind the lens. For our 30th anniversary edition, we invited them to nominate their favourite pictures.

94 Preservation spirit

The wrecking of one of the first merchant vessels to arrive after the First Fleet led to a remarkable tale of survival on Tasmania's Furneaux Islands.



Bottles and Chinese porcelain were among the artefacts brought up from the shipwreck of the Sydney Cove.



One of the largest populations of brumbies is found in the rocky ranges and arid plains of the NT.

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Born under a lucky star

Tamborine Mountain visitors and locals get to share in a colourful annual scarecrow festival that celebrates creativity and community spirit.



WATCH Australian GEOGRAPHIC COME TO LIFE!



DOWNLOAD your free viewa app from the iTunes App Store or Google play.

Download viewa free from:



PAGE 22: LISTEN to AG veteran Barry Skipsey sing a song for our 30th birthday.

PAGE 23: WATCH a film about the work of Tassie devil champion Tim Faulkner.

PAGE 34: DONATE to our campaign to help conserve numbats.

PAGE 44: SEE a short film about the men of WA's Numbat Task Force.

PAGE 56: WATCH footage taken above the Red Centre with a camera drone.

PAGE 111: WIN a DVD copy of the film *Oddball: Every underdog has his day*.



The beautiful waratah is the state floral emblem of NSW.



On the cover

Feral horses in Central Australia – captured here by Jason Edwards – have to make the best use of scant resources, such as water, when they are available.

Online

The content doesn't end with this issue of the journal. You'll find thousands more articles, images and videos online. Discover all the stories highlighted here at: australiageographic.com.au/issue130



Australia's prettiest scenes in panorama

Australia abounds in beauty, and photographer Ken Duncan has captured some of its finest angles. See a gallery of his incredible images.



High Country cattlemen

In this gallery, photographer Melanie Faith Dove depicts Australian mountain cattlemen at work.

Perth through a local lens

See evocative images from Australian Geographic photographer Frances Andrijich's new book Perth.



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Sign up to the Australian Geographic email newsletter on our homepage and we'll deliver fresh content to your inbox every week!

Talkb@ck



October marked 30 years since the custodianship of Uluru and Kata Tjuta was passed back to their Anangu traditional owners. Here's what you had to say:

LINDA SUSAN LAW

Happy Anniversary, lovely to see these beautiful places being handed back to the rightful people.

RHETT PARSONS

Wonderful place. The mystic feeling around both Uluru and Kata Tjuta is almost impossible to describe. And the Anangu people are so caring of this sacred land. It was an absolute honour to visit their land.

BOB SMITH

We were there working at Yulara at the time – a lot of mixed opinions back then, but I think now people know it was the right thing.

KERSTIN LODIGA

Lovely Anangu people you are always in my heart. I had some wonderful times out there. Thank you sooo much!

BEN KERR

How many have had the privilege to actually learn from the Anangu? Better than anything you'll ever learn in school!



The Bremont Boeing Model 247 and the F/A-18 Super Hornet share the same hardened Custom 465° Steel.



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WE'VE NEVER BUILT A WATCH FROM THIS KIND
OF STEEL BEFORE. BUT IT SEEMED TO WORK OUT
OKAY ON THE F/A-18 SUPER HORNET.

A few years ago the British watch manufacturer Bremont and American aviation giant Boeing, embarked on a development project to build a range of mechanical timepieces that embraced the latest in material and manufacturing research from the worlds of horology and aviation. The result is something remarkably special.



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30 Aug – 26 Sep 2016 : Svalbard to Anadyr

Priced from AU\$990* per day including all meals, accommodation on board, excursions and expert lecture programme.

New Zealand's award winning Heritage Expeditions is now taking reservations for the long awaited voyage through the Russian Arctic's Northeast Passage.

For the many years we have worked in the Russian Arctic we've dreamed of exploring one of the greatest seaways in the world, the Northeast Passage. Known within Russia as the Northern Sea Route, only a handful of expedition vessels have ever transited this seaway. Recent changes in sea ice conditions mean this historic and fascinating sea route is now accessible. Following in the footsteps of legendary Swedish explorer Adolf Erik Nordenskiold, we will transit through the Passage exploring Franz Josef Land and the New Siberian Islands before spending three days at Wrangel Island.

We invite you to be part of this history-making expedition.



Wrangel Island 1, 15, 29 August 2016

Untouched by glaciers during the last ice age, Wrangel Island is a treasure trove of Arctic biodiversity including Polar Bears, walrus, Snowy Owls and Snow Geese. Priced from AU\$1,050* per day including all meals, accommodation on board, excursions and expert lecture programme. Flights from Alaska available



Macquarie Island 4 & 23 December 2016

Visit Australia's most spectacular wildlife sanctuary where Elephant Seal pups laze side by side with inquisitive King and endemic Royal Penguins. Enjoy the hospitality of the rangers who call this wild island home. Priced from AU\$715* per day including all meals, accommodation on board, excursions and expert lecture programme.



Jewel of the Russian Far East 12 September 2016

Cruise the Kamchatkan Coast as the onset of autumn paints the landscape vivid colours. See fat Kamchatkan Brown Bears, Steller's Sea Eagles and vibrant scenery. Priced from AU\$780* per day including all meals, accommodation on board, excursions and expert lecture programme.

* 30 August 2016 departure only. AU\$ pricing based on exchange rate of the day, on Main Deck cabin (land fees additional), contact us for current rate.
1 - 28 August 2016 reverse itinerary also available.



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Heroes

WEELCOME TO AUSTRALIAN GEOGRAPHIC's 30th anniversary edition, which we are celebrating with a brand-new look. Our talented team has been hard at work for six months to freshen up the content and layout, and we created a dramatic new cover design. We hope you'll enjoy poring over this landmark edition as much as we have enjoyed putting it together.

Our regular photographers are often the unsung heroes of AG as they battle bad weather, poor light and other unexpected challenges to capture those photos that bring our stories so vividly to life. We put them firmly in the spotlight for our birthday issue and invited them to nominate their favourite photos. It's great to revisit classic images, such as the swagman on the Birdsville Track, and hear the backgrounds to these memorable photos.

In 30 years, the environment has moved from the margins to the centre of political debate, thanks mostly to the efforts of a few articulate, committed and passionate individuals. We salute 30



The AG team. From left: Jo Runciman, Mike Elliott, Tessa Cassetta, Lauren Smith, Chrissie Goldrick, Carolyn Barry, Rebecca Cotton (front), Natsumi Penberthy, John Pickrell, Jess Teideman, Katharine McKinnon (front), Amy Russell and Nicola Conti.

heroes who have had a profound influence on Australian conservation.

Oh, and there's a birthday gift for our readers. A fully updated Australia sheet map to inspire future adventures.

See you along the track somewhere.

Chrissie Goldrick

Follow me on Twitter at:
twitter.com/chrissigoldrick

We would like to acknowledge the sponsors of the 2015 Australian Geographic Society Gala Awards.



Contributors



Frank Povah

has been working as a copy editor for AG since the mid-1980s. His first corrections were read over the public tele-

phone at Wollar, NSW – a village boasting the last manual exchange in the state – as he sat on a crate with proofs arranged around him and weighted down by rocks. His passion is 'dinkum lingo', the once-rich Australian dialect and accent that is rapidly giving way to TV English, the language of US script writers (see page 15).



Jason Edwards

is a longtime contributor who has travelled the world for several decades, also working for publications such as

National Geographic, BBC Wildlife and The New Yorker. His passion for wildlife and the environment has seen him take on unusual assignments, such as the time he spent 300 hours in a hide photographing northern hairy-nosed wombats for us (AG 72). See his shots of brumbies on the cover and in our feature on page 72.



Sandy Guy

has been working as a freelance journalist for more than 20 years, writing about anything and everything. Her

work has taken her around the world, from piranha-infested waters in Brazil to the Indian Himalaya. Despite the globe-trotting, her main passions are native and historical stories, such as the feature on the Sydney Cove shipwreck (page 94), which is the first story she has penned for AUSTRALIAN GEOGRAPHIC.

More contributors: Peter Aitchison, Jeff Ayton, Bill Bachman, Colin Beard, Esther Beaton, Ben Blanche, Jenni Brammall, Amanda Burdon, Chris Duczynski, Trevor Evans, Tim Flannery, Karen Ford, Don Fuchs, Andrew Gregory, Jane Hammond, David Hancock, Ben Hansen, Joanna Hartmann, Bill Hatcher, Frank Heydrich, Owen Hughes, Ellen Keidge, Louisa Kelland, Karl Kruszelnicki, Mike Langford, Ofer Levy, Peter Meredith, Tamara Montgomery, Peter Morris, James O'Hanlon, Peter Rae, Nick Rains, Mitch Reardon, Mike Rossi, Ben Sanders, Barry Skipsey, Ed Sloane, Mark Spencer, Ian Vickers, Fred Watson, Rebecca Wellard, Thomas Wielecki.

Historic pictures
of Hans Heydrich's
canyon crossing.



Featured Letter

HISTORIC GLIDERS

Thanks for the feature on Heather Swan and Glenn Singleman's wingsuit flight (*Crossing the canyon*, AG 127). Their photo from above the Grand Canyon reminded me that it was another Australian, and good mate of mine, Hans Heydrich, who was one of the first two people to hang-glide across the canyon in June 1985 (the other was American Bob Thomson).

Hans took an equally great photo from his hang-glider on his flight, showing the Grand Canyon tourist Cessna way below him. Hans and I graduated in mechanical engineering at the University of Adelaide in 1967. He went on to become a third-generation pilot; his father Fred flew for the Luftwaffe, and his grandfather flew Zeppelins. Sadly, Hans died in a glider crash on Lake Pleasant, Arizona, in September 2002.

BOB BURKE, ADELAIDE, SA

DROP US A LINE!

Send us a great letter about AG or a topic of interest to you for a chance to be our Featured Letter and win an AG T-shirt.



EDUCATION IS KEY

It was surprising to read a scientist of Professor Doherty's standing summarising the climate change debate as he did in *An evidence-based world* (AG 128). However, he has a point – there is a growing need to examine the evidence, enabling "those of us who lack... specific training" to find the truth.

Common sense suggests that the world's leaders will not reach any agreement allowing us to manage the climate, and we must accept that the predictions of scientists, especially regarding carbon pollution, will be proven true. Regardless of climate change, however, we urgently need to take action to clean up our act.

Australia has much to offer in regards to solving the immediate problems that plague the planet. In terms of reducing pollution, research by the CSIRO and industry bodies into cleaning up coal, and developing alternative means of generating power from renewable resources, are some good examples.

Our experience and research in other areas, such as dry-land farming,

can help the millions of people in Africa and similar areas; and increasing their standard of living may be the best thing we can do to limit their emissions of carbon. Australian development of coconut-oil production is already helping people in the Pacific Islands create employment using local resources.

Solar and wind power technologies are now well proven, and their limitations recognised. Our research funding should be directed away from these areas and into other technologies.

I'd like to see AG providing information on these topics. Articles such as Bryce Kelly's story on fracking (*What's the hurry with CSG fracking?*, AG 107) help us to make informed decisions. I've always found AG to be a reliable source of information about the environment, and there is no more important issue than today.

PETER MCCLOY,
WOLLOMBI, NSW

TRAILBLAZERS

I was dumb-struck by the choice of those included in *Trailblazer's: Australia's*

50 greatest explorers (AG 129). I don't think some of the more recent nominees merit the title "greatest explorer". Their exploits might rate as great adventures, but their motives were more about self-gratification.

One must ask these questions: Where are the contributions of lasting value that they have made? What increase in scientific or geographic knowledge have they imparted? Where are their published journals that record their observations?

Although I am not belittling these individuals for their fortitude, courage and endurance, the fact remains that these people are adventurers, not explorers. I can name a few of those worthy individuals who, during their explorations, gathered observations of lasting benefit to all. At the top of my list is Baron Sir Ferdinand von Mueller, botanist and geographer. To this I would add Edward John Eyre, Ernest Giles and John Gilbert. And if you're wanting someone more modern, you can't go past Len Beadell.

MERV COBCROFT,
STAFFORD HEIGHTS, QLD



Spiky visitor by Tamara Montgomery

I live on a rural property, 23km outside of Mungindi, QLD. I took this photo of a young echidna as it passed near my house. It curled into a ball when I approached, so I just lay on my stomach and patiently waited for it to keep going on its way, which it did happily.



Cloudy cliffs by Ben Blanche

I captured this image early in the morning on the Overland Track in Cradle Mountain-Lake St Clair National Park, TAS. Fog was rolling down the button grass of Pelion Plains, beneath the imposing dolerite cliffs of Mt Oakleigh.



Pup of the sea by Jacqueline McGhie

About a two-hour drive north of Perth is a town called Jurien Bay. Out on the nearby islands, the Australian sea lion can be found hauling out. I was enjoying a snorkel when this pup came to investigate; I managed a couple of snaps before exiting the water.

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GEO**buzz**

An aerial photograph capturing a dynamic scene at sea. The water is a deep, vibrant green, with white foam and spray from breaking waves creating intricate patterns across the surface. Several surfers are visible; one is riding a wave on the right side, while others are positioned further back, some on their boards and others in the water. A small white boat with two people is also present on the left. The overall composition conveys a sense of energy and movement.

January • February 2016



WATCH Use the free **viewa** app to scan this page and see Chris Duczynski's aerial footage of Sharky Beach surfers.



Wave riders

by Chris Duczynski

ABOUT 100M from Sharky Beach, on the NSW Illawarra Coast, waves break both ways over a seaweed-smothered reef, generating masses of aerated foam. Chris captured this image of surfers at midday with his GoPro and drone. Although dawn and dusk are often favoured by photographers, Chris prefers the abstract results when the sun is directly over the water. “When you’re up 30m high at this time of day, the colours are more vibrant,” he says. “It looks as if the surfers are riding over a carpet of grass.”



Dinkum flingo

WITH FRANK POVAH

Brass razoo/rahzoo
[Not worth a]



THIS IS an interesting phrase of unknown origin. Never used in the positive sense (“It only cost a brass razoo”), it indicates worthlessness or the state of being absolutely flat, stony broke – “I haven’t got a brass razoo”. None of my references can pin down its origin. The fact it first appeared in print in about 1919 suggests it may have come to Australia with troops returning from WWI, but this is mere speculation on my part. I don’t hear it much anymore and, like so much of our once-rich dialect, it seems to be disappearing.



Natural history

Best foot forward

Small differences in the hands and feet of frogs are clues to big differences in behaviour.

FEET CAN TELL you plenty about the habits of frogs, and reflect amazing adaptations, says Dr Jodi Rowley, at the Australian Museum, who is studying species from Australia and South-East Asia. A spectacular example of this occurs in flying frogs (e.g. 1, 9, 12, 14), which have enormously enlarged hands and feet, used as parachutes to glide down from the treetops. Toe-pads are another adaptation to climbing (2, 3, 4, 7, 13, 14), and hanging on in swift-flowing streams (11). Webbed feet in more aquatic species (5, 8, 10, 11) can be used for swimming. Other frogs with slender toes (6, 15) have no need to swim or climb, and instead stick to the forest floor and slow, shallow streams. “Differences in the feet are useful in identifying species,” Jodi says. “The colour and extent of webbing, the shape and size of toe-pads and the length of the toes are all used to tell one species from another.”

TOP ROW: *Rhacophorus feae*, *Rhacophorus* sp., *Polypedates leucomystax*
SECOND ROW: *Rhacophorus* sp., *Odorrana chapaensis*, *Leptolalax* sp., *Kurixalus* sp.
THIRD ROW: *Odorrana* sp., *Rhacophorus kio*, *Amolops* sp., *Amolops ricketti*
BOTTOM ROW: *Rhacophorus* sp., *Polypedates leucomystax*, *Rhacophorus annamensis*, *Quasipaa* sp.

Australian Geographic Society



CASSOWARY CLOSE-UP

A new AGS-supported documentary offers a glimpse into the secret life of these majestic birds.

TWO YOUNG filmmakers are focusing their lenses, and public attention, on one of Australia's largest birds, the endangered southern cassowary. This flightless bird is found only in the dense rainforests of far north Queensland. It is an important species that helps maintain rainforest ecology by dispersing seeds and encouraging plant diversity, yet its numbers are in decline. This is due largely to habitat loss, impacts with vehicles and dog attacks.

To help combat this decline, Edward Saltau and Daniel Hunter are using their cameras for conservation. The pair is making a documentary that will provide a glimpse into the life and behaviours of the cassowary, in the hope that they can create greater public awareness about its plight. "They are secretive, cryptic animals,"



Dan Hunter (top) and Edward Saltau are hitting the Daintree in 2016 to film the southern cassowary (right).



Edward says. "They usually spend their time deep in inaccessible rainforest, so it's difficult to observe their natural behaviours. Our aim is to show the intimate world of the cassowary in a new level of detail."

Edward and Daniel will spend up to nine months in 2016 in the rainforests of the Wet Tropics observing the birds, surveying their habitats, and capturing them on film. "We hope to communicate the cassowary's

fragility and highlight the need for its conservation," Daniel says. "Our rainforests need cassowaries. They are environmental engineers that help create complex and healthy forests."

The pair is excited about the long, hot days of filming ahead. "It's going to involve hard work, and there will be lots of leeches and mosquitoes, but seeing a wild cassowary in an ancient rainforest is a truly humbling experience," he adds.

Ask an expert

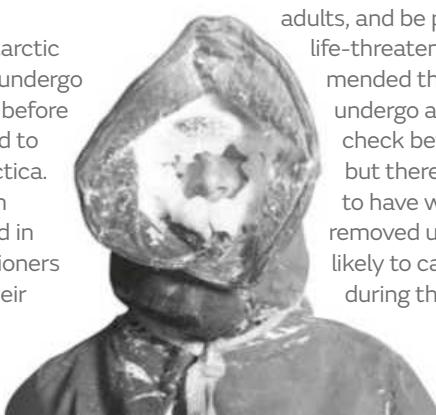
Dr Jeff Ayton, chief medical officer, Polar Medicine Unit, Australian Antarctic Division.

Q What body parts have to be removed before you can get a job in Antarctica?

A Australian Antarctic expeditioners undergo health checks before being approved to work in Antarctica. When Mawson Station opened in 1954, expeditioners had to have their

appendix removed prior to departure. Today, only doctors undergo this – there's just one doctor on the station during winter, and evacuation is impossible for part of the year. This requirement dates back to the 1950s, when a doctor developed appendicitis on Heard Island and had to be evacuated at great cost. Appendicitis is an unpredictable

condition that can occur in healthy adults, and be potentially life-threatening. It is recommended that expeditioners undergo a thorough dental check before they depart, but there is no requirement to have wisdom teeth removed unless they are likely to cause a problem during the expedition.



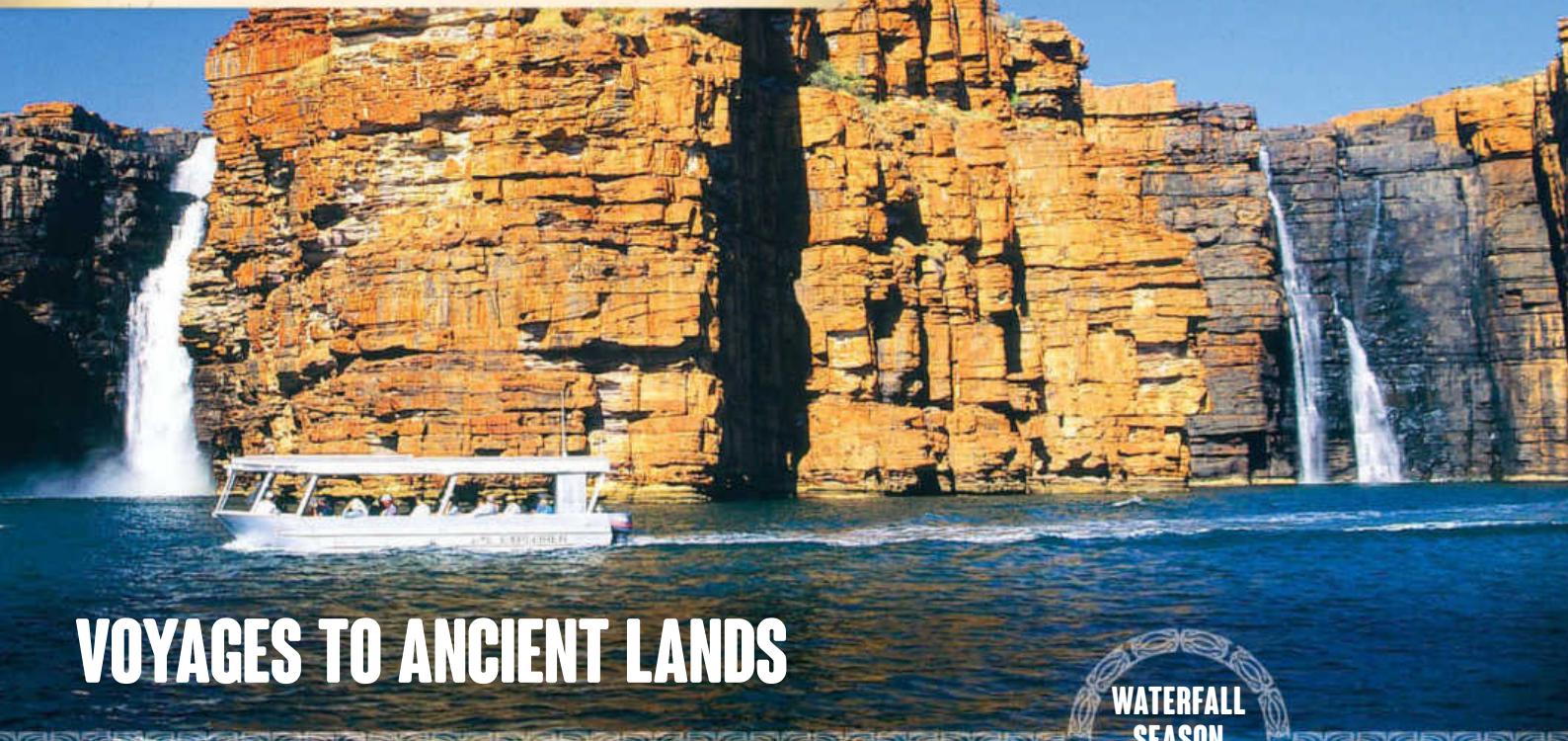
On this day

14 February 1966

Fifty years ago, the switch to decimal currency transformed Australia. A series of names were considered for our new coins and notes – including the Emu, Koala, Digger, Oz, Boomer, Roo, Kanga, Kwid and Dinkum – before the British pound was replaced with the dollar. The UK itself did not follow suit until 1971.

VOYAGE: 1104 - THE KIMBERLEY > KING GEORGE FALLS > PICTURE TAKEN: NOVEMBER 2004

Named in honour of King George by the explorer Charles Conigrave in 1911, the falls gain full force from January through May each year after the wet season rains and are best viewed from beneath the cascade.



VOYAGES TO ANCIENT LANDS



Join a 10 night Coral Expeditions cruise in April and May 2016 and discover the iconic Kimberley in waterfall season. From spectacular four-tiered Mitchell Falls to the thundering 80-metre twin falls in the King George River, the Kimberley comes to life after the wet season rains. The desolate beauty and distinctive wildlife of this region are best appreciated from a small ship. Each of our ships carry specially-designed tenders and zodiacs (pictured) that allow up close access to out-of-the-way places. Enjoy the expert knowledge of our famed Expedition Leaders and Guest Lecturers, and savour small batch meals using local produce paired with artisanal Australian wines. This is small ship expedition cruising at its finest.

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Epic feats

AS AUSTRALIAN GEOGRAPHIC turns 30, we look back at 30 record-breaking feats achieved by AG Society adventurers since 1986.



Australian Geographic Society



SOLO SIMPSON DESERT TRAVERSE

An AGS adventurer has completed a gruelling challenge in record time.

IT TOOK IAN VICKERS just 20 days to cover 400km of the Simpson Desert. He crossed west-to-east, starting his journey at Old Andado station in the NT and ending at Poeppel Corner, at the intersection of the NT, SA, and Queensland borders. Months of training helped

prepare Ian for the effort of scaling 1100 sand dunes, each up to 40m in height. "I'd get to the top of one dune hoping that the valleys in between might start to open up, but they didn't for some time, which was disheartening," he says. "It was physically and emotionally draining, but one of the most enjoyable parts of the journey."

For 16 days, Ian didn't see anybody else, but the biggest challenge was pulling his cart, which weighed 160kg when laden with food and water at the start of the journey. On the western edge of the desert, where spinifex dominates the landscape and the

dunes are just 200m apart, dragging this behind him was punishing, he says.

But the desert also had its perks. "Most nights I'd get myself on top of a big red dune, get my bed-roll out and... then I'd just look up at stars," he says.



Lightning Ridge Scientific Expedition

Our first fossil dig scientific expedition – which saw 40 volunteer diggers lending a hand in outback NSW – was a roaring success.

OVER TWO WEEKS last August, 40 readers headed to the outback mining town of Lightning Ridge to participate in a fossil dig that was a collaboration between the AG Society, the Australian Opal Centre and the University of New England (UNE). Lightning Ridge in northern NSW has one of the richest collections of dinosaur remains and other fossils in Australia (AG 125). A series of large dinosaur fossils is waiting to be described by palaeontologist Dr Phil Bell at UNE, including the most complete dinosaur fossil in NSW and several new species of carnivores (AG 129).

The expedition was split into two week-long digs, each with 20 volunteers; participants searched for fossils by picking through opal mine tailings and specking on mullock heaps. Some went down into mines with Dr Federico Fanti from the University of Bologna in Italy, who was collecting data about the geology and sediment layers.

The expedition was a huge success with many small fossils found, and exciting geological discoveries made. Finds included plants, mussel shells, dinosaur bones and teeth, crocodile and marine reptile teeth, turtle shell and even the partial tiny arm bone of a bird.

Currently Lightning Ridge fossils are thought to date to about 110 million years ago, but these estimates come from dating done at sites hundreds of kilometres away. Federico collected sediments containing volcanic ash, which will allow the first accurate dates to be ascertained for the dinosaurs and other fossils from Lightning Ridge.

WE WILL RETURN in 2017. To enquire, email dig@australianopalcentre.com, call 02 6829 1667 or visit: australianopalcentre.com.



Dr Federico Fanti (top left) explores the geology of opal mines in and around Lightning Ridge, NSW. None of the work we did would have been possible without our fantastic week one (above) and week two (right) groups of volunteer fossil diggers.





AG readers and expedition participants (top, from left) Denis Hurley, Jane West, Ali Calvey and Kathryn Burton pick through fine sediments to find microfossils. Some of the fossils we found included tiny and beautifully serrated opalised teeth (centre) of small carnivorous dinosaurs. Also pulled from Lightning Ridge opal mines have been larger specimens, such as this as-yet-undescribed herbivorous dinosaur, which is the most complete ever discovered in NSW.

JOYOUS FEATHERS

This silver wedding headdress ornament from China is held in the collection of the Museum of Applied Arts and Sciences in Sydney and was presented by an Australian donor in 1940. Crafted in China in about 1800, it is inlaid with gloriously iridescent ultramarine kingfisher feathers, which retain their colour even after several centuries. The design is a 'double happiness' motif that joins two of the Chinese characters for 'joy'. For thousands of years, kingfisher feather jewellery has been highly valued in China, denoting wealth and social status.



EARLY
2016

Event

A Fine Possession: Jewellery & Identity

Throughout history, the desire of humans to adorn themselves has been universal. This exhibition – including 700 pieces from the Powerhouse Museum's collection of 500,000 objects – celebrates the important place of jewellery in our lives, from antiquity to the modern-day, through an eye-opening variety of fascinating pieces made, worn and collected in Australia.

When and where:

Until 22 May 2016

More info: www.powerhouse-museum.com/exhibitions/jewellery/

NEED
TO KNOW

with Dr Karl Kruszelnicki

Heat wave

MOST AUSTRALIANS remember that the Black Saturday bushfires in Victoria in 2009 killed 173 people. But the crippling heat wave that came alongside them killed more than twice that number: 374 people. The 2003 European heat wave killed 50,000–70,000 people, while the Russian heat wave of 2010 killed about 55,000.

The World Meteorological Organisation defines a heat wave as a period of five days in a row with a maximum temperature 5°C or more higher than the average maximum temperature for that location.

It's difficult to link specific deaths to a heat wave, however,

because there are few clues that appear in an autopsy. Furthermore, your ability to tolerate heat depends on what temperatures you are used to, your age, health, fitness, and many other factors.

But morticians easily recognise heat-wave deaths in the morgue, when the bodies start to pile up. During the heat waves listed above and Victoria again in 2014, there was simply no more

room to store the bodies that were coming in. The overflow had to be stored in mortuaries, universities and funeral parlours.

Unfortunately, with climate change, the projections are that future heat waves will be more extreme in temperature, happen more frequently, last longer,

and cover more of the Earth's surface.

Back in the early 1960s, heat waves with temperatures three standard deviations above the average covered about 1 per cent of our planet's land area. By 2010 they covered about 5 per cent. By 2020 it's expected to rise to 10 per cent – and by 2040, 20 per cent. In other words, before the middle of this century, when heat waves do arise, they will cover about one-fifth of all of Earth's land area.

In fact, heat waves have killed more Australians than all other natural disasters combined. At least 4500 Australians have died from heat waves since the year 1900. For the vulnerable at least, heat packs a powerful punch.

DR KARL is a University of Sydney physicist and a prolific broadcaster and author. His new book, *Dr Karl's Short Back and Science*, is published by Pan Macmillan. Follow him on Twitter: @DoctorKarl.



Ask an expert

Dr Karen Ford, animal physiology and behaviour expert, Australian National University, Canberra.

Q

Do koalas get intoxicated by their diet of gum leaves?

A

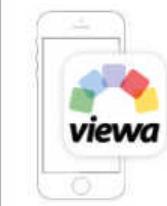
Although koalas can spend up to 20 hours a day sleeping or resting, it's not because they have become intoxicated by gum leaves. Their sleepy behaviour is instead a means to conserve energy. Gum leaves are a



poor source of energy, and koalas only obtain about as much energy from their diet every day as we'd get from eating five slices of bread. As well as being a poor source of nutrients, eucalypt leaves contain many toxic compounds. Koalas, however, are efficient at metabolising these, and can exploit a food resource not available to most animals. There are, however, other animals known to be adversely affected by food choices. Tasmanian poppy growers have reported wallabies behaving strangely in their fields; and 'drunken parrot season' in the NT produces dozens of seemingly drunk red-collared lorikeets each year, although experts aren't entirely sure what accounts for the symptoms.

Happy Birthday to us!

January 2016 marks 30 years since AUSTRALIAN GEOGRAPHIC was first published. To celebrate, veteran AG photographer and musician Barry Skipsey (see page 93) recorded a special song, called *When Australian Geographic Took The Stage*. To watch the video use the free **viewa** app to scan this page.





WATCH Use the free **viewa** app to scan this page and watch a film about Tim Faulkner.

TIM FAULKNER

Conservation coalface

Tim Faulkner, the 2015 Australian Geographic Society Conservationist of the Year, is the public face of a pioneering project that offers new hope to beleaguered Tasmanian devils.

CONSERVATION biologists were few and far between when Tim Faulkner began work as a trainee keeper at NSW's Featherdale Wildlife Park, aged 14. But during an action-packed career spanning nearly 20 years at two of Australia's premier wildlife institutions, it's a title that has come to fit as comfortably as his khaki uniform.

"I've worked at the conservation coalface my whole life," says the energetic 33-year-old, now general manager of the Australian Reptile Park (ARP), in Somersby, NSW, and Devil Ark, a pioneering breeding facility for Tasmanian devils. "As well as the devil work, I am an

ambassador for quokkas and dingoes, and I've contributed to projects on everything from bilbies and eastern quolls to regent honey-eaters and pygmy blue-tongue lizards."

That lifelong passion for Australia's animals, fostered by family holidays in the bush and reptile-keeping relatives, was recently recognised when Tim was named the 2015 AG Society Conservationist of the Year.

At the ARP, he and the 40 full-time staff and 80 volunteers he oversees help visitors to get up close and personal with nature. "We give people a good experience, raise their awareness and slip in some key conservation messages," he says.

His television show *The Wild Life of Tim Faulkner* (see page 110) extends that reach to more than 5 million people an episode.

While wrestling cranky crocodiles and milking deadly snakes might be all in a day's work, Tim regards the Devil Ark project – to create an insurance population of devils as protection against a devastating facial tumour disease – as among his most important work. It is widely seen as a model for species recovery internationally. "They are such stimulating critters with distinctive personalities; no two devils are the same," says Tim enthusiastically. "I love them."

AMANDA BURDON



THE 10 MOST

Destructive cyclones in recent history

In terms of intensity and damage wrought, these are some of the worst cyclones ever to have hit Australia.

CYCLONES ARE A FACT of life for northern Australians, who face alerts and storms each wet season, from November to April. Despite improved warning systems and more coordinated response strategies, the biggest cyclones always wreak havoc and waiting one out is an experience not easily forgotten. Cyclones and hurricanes, as they are called in the Atlantic Ocean, form over warm tropical ocean water and usually dissipate once they move over land or cooler waters further south. Their severity is categorised on a scale of 1 to 5, based on the strongest recorded wind gusts. Category 5 cyclones are extremely dangerous, with winds of more than 280km/h. We look back at some of the most destructive cyclones to have hit Australia since records began.

AMELIA CADDY

Cyclone Yasi – seen here near its peak intensity on 2 February 2011 – developed north-west of Fiji and made landfall in north-eastern QLD.

Cyclone Tracy in 1974 was Australia's most significant, killing at least 65 people and devastating Darwin.

GEObuzz

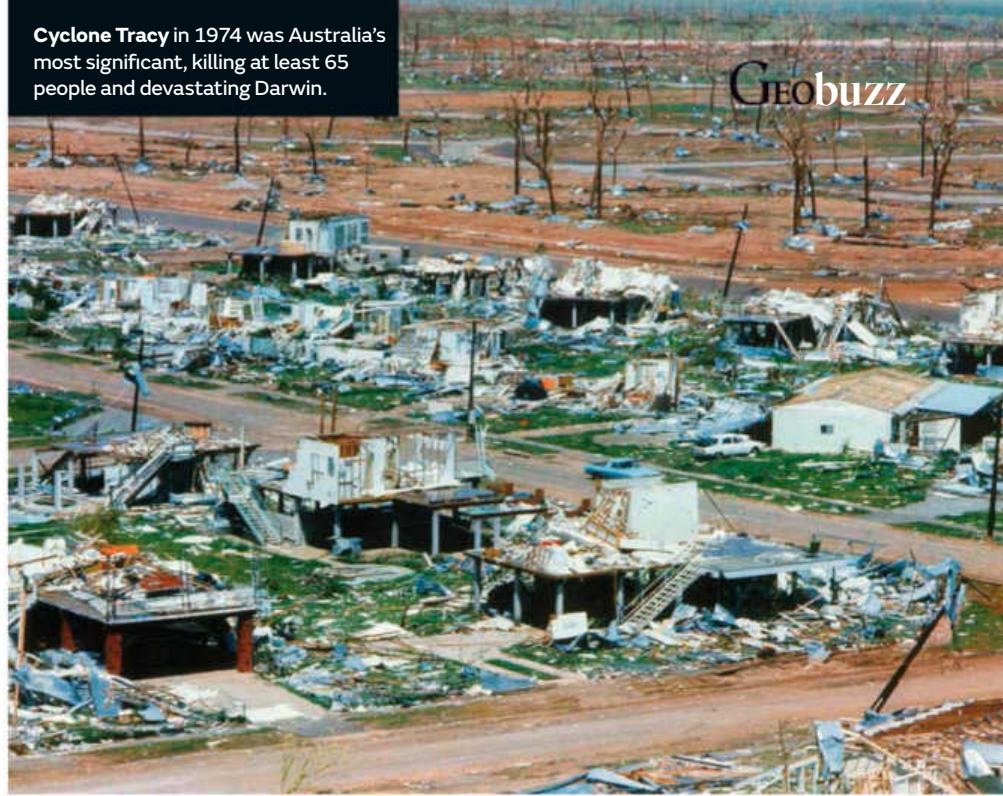
KEY

- C** Category (4 or 5)
- Wind** Maximum wind gust speed

*Estimated speed

1 CYCLONE MARCIA 2015 C5 Wind 29km/h*

Cyclone Marcia intensified from a category 2 to a category 5 just before crossing the Queensland coast north of Rockhampton in February 2015. With wind gusts of almost 300km/h, it destroyed about 350 homes and damaged almost 2000 properties in and around Yeppoon and Rockhampton. Pre-empting dangerous coastal erosion, conservation volunteers worked hard to relocate the nests of loggerhead turtles higher up the beaches near Bundaberg before the cyclone made landfall.



2 CYCLONE YASI 2011 C5 Wind 285km/h*

Cyclone Yasi bore down on northern Queensland with all the strength of a category 5 system just days after a category 2 had made landfall in the same region. Hospital patients were evacuated from Cairns amid fears the city would suffer a direct hit. But Yasi made landfall near Mission Beach, 140km to the south, causing major damage to infrastructure and vegetation around Tully. Yachts in Port Hinchinbrook suffered millions of dollars of damage. One young man was killed – he was asphyxiated by fumes while sheltering inside with his generator.

3 CYCLONE MONICA 2006 C5 Wind 360km/h*

Cyclone Monica's powerful wind gusts wiped out a weather station as it neared the Top End coast. It moved over fairly remote regions, causing no deaths or serious injuries, although Darwin's ANZAC Day commemorations were cancelled. Even in the hard-hit Arnhem Land community of Maningrida, 35km from where Monica crossed the coast, there were no reported losses.

4 CYCLONE INGRID 2005 C5 Wind 207km/h

Cyclone Ingrid was unusual in that it caused widespread damage in two states and a territory. It crossed Cape York as a category 4; intensified to a category 5 before battering coastal and island communities along the NT's Arnhem Land coast; and crossed WA's Kimberley coast as a category 4. Five people died when large swells capsized their boat near Kerema, in Papua New Guinea.

5 CYCLONE JOAN 1975 C5 Wind 208km/h

When Cyclone Joan struck Port Hedland, on the Pilbara coast, it was one of the strongest ever to have hit Australia. About 85 per cent of the houses here were damaged, a hospital was destroyed, and dozens of caravans were overturned, which affected the region's many itinerant mine workers. One witness recalled the winds were so strong that small crabs from the sea were blown in under her door. Although there was no loss of human life, graziers suffered heavy losses to livestock.

6 CYCLONE TRACY 1974 C4 Wind 217km/h

When Cyclone Tracy struck Darwin on Christmas morning 1974, it was a catastrophe that left little unscathed. With winds of more than 200km/h, Tracy left more than half the city's 43,000 inhabitants homeless. Within weeks, three-quarters of the entire population had either chosen to leave or had been evacuated. Many never returned. At least 65 lives were lost and Australian attitudes towards cyclones changed forever.

7 CYCLONE ALTHEA 1971 C4 Wind 196km/h

Cyclone Althea hit Townsville on Christmas Eve, and was one of the most powerful to ever hit the city. It claimed three lives, destroyed at least 200 homes in Townsville, and damaged most homes on nearby Magnetic Island. Recommendations from the damage assessment changed how Queensland homes were constructed, forming the basis for the first state-wide building codes.

8 CYCLONE MACKAY 1918 C5/C4 Wind 195km/h*

Striking Mackay, Queensland, in January 1918, Cyclone Mackay was a large system that caused damage along the coast to Rockhampton, where 1400 homes were flooded. About 30 people died as a result. The railway lines and roads in and around the town were damaged, isolating it from the surrounding regions and supplies. It took residents five days to successfully send word out to signal the alarm and tell the rest of Australia what had happened.

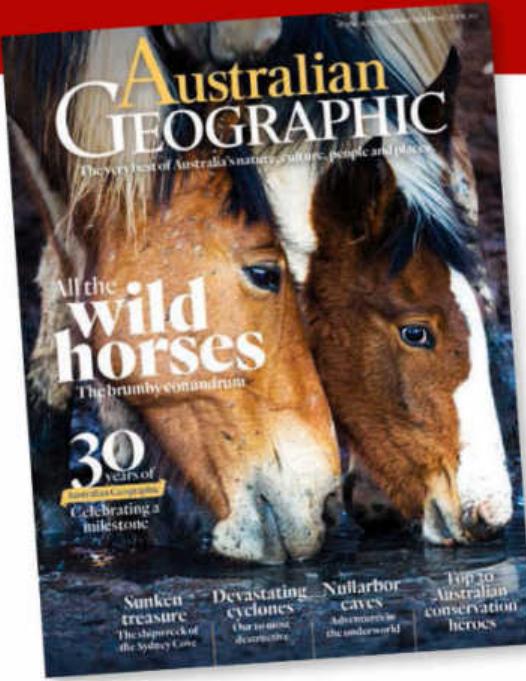
9 CYCLONE INNISFAIL 1918 C5 Wind Unknown

Before 10 March 1918 Innisfail in Queensland was a town of 3500 people. After Cyclone Innisfail only 12 houses remained. It's thought 37 people died in the town and possibly another 60 in surrounding areas. A storm surge in the Bingil Bay/Mission Beach area swept hundreds of metres inland leaving debris 7m up in some trees.

10 CYCLONE MAHINA 1899 C5 Wind Unknown

Cyclone Mahina may have claimed more than 400 lives when it struck Princess Charlotte Bay on Cape York Peninsula, in March 1899, making it Australia's deadliest natural disaster. Researchers in Queensland have attempted to change official records stating the storm reached an intensity of 914 hectopascals (a measure of central pressure, where low figures are more severe). They believed the real figure was 880hPa, putting it among the world's most intense cyclones of all time.

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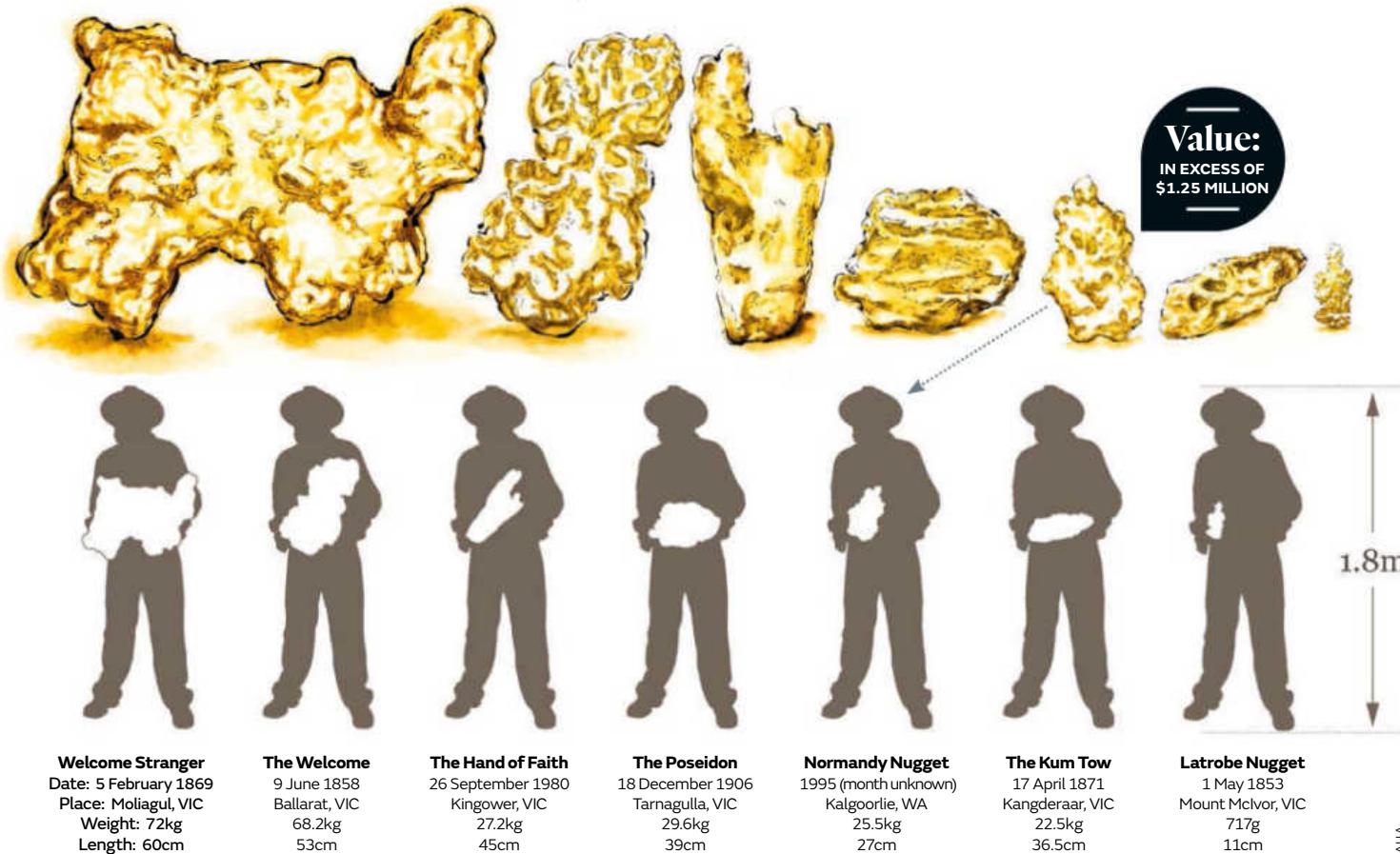
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Mining heritage

Golden glory

Most of the world's largest gold nuggets have come from Australia. Here are some of the biggest and most famous examples.

OLD NUGGETS HAVE been found nationwide but were particularly abundant in Victoria, the source of the world's largest nugget, the Welcome Stranger. Since the first gold rushes in the 1850s, major nuggets have always been big news, and they spurred a Victorian rush that, by 1910, resulted in the discovery of about 1200 nuggets, each weighing more than 620g. Large specimens are still found today, such as the Normandy Nugget, discovered in 1995 and held at The Perth Mint. It is the second-largest nugget still in existence.



Clues in the Kimberley

The first detailed study of Kimberley rock art may provide a new date for when Aboriginal people arrived.



Wanjina art at
Manning Creek, WA.

AUSTRALIA'S BIGGEST rock-art study could set a new limit on the date for when people first arrived in Australia. There are tens of thousands of artworks in Western Australia's Kimberley region, and they may be 50,000 years old, but they have never been comprehensively dated. "Theoretically, people started producing art as soon as they landed," says Peter Veth, an archaeologist at the University of WA. Many researchers are collaborating on the project, led by the Kimberley Foundation Australia. They have been analysing different art styles, including engravings, portrayals of animals, Gwion figures and Wanjina spirits. Nine techniques are being used to determine when the art was created, and the results will be cross-referenced against each other. Many of the techniques involve analysing material around the art, such as mineral crusts or ancient wasp nests.



National Treasure

Hook, Wheatley & Williams doll

In the collection of Museum Victoria, Melbourne (circa 1916–1920).

BEFORE 1914 dolls were mostly imported, but the outbreak of World War I hindered supplies and local manufacturers began to emerge.

Sydney Hook of Adelaide had been keen to start a manufacturing business, and in about 1916 he made up his own composition formula for the production of dolls through trial and error using paper pulp, sawdust, whiting and glue. The dolls' heads were formed in cast iron moulds made by Wheatley & Williams Pty Ltd of South Australia.

Sydney's wife, Elsie, made the first torsos, the articulated cloth limbs filled with cotton-like kapok, and the clothes for the dolls; later her



mother and employees took on these tasks while Elsie painted the dolls. They came in 11 sizes and were marketed as unbreakable.

The business became part of the war effort. In October 1918 it made a 'Doll Bazaar' float for a Red Cross fundraising parade in Hindmarsh.

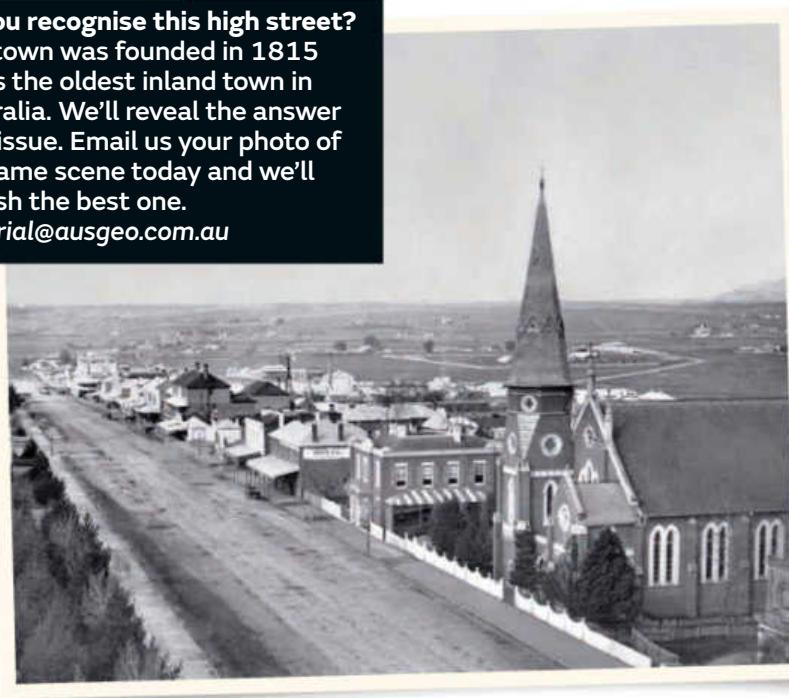
The float was marked: "See that the dolls you buy are branded Hook's Dolls Made in Australia".

After the war ended, new suppliers flooded the market, and a major fire destroyed Hook's stock, effectively ending the business.

In later years Elsie returned to doll-making during the Great Depression and then World War II.

TIME TRAVELLER

Do you recognise this high street?
This town was founded in 1815 and is the oldest inland town in Australia. We'll reveal the answer next issue. Email us your photo of the same scene today and we'll publish the best one.
editorial@ausgeo.com.au



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LISTENING TO AUSSIE ORCAS

An AGS project has conducted the nation's first major orca survey.

THE KILLER WHALE is found across the world, but little is known about it in Australian waters. To learn more about populations, migration patterns and habitat use, Rebecca Wellard and her Curtin University team are conducting the first dedicated Australian study of orcas. "We must learn more to protect them and their environments," she says.

For two years, Rebecca has been using 'passive acoustic monitoring' to study the sounds of two orca populations in WA – one in the south, near Bremer Bay, and the other off the central coast, near Exmouth. Analysing marine acoustics is a good way to study whales, since they rely on sound to communicate, navigate and hunt. Orcas produce whistles, echolocation clicks, and 'burst-pulse' sounds. "We can study how they use sound, but also take advantage of the acoustic activity to detect and track them," she says.

The team has assembled a large catalogue of sounds from the study sites – and identifying killer whales in these recordings is very exciting, Rebecca adds. "Understanding more about Australia's killer whales, and the roles they play in marine ecosystems, is critical for their conservation."

Emblematic beauty

Valued for their ecological and cultural values, Australia's floral emblems represent the beauty and diversity of all our native flowers.

TEXT BY JAMES O'HANLON ILLUSTRATIONS BY HEIDI WILLIS



AUSTRALIAN CAPITAL TERRITORY

NATIVE FLOWERS are part of our cultural heritage and vital to sustaining Australia's unique ecosystems. We have about 21,000 species of native flowering plant, and they are celebrated in festivals and gardens nationwide. They emblazon flags, coins, bank notes, stamps and sports jerseys, and are often presented to dignitaries and sporting heroes. Nine are officially recognised as national, state, and territory floral emblems – including the golden wattle (*Acacia pycnantha*) that inspires our national colours. And they feature alongside Australia's bird and mammal emblems on official coats of arms.



NEW SOUTH WALES

ROYAL BLUEBELL

Wahlenbergia gloriosa

A protected species that cannot be collected from the wild, this small perennial alpine herb grows close to the ground in open areas, rocky outcrops and woodlands in the Australian Alps. Its vivid blue/purple flowers grow to about 3cm wide, on the ends of long, slender stems and attract insect pollinators. It's often mistaken for the more common, widespread tall bluebell (*Wahlenbergia stricta*).



VICTORIA

WARATAH

Telopea speciosissima

This waratah is found along the NSW central coast and throughout the adjoining mountains, particularly around Sydney and in the Blue Mountains. It grows as a large shrub that can reach a height of 4m and produces large inflorescences made up of many small individual flowers, surrounded by crimson petal-like bracts. Hundreds of flowers open together, creating a bright beacon that attracts native birds.

SOUTH AUSTRALIA

COMMON HEATH

Epacris impressa

Victoria was our first state to adopt an official floral emblem and the pink-flowered form of this species was it. A slender, upright shrub growing to about 1m tall, the common heath produces stems lined with many tubular flowers that range from pale white to deep red. Small birds often perch among the short spiked leaves, where they can feed on the nectar produced by the flowers.

STURT'S DESERT PEA

Swainsona formosa

Sturt's desert pea, which grows in sandy soils across much of Australia's arid interior, is pollinated by nectar-feeding birds. Each inflorescence bears six or seven usually bright red flowers with black bulbous centres, which birds probe with their beaks to reach sweet nectar within. As they feed, pollen is deposited on the birds' abdomens and transferred between different flowers.





TASMANIA

TASMANIAN BLUE GUM*Eucalyptus globulus*

This large, straight-trunked tree grows to about 70m tall in open forests in south-eastern Tasmania, on Bass Strait islands and in parts of southern Victoria. Its common name comes from the waxy blue-green colour of its juvenile leaves. The plant's cream-coloured flowers are a good source of nectar for bees and the resultant honey is dense and strongly flavoured.

QUEENSLAND

COOKTOWN ORCHID*Dendrobium bigibbum*

This orchid was selected during Queensland's centenary celebrations in 1959 as the state's floral emblem. An epiphyte that grows on the trunks of large trees, its natural range is restricted to the Cape York Peninsula in the far north, where it flowers for six weeks in autumn and winter. It's widely cultivated and exported commercially, but protected wild specimens are threatened by illegal collecting.

NORTHERN TERRITORY

STURT'S DESERT ROSE*Gossypium sturtianum*

Closely related to species of commercial cotton, this is not a rose at all. It's a drought-tolerant shrub that is found on rocky slopes and in dry creek beds throughout Central Australia, and produces pretty mauve- and lilac-coloured flowers with red centres. The five-petalled flower is depicted on the NT's flag with seven petals, representing Australia's six states and the NT.

WESTERN AUSTRALIA

RED AND GREEN KANGAROO PAW*Anigozanthos manglesii*

Kangaroo paws are restricted to WA's south-west, and are found nowhere else in the world. These strap-leaved plants produce bright red flower stalks that grow to about 1m and bear vivid green flowers. The stems and bases of the flowers are covered in hairs. When mature, the flowers split open to reveal their smooth, pale green interiors.



Wild Australia

JANUARY · FEBRUARY 2016



Essential wildlife highlights that can't be missed



JACANA: *iridiopara gallinacea*; SEAL: THOMAS KURMIEIER / GETTY; LEATHERWOOD: REDZAAL / GETTY



SA

Australian and NZ fur seal breeding season, Kangaroo Island, South Australia.

January is peak breeding season for these two species, which live alongside one another. Adult bulls weighing up to 360kg wage fierce territorial battles. Visitors can watch these displays of dominance from a safe distance at Admirals Arch, in Flinders Chase NP.

More info: www.tourkangarooisland.com.au or call Tourism Kangaroo Island on 1800 811 080



Walk on water

By Ofer Levy

The comb-crested jacana – or lily-walker – is one of the beneficiaries of the bountiful season of Gudjewg when it strikes Kakadu with intense heat, humidity and dramatic thunderstorms in the summer months. The enormous splayed feet of the species allows it to tread effortlessly on lily pads across the water's surface, also earning it the name 'Jesus Christ bird'.

TAS

LEATHERWOOD
FLOWERING, TASMANIA



The leatherwood (*Eucryphia lucida*) is an endemic, temperate rainforest tree that produces masses of sweet-smelling white flowers in December–January. It's mostly found in the moss forests of western Tasmania, but leatherwoods can also be seen at the Tasmanian Arboretum in Eugeniana, near Devonport. Leatherwood flowers are much loved by bees and beekeepers for their copious nectar and the aromatic honey that comes from them.

More info: www.tasmanianarboretum.org.au or call the Tasmanian Arboretum on 03 6427 2690



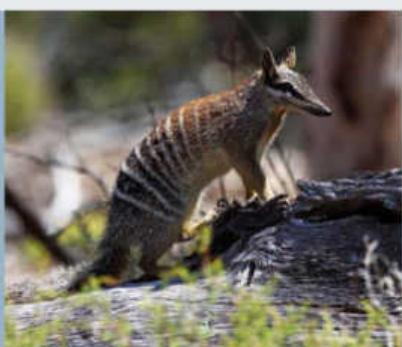
NT WET SEASON, OR 'GUDJEWG', TOP END

Experience the dramatic afternoon thunderstorms and explosion of life that accompanies the season that Kakadu's traditional owners call Gudjewg. For Bininj/Mungguy people there are six seasons, marked by subtle changes in weather, flowering and the availability of bush foods. Gudjewg runs from December to March, bringing heat and humidity to the Top End. During this time, rivers swell, spear grass grows to 2m tall, magpie geese nest in the sedgelands, and monsoonal rains flush out animals, which makes for easy hunting.

More info: www.parksaustralia.gov.au/kakadu or call the visitor centre on 08 8938 1120

AG Society fundraiser NUMBY NEEDS YOU NOW!

The numbat was once found across southern Australia, but there are now fewer than 1000 in the wild and it is restricted to isolated pockets of south-western Western Australia and predator-free fenced sanctuaries in NSW and South Australia. Australia has lost many of its small mammals and it would be a tragedy to lose the iconic numbat, which is WA's faunal emblem. The numbat's greatest threats are feral cats and foxes. Donate NOW to help Project Numbat fund research and predator-control programs and monitor the species' progress.



DONATE Use the free **viewa** app to scan this page. Or visit www.australian-geographic.com.au/society or mail a cheque to: AGS administrator, Level 9, 54 Park St, Sydney NSW 2000.



NSW WILDFLOWER SEASON, SNOWY MOUNTAINS

Above the tree line in the Snowy Mountains, the best displays occur in January–February. At this time, the high plains are carpeted in yellow, purple, orange and white blooms. There are more than 200 flowering plants and ferns in Kosciuszko NP, 21 of which are endemic. As you wander across exposed fields you'll come across everlasting, billy buttons, buttercups, silver snow daisies and the Kosciuszko rose.

More info: Call 02 6450 5600 or visit www.nationalparks.nsw.gov.au/Kosciuszko-National-Park.

VIC MIGRATING MUTTONBIRDS, PHILLIP ISLAND

Short-tailed shearwaters, also known as muttonbirds, fly about 15,000km on an annual migration from the Alaskan Aleutian Islands to Phillip Island for breeding. From late September to late April you can watch more than 1 million return to their burrows at sunset after a day of fishing at sea. One of the best places to witness this spectacle is at Cape Woolamai on the island's south-east.

More info: www.visitphillipisland.com or call visitor information on 1300 366 422



NATURE

Why do whales strand themselves?

Australia is a global hotspot for mass whale strandings.

The causes of these events are many, varied and often mysterious.



AUSTRALIA has a long history of whale strandings. They often occur (or are noticed more) in summer months and are most common in Tasmania, but they occur with some regularity all around our southern coastline. On a global scale, Australia and New Zealand are hotspots for mass strandings. Within Tasmania, Circular Head and Macquarie Harbour/Ocean Beach are areas where they frequently occur, and this may be related to coastal topography. Strandings can also occur singly, and in these cases the animal is often sick or dying.

Recent mass strandings include: 29 pilot whales that died at New Zealand's Stewart Island in November last year, 18 that were stranded (and 12 that died) at Bunbury in Western Australia in March, and seven sperm whales that died on South Australia's Yorke Peninsula in December 2014. Other strandings have been even more dramatic – 38 dolphins and 44 pilot whales were beached at New Year Island, north-west of Tasmania, in 2012; while another incident in 2009 saw 177 animals stranded on nearby King Island.

But why do mass strandings occur? There are many reasons and little clarity as to the major culprit, but there are some patterns. The kind of whales that beach *en masse* are more likely to be open-ocean species that don't spend a lot of time in the shallows (though this is not an absolute rule), and are those that live in close-knit social groups. Whales that strand are often toothed species – such as sperm whales, common dolphins, and pilot whales – not filter-feeding baleen whales. More than 3500 long-finned pilot whales have been stranded in Tasmania since records were first kept.

Sometimes strandings are down to navigational errors. Research from the University of Tasmania and the University of WA shows that the flow of cold, food-rich ocean currents close to shore, and places that have wide, gently sloping coastlines, can lead to confusion, which results in disaster. Strandings at Tasmania's 33km Ocean Beach are thought to be down to such topography. Ear infections, which limit the use of echolocation, have also been implicated – and if one pod member becomes stranded, its distress calls can lead other members of the group to follow, with often fatal consequences.

In some cases, sickness from toxic

algal blooms, viruses and other agents have been implicated. In that situation, the animals may simply have been too sick to swim anymore.

There's also evidence that shipping noises and military sonar frighten or distress whales, causing internal haemorrhaging or decompression sickness as they flee towards the surface. There's little doubt sonar is responsible on some occasions, but since mass strandings were written about by Ancient Greek philosopher Aristotle in 350 BC, it's clearly not the only explanation.

Perhaps the oddest theory is that whales intentionally beach themselves in mass suicides – mooted in situations where casualties appear otherwise healthy – but there is little evidence to confirm this seemingly far-fetched idea.

Processes for helping stranded whales have been improved in recent years, meaning smaller whales can be refloated if rescuers act swiftly, and act carefully to minimise chances of them stranding again. Larger sperm whales, which can reach 18m in length, are much more difficult to refloat and often have internal injuries caused by the pressure of gravity on internal organs, meaning they can't be saved. If you spot stranded whales it is important to call local authorities to summon help quickly. In Tasmania you can dial the Whale Hotline on 0427-WHALES or 0427 942 537.



Pilot whales strand more than any other species.

JOHN PICKRELL

is the editor of AUSTRALIAN GEOGRAPHIC. Follow him on Twitter: @john_pickrell.

OUR HISTORY

Reeling in the surf

For many decades a great piece of Aussie ingenuity was used as an aid for rescuing and safely returning struggling swimmers to shore.

THE ICONIC REEL-and-line device on display here at a Bondi lifesaving carnival in the late 1950s echoes the prototype crafted by Lyster Ormsby in 1907. Ormsby created a miniature device with a cotton bobbin and a hairpin, which became the model for the surfing reel used across Australia for nearly 90 years. Attached to this device, surf lifesavers would sprint and swim towards a troubled beachgoer and then be reeled back in by a four-man team on the beach.

According to Professor Sean Brawley, a historian at Macquarie University, ‘the reel’ has always distinguished Aussie lifesavers from Americans, who preferred running into the waves with torpedo buoys. The reel “reflects the community culture of Australian surf lifesavers, rather than the more individualist approach of the Americans”, he says. This winching system survived, with tweaks – a release pin, better belts and lighter ropes – until it was replaced in 1993 by the newer technologies of inflatable surf boats, rescue boards and tubes.

Ormsby was part of the group that, in February 1907, formed the Bondi Surf Bathers’ Life Saving Club, now the oldest in the world. Following Bondi, clubs sprang up around the nation, and bronzed surf lifesavers came to epitomise Australia’s blossoming beach culture. Despite the fact that the club was a volunteer organisation, Ormsby insisted on strict rosters, which contributed to the movement’s success. He also guided the clubs towards a national body – a structure that California’s surf lifesavers replicated after visiting Australia in 1950s.

Although professional lifeguards watch over the busiest beaches today, surf lifesaving volunteers still patrol on public holidays and weekends, and look after smaller beaches. About 167,000 Australians volunteer, and, along with the Australian Lifeguard Service (ALS), rescue roughly 12,000 people every year.

NATSUMI PENBERTHY

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Melting point

Mars may be frozen, but the evidence of water flow is easily explained, says Fred Watson.

ONE OF THE biggest space news stories of late 2015 was the announcement of compelling evidence for active water flows on Mars. It's a story that goes back almost a decade, with images from orbiting spacecraft revealing ribbon-like features that hinted at the flow of liquid down Martian hillsides and sand dunes. Tantalisingly, these features showed changes over time, with some of them – known as 'recurrent slope lineae' – temporarily assuming a darker appearance during the Martian summer.

What could be causing the features? One idea was that bubbles of carbon dioxide might be escaping from their frozen state beneath the Martian surface near the hilltops – these would disturb the soil as they careered downhill in a process reminiscent of the dangerous hot gas and lava flows that sometimes accompany volcanic eruptions on Earth. But the most favoured explanation was that the flows were due to a periodic wetting of the surface by liquid water, with the soil darkening as the water flowed.

How could this be? The average surface temperature on Mars is -63°C, and – even in summertime on the Martian equator (where most of

these phenomena have been observed) – the temperature seldom exceeds -20°C. Any water, therefore, should be frozen solid. But observations made with NASA's Mars Reconnaissance Orbiter (MRO) have shown that the lineae are rich in chemicals that effectively lower water's freezing point, sometimes by as much as 70°C. This natural antifreeze has already been observed in analyses carried out by NASA's Phoenix lander back in 2008. MRO's remote sensing has now confirmed its presence in the lineae.

The discovery excited astrobiologists – the scientists exploring the possibilities for life beyond Earth – and raises an immediate question. Could we send one of the two operational rovers currently on Mars (Opportunity and Curiosity) to take a closer look at the recurrent slope lineae? Sadly, the answer is no, because the distances are too great. There are also international protocols that forbid spacecraft to approach sites that may harbour living organisms for fear of contamination (see AG 118). We'll just have to wait to confirm precisely what the streaks are.

FRED ANSWERS YOUR QUESTIONS

Why does the Moon look different when seen from the Earth's equator?

Anne Spencer, Narrabeen, NSW

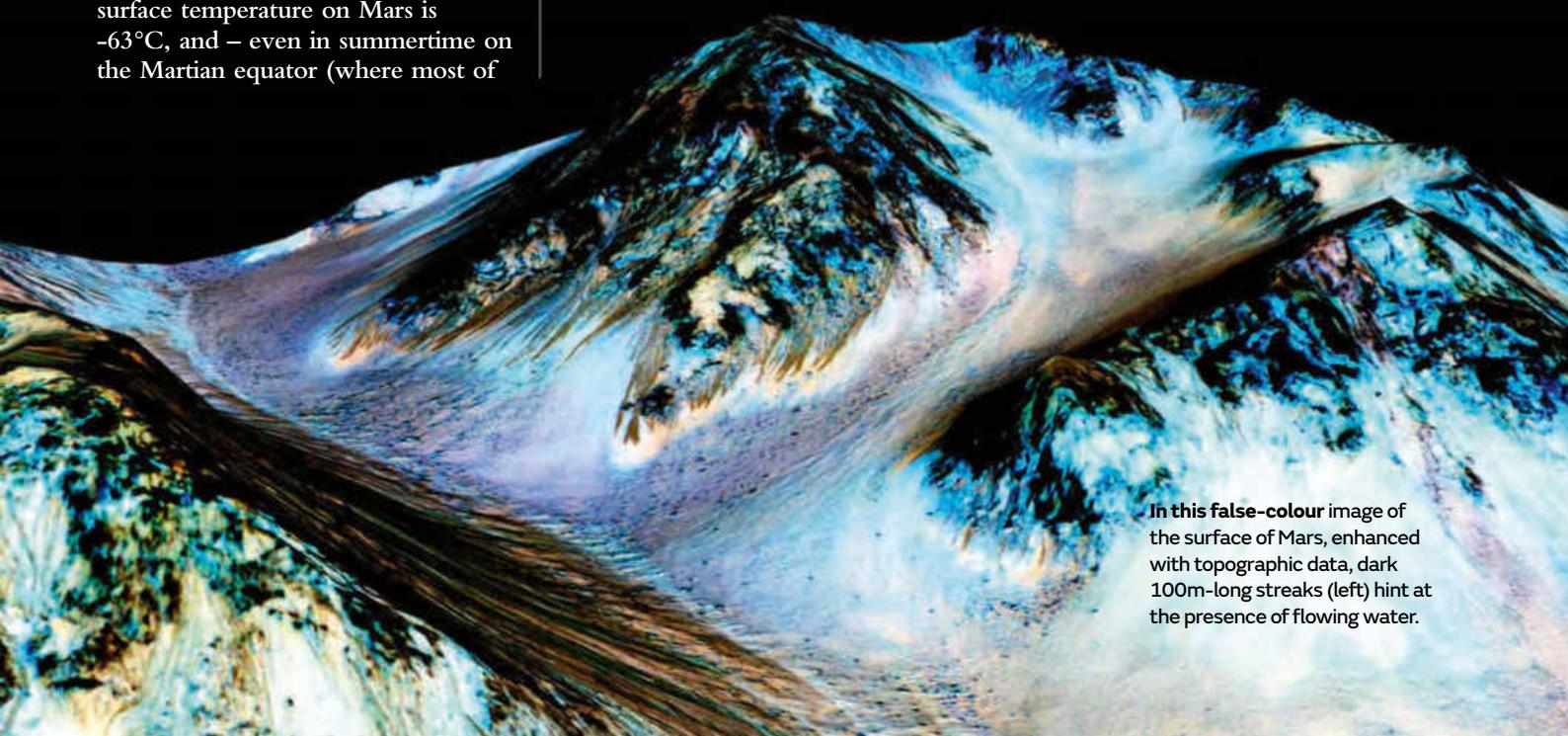
The Moon's path through the sky is much the same as the Sun's. So, on the equator, the Moon rises and sets vertically in relation to the local horizon, passing more or less overhead, depending on the season – just like the Sun. It also means the crescent Moon lies on its back in the morning or evening equatorial sky – giving the world a celestial smile!

If you have a space question for Fred, email it to editorial@ausgeo.com.au



FRED WATSON

Fred Watson is an astronomer at the Australian Astronomical Observatory.



In this false-colour image of the surface of Mars, enhanced with topographic data, dark 100m-long streaks (left) hint at the presence of flowing water.



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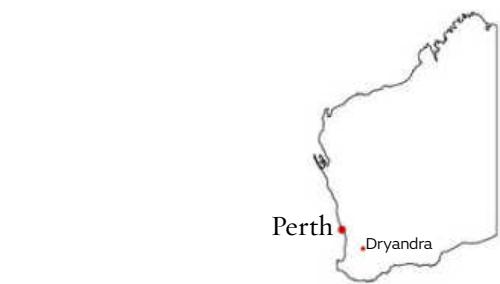
Numbat force

A group of numbat lovers has come to the rare marsupial's rescue in a pocket of south-western WA.

STORY BY JANE HAMMOND PHOTOGRAPHY BY ROBERT MCLEAN

Numbats were once widespread across southern and central Australia, but now there are only about 1000 left in the wild. Juveniles (pictured) are the most vulnerable to cats and foxes.





AT FIRST GLANCE, Robert McLean seems an unlikely conservationist. A meat-truck driver by day, he's a bloke who loves steak, beer and thongs. But most weekends you won't catch him putting his feet up watching the footy or imbibing the amber fluid at the pub. Instead you'll find him deep in the Dryandra Woodland on the frontline of a battle to save Western Australia's faunal emblem from extinction.

Robert's passions are photography and numbats, and he has successfully combined the two into a constructive obsession. On weekends he heads inland, driving for several hours from his coastal home to the Dryandra conservation area 170km south-east of Perth, to find and photograph numbats. His unusual hobby has led him to form a strong bond with three other unlikely conservationists: airline worker Sean Van Alphen; power-company employee Matthew Willett; and John Lawson, caretaker of the Lions Dryandra Woodland Village and former stonemason. The group met on individual searches for the elusive creature after bumping into one another while following the network of old logging tracks that criss-cross Dryandra.

Together they formed the Numbat Task Force, initially to lobby for protection for the numbat from feral cat predation. But when plans were announced to site a major rubbish tip just 6km from Dryandra, McLean says it was "all hands on deck" in a campaign to save the creatures. The four friends set up a Facebook page (facebook.com/numbatTF) and now post every shot they can of the numbats captured on their cameras. Their efforts have managed to overturn a decision by the state's Environmental Protection Authority not to assess the tip proposal. It was a significant victory for the team, assisted by local WA Greens MP Lynn MacLaren, and means the potential impact of the waste facility on Dryandra will now be examined by the environmental watchdog.

It's hard work finding numbats and it takes patience and perseverance. In the years that the four men have been photographing the small marsupials, they have seen the numbers in Dryandra plummet from more than 600 in the early 1990s to fewer than 50 today. "If the tip gets the go-ahead then the



Members of the Numbat Task Force – (L-R) Robert McLean, John Lawson, Sean Van Alphen and Matthew Willett – ready their cameras. The four friends are working to save Dryandra's numbats, one of only two natural populations of the endangered marsupial left.

numbats won't stand a chance. The tip will attract feral cats and it won't take them long to move into this area," says Robert, who's worried that cats will wipe out the population.

Numbats are adventurous and at times seemingly ignore the presence of people as they dig the forest floor in search of the 20,000 termites they need to eat every day. It is this apparent disregard for danger that puts them on a collision course with voracious feral cats. "Numbats are the clowns of the forest," Robert tells me as we drive at "numbat pace" through the woodland, keeping watch for the diurnal creatures. "They are like meerkats on steroids," he says.

Their long, bushy tails, striped backs, reddish coats and long snouts make them appealing to look at and their skittish behaviour is endearing. "Once you see a numbat in the wild. That's it. You're hooked," Robert says, and he's right. After two days of traversing the dusty tracks in the company of the four men I see my first numbat. It's just a glance but worth the many hours spent peering out from the back of a ute. ▶





In early spring, at about nine months of age, baby numbats start to take their first forays in the world outside their burrows. Their stripes echo those of a related dasyurid marsupial, the extinct thylacine or Tasmanian tiger. Much smaller than the thylacine, adult numbats can reach up to 47cm from nose to tail, with males growing larger, but adult females boasting longer tails.

Help save the numbat!

Turn to page 34
to find out how.



Also known as
banded anteaters,
numbats have long,
sticky tongues,
which they use to
collect the 20,000
termites they eat
daily. Their claws are
not powerful enough
to break directly into
termite mounds,
so they strike just
below the soil
surface as termites
travel between
food sources.

WATCH Use the free **viewa** app to scan this page and see Numbat Task Force at work.



In July last year, the numbat was named as one of 20 priority species.

We look out for known numbats including Picasso, named for his bushy, paintbrush-like tail; Sheriff, who lives in an area the task force call "Log City"; Speedy Gonzales, named for his ability to run from the cameras; and Big Balls (I'll leave that one to your imagination). The group searches with two vehicles in convoy in the expectation that if the first vehicle misses a sighting the second will pick it up. They laugh and joke their way through the woodland, stopping to check on echidnas, snakes and other wild creatures.

Sean knows every bird species that inhabits the woodland and documents every sighting or call. Matthew is the quietest of the four and breaks into a huge infectious smile when a numbat is in his viewfinder. John lives at Dryandra and has a wealth of knowledge about numbat quirks and habits. He points out raised lines of earth on the forest floor explaining they are shallow termite galleries that the numbats use to reach the insects.

The numbat's claws are not strong enough to dig into the concrete-like termite mounds that dot the woodland. Instead they attack the termite colonies at their weakest points, the network of galleries the insects use to move between dead logs and other food sources.

Dr Tony Friend, from the WA Department of Parks and Wildlife, has spent a lifetime monitoring and recording numbats, much of it at Dryandra. He says the Numbat Task Force has done a fantastic job in promoting the numbat and raising its status through lobbying, photography and social media. Tony says there are about 1000 numbats left in the wild, and he is optimistic that – if used carefully – a new feral cat

bait called Eradicat, will help bring down cat numbers, giving numbats a better chance of survival (see AG 115). He has led a successful translocation program reintroducing about 500 numbats, many bred at Perth Zoo, into cat-free fenced sanctuaries in NSW and South Australia, as well as other smaller reserves in WA. Dryandra has been the source of the genetic stock used in the zoo's captive-breeding program and the site of a number of releases.

Robert says he is not so sure Eradicat will work in an area such as Dryandra, with its bounty of fresh food for cats, and he is worried that not enough is being done to tackle the scourge of the feral cat.

In July last year, the numbat was named as one of 20 priority species by Gregory Andrews, the federal government's Threatened Species Commissioner. The numbat is "a remarkable Australian animal and a unique product of evolution", he told AUSTRALIAN GEOGRAPHIC, adding that he is impressed by the passion of the Numbat Task Force. "We need people and groups like this to protect their local wildlife. Government alone can't tackle the crisis of species extinction," he says.

The numbat's new status means it will have its own recovery plan and will be placed under the national spotlight. It is welcome news for the men of the task force who have vowed to continue their grassroots campaign to promote and protect this adorable and engaging creature. **AG**

FIND more images at: www.australiangeographic.com.au/issue130 and donate to our numbat appeal on page 34.

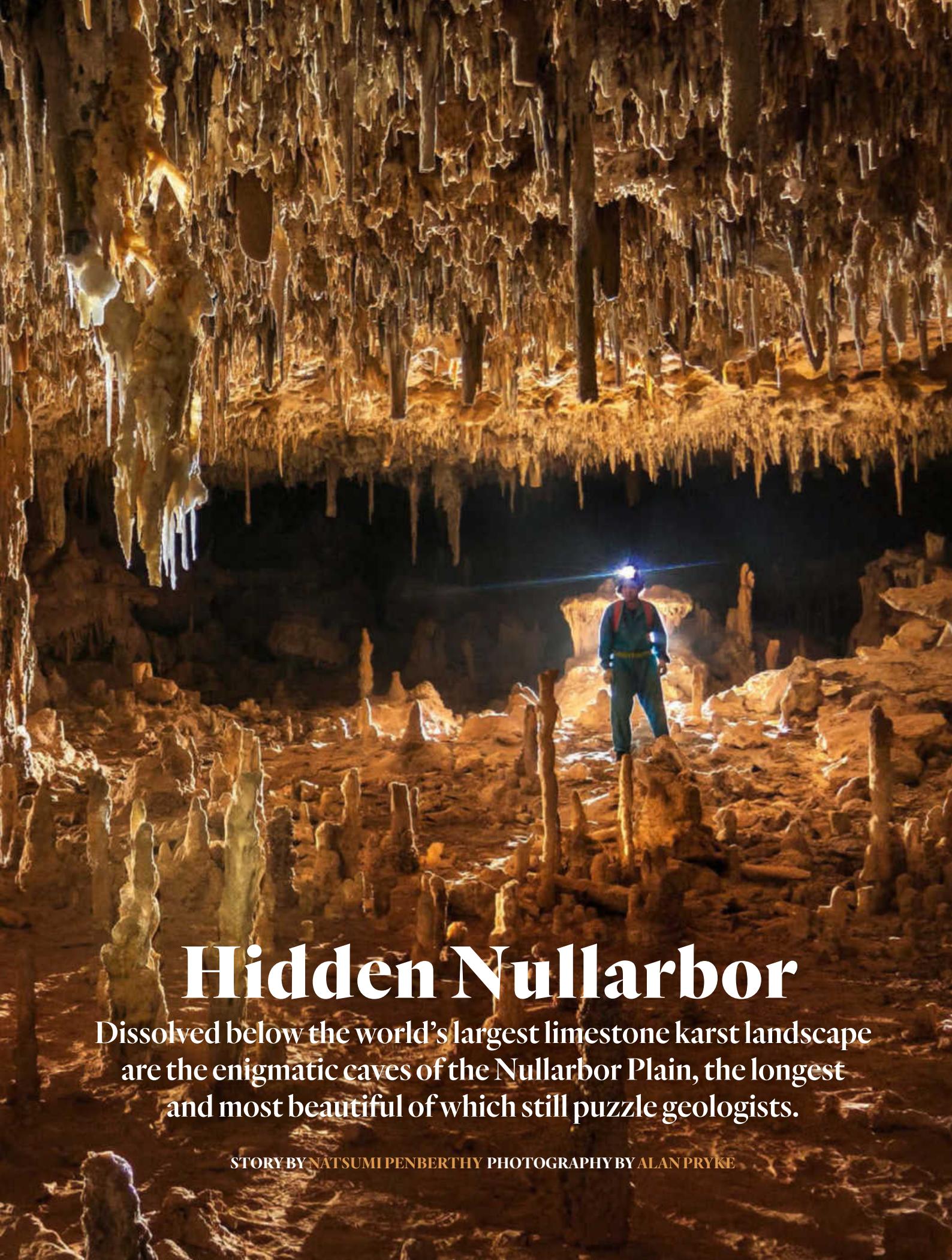
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Katie Keophilaphet (at right)
and Ann-Marie Meredith explore
the intricate stalactite and
stalagmite calcite deposits
that grow respectively from the
ceiling and the floor of Kellys
Cave in WA.



Hidden Nullarbor

Dissolved below the world's largest limestone karst landscape are the enigmatic caves of the Nullarbor Plain, the longest and most beautiful of which still puzzle geologists.

STORY BY NATSUMI PENBERTHY PHOTOGRAPHY BY ALAN PRYKE

ALMOST EXACTLY 100KM west of the Western Australia–South Australia border, Graham Pilkington twists and clammers down a fissure little wider than his body into one of the first of Old Homestead Cave system's large passages.

Light from his head-torch pierces the blackness as his hands grip a wet ladder made slippery by condensation in 90 per cent humidity, before his boots thump to the cave floor, raising a dull echo.

This low, wide entry passage sits below the Nullarbor Plain, the world's largest limestone karst landscape, which is tens of millions of years old. The Nullarbor – a dry, flat, 200,000sq.km savannah – stretches 1100km along the southern coast of Australia from Balladonia east of Norseman, WA, to north of Yalata in SA. Above ground it is famously featureless. Edward John Eyre, the first European to cross the Nullarbor in 1840–1841, described it as the “sort of place one gets into in bad dreams”. But beneath the surface is a complex world of tunnels within a vast slab of limestone. Much of southern Australia is also riddled with smaller blocks of limestone.

The Old Homestead Cave – one of Australia's longest cave systems yet discovered – comprises about 34km of known tunnels and chambers across four levels. These are filled with stalactites and stalagmites, smooth flowstone and occasional curling tendrils of gypsum crystals that grow out from the walls.

Some of the other equally impressive Nullarbor cave systems are protected within the 28,730sq.km Nullarbor National Park and Regional Reserve. Another 9000sq.km falls within the Nullarbor Wilderness Protection Area.

Karst topographies such as this are created when water seeps through large expanses of soluble rocks, such as limestone or dolomite, riddling them with sinkholes and caves, like holes in Swiss cheese. Dripping with stalactites, the chamber Graham is exploring is beautiful but also packed with information. “We think of the shape of the cave itself as nice to look at,

but every shape also shows you the history of the cave,” he says. A life member of the Cave Exploration Group of SA, Graham is the expert on the Old Homestead Cave. It's been his passion to map this remote cavern almost every year for more than three decades.

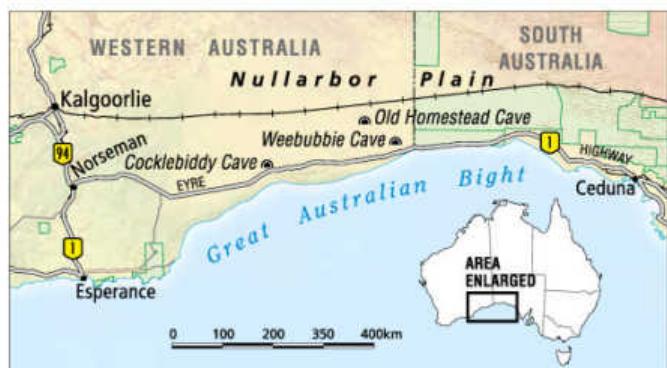
Exploring the caves that riddle Nullarbor has been a lifelong obsession for a select group of cavers and cave-divers. Among them are Andrew Wight, the AG Society's 1989 Spirit of Adventure awardee, who was killed in a helicopter crash in 2012; and Ron Allum, creator of the *Deepsea Challenger* submarine that in 2012 took Hollywood director James Cameron to the bottom of the Mariana Trench. Indeed, James helped produce *Sanctum* in 2011, a suspense-thriller based on the true story of 15 cavers, including Andrew, who became trapped in a Nullarbor cave in 1988 after the entrance collapsed (AG 19).

All this limestone began to form more than 50 million years ago when the continent broke away from Antarctica and the sea flooded into the subsequent gap. The calcium carbonate shells of tiny sea creatures accumulated on the ocean floor, eventually forming into a chalky layer of limestone. More recently, the sea retreated and the southern part of Australia tilted, lifting up the 100m-high sea cliffs that line the southern coast of the Nullarbor today.

Ian Lewis, a karst geomorphologist based in Adelaide, describes the Nullarbor as one of very few places in the world where the limestone retains its original shape – a vast, flat disk, hardly touched by the grinding, breaking and buckling pressures generated as tectonic plates collided.

“The southern end of Australia is geologically peaceful,” he says. “That ancient sea floor has been relatively untouched for millions of years.” If it had been in the north of the continent, it would have been scrunched up into mountains in New Guinea, or pushed under the ocean floor, he adds.

There is a great variety of cave types under the Nullarbor, but the plain's most interesting features are long, deep systems (such as the Old Homestead Cave), ▶



Nullarbor Caves

Permits are required to access many of the hundreds of subterranean caves that dot the vast karst system of the Nullarbor Plain, which covers 1100km of Australia's southern coast. Some caves are open to the public, but only to those with extensive caving experience. Permits are available for the caves in each state from the WA Dept of Parks and Wildlife and the SA Department of Environment, Water and Natural Resources.



▼ **Katie Keophilaphet**, president of the Sydney University Speleological Society – one of the nation's oldest, largest and most active caving groups – explores the Nullarbor's Stegamite Cave.

▲ **The horizontal lozenge** shape of this chamber of the Old Homestead Cave hints it was dissolved out of the rock by sitting water. Caves elsewhere in the world are more commonly cut by rivers, giving them a vertical profile.





▲ **Old Homestead's** two 'doline' or sinkhole entrances – one north and one south – lead to complex passages, ranging from 50cm to 100m wide. Traversing them all eventually takes cavers 85m below the surface.

▼ **Crystalline needle gypsum** forms through evaporation in undisturbed clay areas of the cave systems, which are drier than those in which stalagmites and stalactites are deposited by the action of water.





Using a photographic memory, Graham Pilkington has created many of the maps of the Old Homestead Cave by hand. He often works to add new details in the old shed that sits near the entrance of the cave system.

Over time, pockets near the surface collapsed, creating dramatic entrances.

which are found only here, in the US state of Florida, and on Mexico's Yucatan Peninsula, all of which all have similar karst limestone layers. Geologists are still trying to understand precisely how the Old Homestead formed. The main theory is that groundwater ate away at the Nullarbor's bedrock, making it porous.

Then, during a wetter era, rainfall seeped into small cracks, slowly dissolving the limestone and forming an extensive network of passageways. Over time, pockets near the surface collapsed, creating dramatic entrances. "Most of the theories about caves have been developed in Europe and North America, where running water has been the main process creating caves," Ian says. "In those places, limestone is generally compressed, hard, raised up, and hilly – with rivers and streams all carving away at it. Instead, our caves have been dissolving quietly beneath the ground."

Satellite imagery appears to support the hypothesis that ancient groundwater had a role in creating

the unusual cave systems. Although the Nullarbor is largely stable, fractures in the rock suggest there may be some flexing of the enormous layer of limestone bedrock. It makes sense, Ian says. "It's the world's biggest slab of limestone, and it's huge and thin. If that's the case, it is most likely that the longer caves are forming along these cracks."

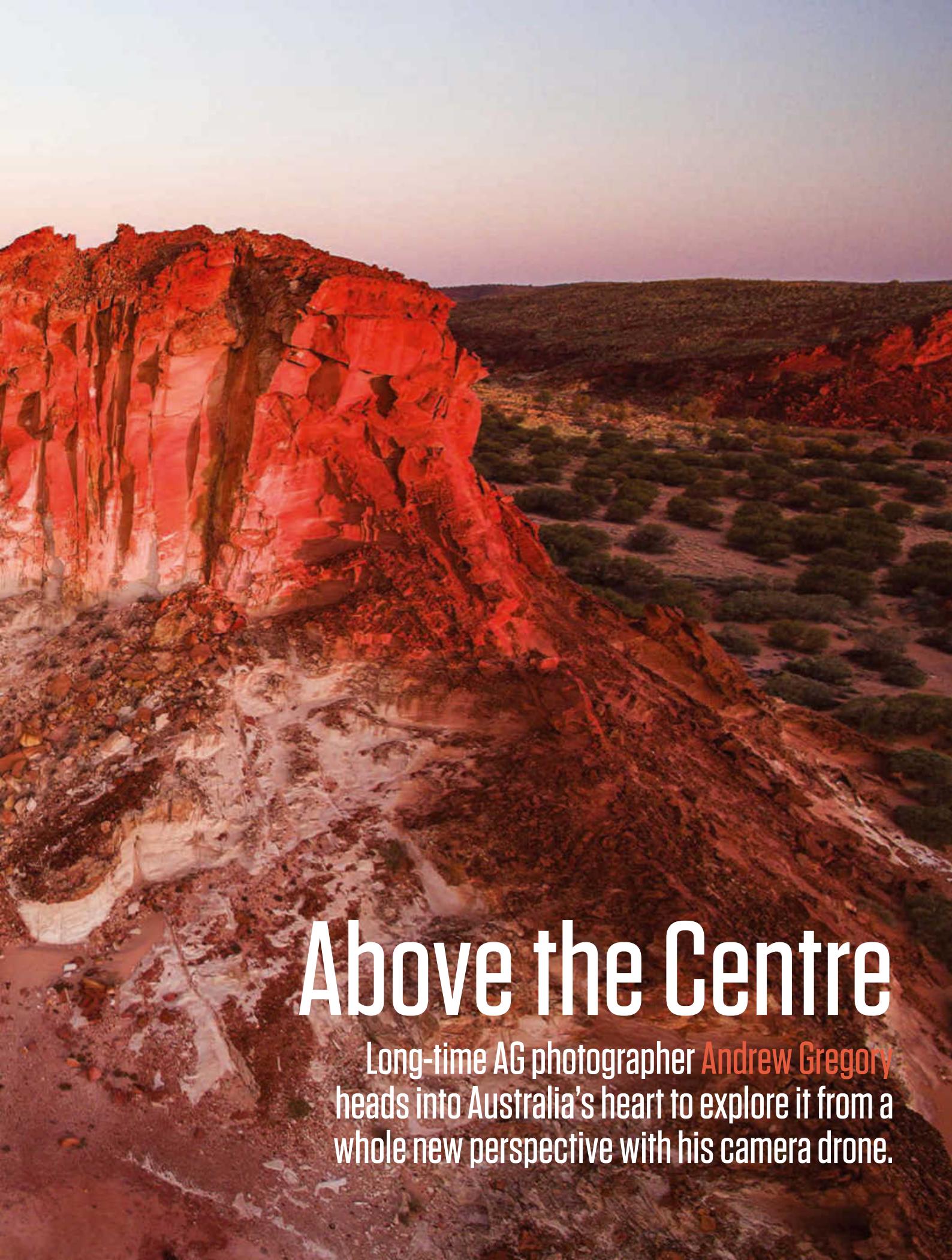
This process might also explain Old Homestead's length. "Old Homestead is a bit of strange one. It's way out in the middle on its own, but it's 34km long," says Ian, who also argues that its position at the centre of the Nullarbor may be key – the centre is weakest if the whole slab is flexed. Imagine pushing at the edges of a soap bar – the middle is likely to crack, letting in more water to expand and lengthen the cracks.

For Graham, whose team returned in 2015 to map unknown sections of the cave's second level, it's a puzzle that still holds his attention. "There's so much of it and we always find something different," he says. "One day you walk this way and you're looking in one direction, the next day you're looking in another, and you find another passage and something completely new." AG

 **SEE** more stunning pictures of the Nullarbor's caves online at: www.australiageographic.com.au/issue130

Drifting above Rainbow Valley, the drone captures the afternoon sun as it highlights a palette of red, orange and white sandstone. The elevated view reveals how the tougher red sandstone persists, while paler rocks are more readily washed away to the plains below.



A dramatic aerial photograph of a large, layered red rock formation, likely sandstone, with distinct horizontal sedimentary layers. The formation rises sharply from a dry, brown, and rocky base. In the background, a vast, rolling landscape of low hills and sparse green vegetation stretches towards a hazy horizon under a clear sky.

Above the Centre

Long-time AG photographer Andrew Gregory heads into Australia's heart to explore it from a whole new perspective with his camera drone.



Hovering in the heat, the drone captures an eagle's-eye view from the centre of Tnorala (Gosse Bluff). With landing gear raised, the camera takes a series of images that reveal the steep walls of the impact crater.

FROM A DISTANCE,

in the heat, Gosse Bluff looks like a mountain range drifting above an endless plain. Its position in the landscape and incongruous shape draw me closer. The nearer I get, the more intriguing it becomes, as its walls rear up like the ramparts of an ancient city. The illusion becomes complete as I follow the track through a gap to the inside of a fortress, its walls glowing in the late afternoon light.

To gain a better look, I launch my UAV ('unmanned aerial vehicle' or drone) into the sky and slowly rotate its camera to take a panorama of this crater. The awesome scale becomes clear and I think about the impact that created it. Tnorala (Gosse Bluff) is about 180km west of Alice Springs in the Northern Territory. It was born 142 million years ago when an object from space, probably a comet, plunged into the Earth, creating a perimeter of fractured rock 20km across. Much of it has since eroded away, leaving just the 5km-wide crater seen today.

Photographing this landscape with a UAV provides a dramatic result. Unlike a helicopter, it remains below 120m, which gives an aerial perspective while retaining a terrestrial connection. The drone has a gimbal

that rotates 360°, creating a unique perspective and the opportunity for unusual panoramas. In Australia's Red Centre, a UAV can be flown into canyons and gorges and made to hover below mountain peaks. While flying I had visits from eagles, falcons and kestrels that would check out the drone as it hovered, and then, curiosity appeased, soar up into the sky.

Using a UAV in the outback, however, comes with its own particular challenges. Willy-willies are frequent and come with little warning, throwing up fine particles that clog delicate motors. Then there's the heat. Even in October, temperatures can be intense.

Batteries heat up during flight and must be cooled before recharging. When the external temperature climbs above 40°C, chargers, iPads and sensitive electronic gear shut down. Recharging is another challenge. My 4WD is fitted with special batteries that are charged using the engine and solar roof panels. These in turn charge a pair of UAV batteries, which provide 15 minutes of flight time. Also to be charged are batteries for a smaller UAV for shooting video, transmitters, monitors and iPads, which run apps to control the drones. Because most images are taken at first and last light, charging goes on through the night to ensure everything is ready for the next dawn.



FOR THIS JOURNEY in search of arid zone scenery, I'm following the Red Centre Way. It's a series of connecting roads between Alice Springs and the West MacDonnell Ranges in the north, and Uluru in the south. On the way it passes the landscapes of Glen Helen Gorge, Tnorala and Kings Canyon.

Travelling south of Tnorala you pass through Aboriginal land on the Mereenie Loop road, which requires a permit and largely follows an unsealed, rugged track. The corrugations rearrange the equipment in my car, but I reduce the tyre pressure to help smooth the ride. Doing this loop road turns the journey into an adventure away from the main highway, with sightings of dingoes and birds of prey along the way.

The MacDonnell Ranges spread in an east-west direction for 640km and become more spectacular heading west from Alice. There are stunning gorges – Simpsons Gap, Standley Chasm and Serpentine Gorge among them – to investigate and explore with the UAVs. One of the most striking is Ormiston Gorge, a deep canyon that becomes filled with dawn light shortly after sunrise. The western ranges have the NT's tallest mountains, all closely grouped: Mt Zeil (1531m), Mt Razorback (1247m) and Mt Sonder (1380m). The beautiful Mt Sonder is a highlight along

the 223km Larapinta Trail. It gently rises like a giant launching ramp to an east-facing summit that captures the radiant morning light. I position the UAV here above the landscape to allow a clear view of the summit and Mt Razorback behind, and then rotate the camera 180° to capture a panorama.

The narrow Redbank Gorge is at the base of Mt Sonder and the Redbank Creek flows through it. The gap at nearby picturesque Glen Helen Gorge is formed by the beginnings of the Finke River. You can swim here and at the other gorges along the way, including Ormiston and Redbank, and Ellery Creek. From Glen Helen the river flows south to Finke Gorge National Park, where it streams past sandy banks and rugged cliffs. Although it's ephemeral, the river ensures the survival of the rare red cabbage palm, which was more widespread at wetter times in the Red Centre's past.

FURTHER SOUTH along the Red Centre Way are two landmark national parks – Watarrka, then Uluru-Kata Tjuta. They both lie at the southern margin of a 170,000sq.km depression, the Amadeus Basin, which covers most of the southern NT. About 440 million years ago this was a great sea, which then became plains and white sand dunes. Continued page 58 ▶



Gums surround the dry bed of Redbank Creek (right) as it winds out from Redbank Gorge, 156km west of Alice Springs. This elevated view shows the 1380m summit of Mt Sonder.

The UAV reveals a wide-angle view of red cabbage palms flourishing in the dry river at Finke Gorge (centre). With a 2km range, it can explore features such as gorges from above.

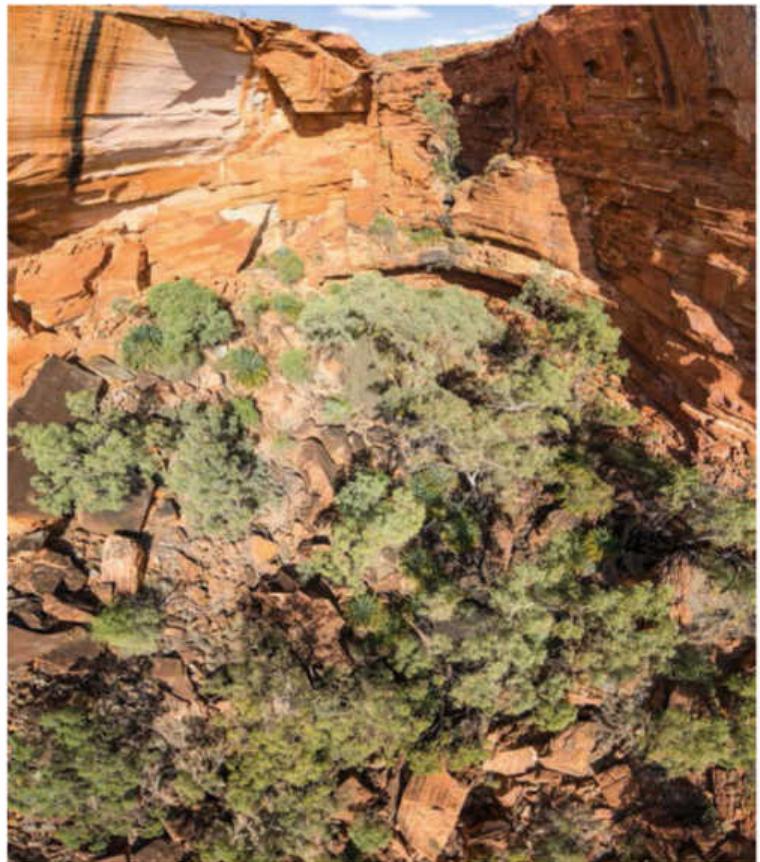
The drone captured multiple images that have been combined to create this view of the striking walls of Kings Canyon and the Garden of Eden on the canyon floor 100m below (far right).



WATCH Use the free **viewa** app to scan this page and see spectacular aerial footage of the Red Centre.



Rotating the camera on the UAV can produce previously impossible images.
Here we look through the gap at Glen Helen Gorge, while also capturing the sweep of the partially dry Finke River, with Mt Sonder in the distance (right).



THE RED CENTRE WAY



The Red Centre Way is a collection of outback roads covering a total of nearly 800km between Alice Springs and Uluru-Kata Tjuta NP, via the MacDonnell Ranges. A 4WD is recommended for comfort on unsealed sections. Check the road conditions before departing Alice Springs.

Captured by my UAV, Kings Canyon in Watarrka is a slice through that geological history, where the more ancient red-brown Carmichael sandstone of the ocean floor lies below white Mereenie sandstone.

The canyon is also a sacred Aboriginal site where walking off-track is discouraged, making the UAV particularly useful. About 350 million years ago, incredible forces pushed up the MacDonnell Ranges, but the pressure was less intense at Kings Canyon, which formed along a crack in the sandstone. The canyon walls have the most beautiful colours and rise 100–150m above Kings Creek below.

There is a surprising amount of plant and animal life here, and the key to this again lies in the geology. The upper Mereenie layer is porous and collects water that is trapped by a layer of shale between it and the Carmichael sandstone below. It supports the canyon's aptly named Garden of Eden – an oasis that taps into the stored water and provides sanctuary for wildlife, including nankeen kestrels and centralian tree frogs. Winds that blow across the top of the canyon produce surprisingly strong downdrafts, so flying the UAV above the Garden is an exhilarating experience.

At the southern end of the basin, Uluru and Kata Tjuta were formed from the erosion of mountains.

Uluru is composed of arkose, granite-rich sandstone created in more ancient mountain ranges that extend for up to 3km underground. Kata Tjuta is a conglomerate mixture of sediments and extends for up to 5km below the surface. As you walk around both of these remarkable inselbergs, you realise how many of the features, such as the caves, valleys, canyons and pools, are due to water erosion.

Seeing the Red Centre's astonishing landmarks from above makes you realise just how much water has played a role in shaping them. Erosion has formed beautiful shapes flowing out of the region's canyons and gorges, and down the soaring walls of Tnorola. And the best time to experience them is when they are bathed in early morning or late afternoon light, as the sun's rays pass across the surface of the Earth, scattering the blue light and making the red light more intense. In the Red Centre, dust in the atmosphere only adds to this, making the warm afternoon light even more striking. 

AUSTRALIAN GEOGRAPHIC thanks Glen Helen Homestead, NT Parks and Wildlife and DJI and for their assistance.

 **FIND** more spectacular aerial images online, at: www.australiangeographic.com.au/issue130

HOW TO DRIVE THE RED CENTRE WAY



Tick-off your driving adventure from Uluru to Alice Springs.

● **Four-wheel drive - 7 day itinerary**

Day 1

- Uluru & Kata Tjuta - Valley of the Winds walk, camel ride, dot painting workshop, sky-dive

Day 2

- Curtin Springs Station - guided walk
- Mt Conner Lookout
- Kings Creek Station - quad-bike ride, take a camel to breakfast, scenic helicopter flight

Day 3

- Watarrka National Park - Kings Canyon Rim Walk or Kathleen Springs
- Kings Canyon Resort - Aboriginal cultural tour, fine-dining under the desert stars

Day 4

- Tnorla (Gosse Bluff)
- Tylers Pass Lookout
- Redbank Gorge
- Glen Helen

Day 5

- Hermannsburg
- Palm Valley, Finke Gorge National Park
- Owen Springs
- Alice Springs

Day 6 & 7

- Discover Alice Springs - hot air ballooning, scenic flights, mountain biking



● **Standard vehicle - 5 day itinerary**

Day 1

- Uluru & Kata Tjuta - walk Uluru base, scenic flight, astronomy tour, bush tucker tour

Day 2

- Curtin Springs Station - paper-making workshop
- Mt Conner Lookout
- Mt Ebenezer Roadhouse - Indigenous art products
- Erldunda Roadhouse
- Henbury Meteorites Conservation Reserve
- Stuarts Well
- Alice Springs

Day 3

- Tjoritja/West MacDonnell National Park - Simpsons Gap, Standley Chasm, Ellery Creek Big Hole, Serpentine Gorge, Ormiston Gorge, Ochre Pits.

Day 4 & 5

- Discover Alice Springs - Aboriginal art galleries, stories of the early pioneers, wildlife and reptiles



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Australian Geographic's



Conservation Heroes

Here's our rundown of the people who have had the greatest influence on protecting Australia's creatures and environments in the decades since AG was founded in 1986.

Tim Flannery

Tim, one of our AG Society expert advisers, is among Australia's most outspoken advocates on climate change. This former Australian of the Year fell in love with fossils as a child, and while working as a zoologist discovered more than 30 new mammals. He's currently a professorial fellow at the Melbourne Sustainable Society Institute and chief councillor at Australia's Climate Council. Tim has worked on ABC, NPR and BBC radio for more than a decade and written many books.



IT WAS THE battle to save Tasmania's stunning Franklin River, shortly before this journal was founded in 1986, that really made Australia's conservation movement a force to be reckoned with. This AUSTRALIAN GEOGRAPHIC rundown of influential conservationists of the past 30 years features some key players from that fight, who went on to great things, including the indomitable force of nature that is Bob Brown. High-profile leaders such as Bob have been crucial, as have international inspirations such as David Attenborough and Jane Goodall, but we mustn't forget the thousands of unsung heroes who have toiled away behind the scenes to keep Australia's natural heritage safe.

We've had space to include a few, such as Felicity Wishart and Nick Mooney. But there are so many other extraordinary people it was impossible to fit in, such as those instrumental in brokering forestry agreements and developing and caring for the national parks that have featured prominently in this journal's pages.

Recently, it's been exciting to see government work complemented by private conservation groups, such as the Australian Wildlife Conservancy (AWC), founded by WA-based philanthropist Martin Copley. Sadly, Martin died in 2014, but the AWC's vital work continues under the watch of Atticus Fleming.

In 1986 our National Reserve System covered about 5 per cent of the country. It's now almost 18 per cent and includes 10,000 properties covering more than 1,370,000sq.km – an area almost as big as the

Northern Territory. Our national park system set the stage for us to embrace the World Heritage Convention to which Australia was one of the earliest signatories, adding the Great Barrier Reef, Kakadu National Park and Willandra Lakes in 1981. Australia remains unusual in having World Heritage listing enshrined in law. This allowed Bob Hawke's government to step in to protect Queensland's Wet Tropics – and World Heritage listing was also sought by Djok Aboriginal man Jeffrey Lee in 2013 to ensure protection from uranium mining for his people's traditional lands.

Also significant has been the *Endangered Species Protection Act 1992*, which many people, such as Col Limpus and Helene Marsh, have relied on to help rescue endangered species.

Australian conservation has many battles ahead and always will, but I believe the biggest threats now come from feral animals and climate change. It's crucial we step up our efforts, particularly at government levels, to stop the destruction caused by cane toads, foxes, cats and camels. And, as the world warms, offering plants and animals space to move and adapt through corridors of bush linking our parks and reserves will be crucial.

But the inspirational efforts of the extraordinary conservation warriors featured on the following pages make me optimistic about our capacity to overcome these challenges and also confident that the future is bright for Australia's natural environments and the many special plants and animals they harbour.

TIM FLANNERY

David Attenborough

BRITISH NATURALIST David Attenborough has seen more of the world than most during his long life of exploration and filmmaking. But he still wishes the “world was twice as big and half of it was still unexplored”. David was fascinated by fossils as a child and went on to study natural sciences at Cambridge University. Natural History broadcasting barely existed when his first TV series, *Zoo Quest*, launched in 1954. His work has since been seminal in shaping the genre, with David writing or producing more than 100 films or series, spanning six decades. “David has affected the lives of people and wildlife for many years,” says ornithologist and BBC presenter Bill Oddie. “With his amazing amount of knowledge, his achievement is to recommend life, wildlife and human life to the people of this Earth.” David’s influence on the public’s perception of nature has certainly been hard to beat: an estimated 500 million people tuned in to his 1979 series *Life on Earth*. Australasia has held great fascination for David and he has travelled here frequently since 1957, when he dived on the Great Barrier Reef for the first time. Visiting Queensland in 2015, he reflected on that experience, describing it as “revelatory, thrilling and unbeatable” and the most exciting natural history exercise of his life. Birds of paradise, found only in New Guinea and north-eastern Australia, is one group he’s returned to film on several occasions.

“The question is, are we happy to suppose that our grandchildren may never be able to see an elephant except in a picture book?”







Yvonne Margarula

For Mirarr Aboriginal elder Yvonne Margarula, conservation is a fundamental survival strategy adopted by her people for millennia. "You have to look after country. For your grandfather's country and mother country, you need to take care," she says. As a traditional owner of land within Kakadu National Park, Yvonne has helped bring a holistic Aboriginal approach to land management. Her work was acknowledged in 1998 with the Friends of the Earth International Environment Award and Nuclear-free Future Award. In 1999 Yvonne and Jabiru elder Jacqui Katona shared the conservation equivalent of a Nobel – the Goldman Environmental Prize – for campaigning against uranium mining at Jabiluka, in Kakadu's north.

Linda Parlane

New Zealand-born Linda Parlane has been a vocal environmental campaigner since she moved to Australia and fell in love with our native plants. She studied botany, took part in the campaign to save Tasmania's Franklin River and then spent years working to protect native forests in eastern Victoria from woodchipping. While working as the director of Environment Victoria between 1990 and 1997, she became known for her considerable talents in coordinating community action, strategy and fundraising. She currently volunteers with Cultivating Community, a non-profit established to assist in the development of community food projects.

Louise Crossley

A Tasmania-based scientist, adventurer and writer, Louise became only the second woman to head an Australian Antarctic station in 1991, when she became the leader of Mawson Station. She had an ongoing role in the Tasmanian Greens and was their first convener in 1989. A passionate environmental leader and campaigner, she spearheaded the protection of Bruny Island's forests and highlighted the plight of the swift parrot and other threatened species. When she died in 2015, tributes poured in from around the world. "She had a great no-nonsense intellect, quick dry wit and keenness to protect the biosphere, not least Tasmania's wild and scenic beauty," said Bob Brown.



Col Limpus

Col has been a leader in marine turtle research and conservation since the early 1970s when he marked 130,000 loggerhead turtle hatchlings for tracking. During the 40 years in which he waited for them to return and lay eggs, he worked tirelessly on research and the species' conservation. Following an 80 per cent decline in egg-laying loggerhead turtles, Col had a breakthrough in 2000 when he convinced fishers to install turtle hatches in their nets. The 2004–05 season was the first not to record a decline in the species and saw the return of Col's first tagged turtles from the 1970s. Col is now Chief Scientist of Queensland's Threatened Species Unit.



Anna Rose

Anna, who was the AG Society's 2014 Conservationist of the Year and is now on our expert advisory panel, has been campaigning about climate change since she was just 14. In 2014 she spearheaded Earth Hour Australia's transition from an annual event to a year-round social movement (AG 119). She is now national manager for Earth Hour with WWF Australia. Among many other achievements, Anna co-founded the Australian Youth Climate Coalition, now one of our largest youth organisations. She made headlines in 2012 when she travelled around the world with former Liberal senator Nick Minchin, to try to change his mind on climate change, resulting in the publication of the book *Madlands: a journey into the climate fight*.



John Wamsley

He was the prime minister's 2003 Environmentalist of the Year, but this controversial conservationist is probably best known for his feral cat skin hats. Regardless of whether or not you agree with his methods, John made Australia sit up and take notice with regard to the nation's appalling mammal extinction record (the world's worst); 30 species and subspecies, mostly marsupials, have become extinct since Europeans arrived. Many of these extinctions are linked to cats and other feral species. John was instrumental in getting the law changed so that people wouldn't be prosecuted for shooting feral cats. He was the first property manager in Australia to fence off feral-free enclosures to protect wild-living native animals, such as bilbies, from feral predators.

Margaret Blakers

Born in 1951, Margaret says she became an environmentalist in high school after reading the landmark 1962 book *Silent Spring*. Written by American marine biologist Rachel Carson, the book is credited with kick-starting the environmental movement. During a lifetime of tireless work, Margaret coordinated the first *Atlas of Australian Birds*, as well as the environmental movement's response to the Victorian Timber Industry Inquiry. She set up the Victorian Greens, worked as an advisor to Bob Brown and organised the first Global Greens Congress. In 2008 Margaret established an environmental think tank, the Green Institute, where she still serves as director.

Harry Butler

Harry began an environmental consultancy career in the 1960s, which has seen him work with corporate clients and government bodies. His support for building connections between environmental conservation and industrial development is seen in his work with the Barrow Island oilfield. Many Australians will recall Harry as the presenter of the late-1970s television series *In the Wild*, which popularised science and natural history for both children and adults. Harry's conservation work has seen him acknowledged as a National Living Treasure.



Jeffrey Lee

As the last Djok clan member, Jeffrey could have sold his people's land for uranium mining and pocketed \$5 billion. Instead, the senior custodian of a parcel of pristine bush called the Koongarra, which contains many tonnes of uranium, spent decades fighting to have the site protected as World Heritage. He achieved this in 2013 when the 1228ha site, which contains sacred burial areas and rock art, was brought into Kakadu National Park. "Money comes and goes," Jeffrey told us (AG 117). "You can always make money other ways, like with visitors, but you can't replace that land."

Felicity Wishart

Felicity Wishart, who tragically died in 2015 aged just 49, was one of Australia's leading conservation advocates. During three decades, Felicity was involved in campaigns to stop land clearing in Queensland and preserve the Great Barrier Reef and Australian rainforests. Some of Felicity's earliest work was with the Wilderness Society to protect the Daintree in the late 1980s. More recent efforts saw her take a major role in protecting our oceans through the creation of a network of marine protected areas around the nation. "All Australians, whether they realise it or not, owe a debt of gratitude for her work," said the Australian Marine Conservation Society following her death.



Atticus Fleming

Raised in the central-west NSW bush, Atticus has always been obsessed with saving endangered species. He is the chief executive of the visionary private conservation organisation, the Australian Wildlife Conservancy (AWC), founded by WA philanthropist Martin Copley. The non-profit now owns and manages 23 private reserves covering more than 30,000sq.km of ecologically key regions. Animals protected include bridled nail-tail wallabies, bilbies and Gouldian finches. Atticus is also an advisor to Australia's Threatened Species Commissioner.

Grahame Webb

Crocodiles are Grahame's particular passion. He's a world-leading authority on the creatures and the conservation and management of wildlife resources through sustainable-use programs. Grahame began full-time research into the biology and ecology of saltwater crocodiles in the 1970s. His work has since shown that conservation and farming can successfully coexist and result in the recovery of endangered crocodile populations. For his contributions to the fields of sustainability and wildlife conservation, Grahame was awarded the Clunies Ross National Science and Technology Award in 2001, as well as an Australian Centenary Medal in 2003.

Nick Mooney

Few people know as much as Nick about the Tasmanian devil, the world's largest surviving marsupial carnivore. He spent more than three decades from the late 1970s as a Tasmanian government wildlife biologist working to shore up the future of various creatures, including the endangered Tasmanian subspecies of the wedge-tailed eagle. But when Tasmanian devil numbers began to plummet due to the deadly Devil Facial Tumour Disease in the 1990s, Nick turned his focus to keeping the marsupial from going the same way as the extinct Tasmanian tiger.



Curt and Micheline Jenner

With the help of an AG grant, whale experts Curt and Micheline Jenner built their first sailing boat in 1995 and set off to study humpbacks along the WA coast. Today they have the larger RV *Whale Song*, which is the operations base for their conservation non-profit Centre for Whale Research (CWR). Achievements include the discovery of a critical Exmouth Gulf humpback nursing ground and identifying the Perth Canyon as an important feeding area for endangered pygmy blue whales.

David Suzuki

Now aged nearly 80, Canadian academic and geneticist David Suzuki has long been an environmentalist of international influence. In 1990 he co-founded the non-profit David Suzuki Foundation, to promote protection of the environment, and has spent his career communicating complex science to the public. As a child, David lived with his family in Canadian internment camps for the Japanese. Despite the challenges, his father instilled in him a love of nature. He went on to study zoology at the University of Chicago and has now written 52 books, and hosted many popular science radio and TV series, including the US-British production *The Secret of Life*.

Steve Irwin

Steve devoted his career to saving wildlife. The Crocodile Hunter, as he became known, was Australia's wildlife conservation poster boy until his death in 2006 at the age of 44. Growing up at his parents' Beerwah Reptile and Fauna Park in Queensland, Steve fostered a special relationship with native wildlife. He would help his dad capture 'problem' crocs, and later developed capture-and-care techniques now used internationally. In the 1990s Steve took over management of the park with his wife, Terri, and renamed it Australia Zoo. Since Steve's death, Terri and their children, Bindi and Bob, have kept his legacy alive. Today, the zoo funds wildlife conservation projects to protect threatened species, while the 1350sq.km Steve Irwin Wildlife Reserve, on the Cape York Peninsula, harbours vital wetlands and rare native species. "I have no fear of losing my life – if I have to save a koala or a crocodile or a kangaroo or a snake, mate, I will save it," Steve, once said rather prophetically. "Yeah, I'm a thrill seeker, but crikey, education's the most important thing."

"I believe our biggest issue is...habitat destruction."



Jane Goodall

Jane rose to fame through her 55-year study of chimpanzees in Gombe Stream National Park, Tanzania. She trained as a secretary and was fascinated by animals, but had no scientific credentials when she travelled to Africa in 1960, aged just 26, to study chimps under anthropologist Louis Leakey. In Gombe, Jane documented chimps using sticks as tools, astounding scientists (AG 105). She's since set up the Jane Goodall Institute, written many books and been made a Dame by Queen Elizabeth II. Her focus in recent years has been on raising awareness of endangered species, particularly through community-based programs. Humanitarian youth group Roots and Shoots, which Jane launched in 1991 with Tanzanian students, now has 150,000 members in about 130 countries. She continues speaking worldwide on environmental issues. "We are losing species at a terrible rate, the balance of nature is disturbed, and we are destroying our beautiful planet," she says. "But in spite of all this I do have hope. And my hope is based on four factors: the human brain, the indomitable human spirit, the resilience of nature, and the determination of young people."

"Every individual has a role to play. Every individual makes a difference."



Phillip Toyne and Rick Farley

Phillip (1947–2015) and Rick (1952–2006) had an irrevocable impact on Australia's environment when, in 1989, they established Landcare Australia. Phillip was a teacher and lawyer for Central Australia Aboriginal communities before heading the Australian Conservation Foundation and then Bush Heritage Australia. Rick, a former journalist and political adviser, fought for the rights of Aboriginal people and farmers alike in roles with the National Farmers' Federation, Cattlemen's Union of Australia, Council for Aboriginal Reconciliation and National Native Title Tribunal. Through Landcare, the pair aligned farmers and conservationists.

Robert Purves

As a businessman Robert has long championed the Australian environment. He used \$10 million from the sale of his shares in a radiology and aged-care company to establish the Purves Environmental Fund. It annually donates \$2 million to support sustainability and biodiversity. And Robert has personally donated more than \$5 million to environmental causes. He is also the current WWF Australia president, a founding member of The Wentworth Group of Concerned Scientists and a director of both Earth Hour Global and the Climate Council of Australia.

Rachel Lowry

Driven to create a sustainable future for all life, Rachel has emerged as one of Australia's most active wildlife conservationists. As Wildlife, Conservation and Science Director at Zoos Victoria, she's developed acclaimed conservation programs, such as the Don't Palm Us Off campaign, which aims to weaken Australia's connection to orangutan habitat destruction by seeking mandatory palm oil labelling on food products. She advises the Threatened Species Commissioner and has led development of a conservation plan to stop species extinctions.

Ian Lowe

Ian has been talking about the climate change issue since long before it was a hot topic of public debate. An emeritus professor in Griffith University's School of Science, he is an anti-nuclear advocate and recognised as one of the world's leading climate change scientists. In 1996 Ian chaired Australia's first national report on the State of the Environment and in 2004 became president of the Australian Conservation Foundation, a position that he held until late 2014. Ian is a prolific writer on environmental issues. His contributions to science have been rewarded on many occasions, including in 2001 when he was made an Officer of the Order of Australia.



Francis 'Frank' Manthey

One half of Australia's 'Bilby Brothers', Frank Manthey has dedicated much of his life to the re-establishment and protection of Australia's bilbies. In 1999 Frank co-founded the Save the Bilby Fund with Peter McRae. The two located land at Currawinya National Park in Queensland for a bilby sanctuary, and raised funds for the construction of a 25sq.km predator-proof fence around it. Frank has since proved to be a gifted communicator, bringing the plight of bilbies to the general public, enlisting the support of Australian chocolate company Darrell Lea, and convincing the federal government to gazette National Bilby Day. He was awarded a Medal of the Order of Australia in 2012 for his conservation efforts.



Ron and Val Taylor

Surprisingly, Sydney-based Ron and Val – two of the world's earliest and most outspoken marine conservationists – began their love affair with the ocean as spearfishing champions. But Ron, who died in 2012, was also a keen photographer and soon became more interested in shooting underwater life with a camera than a spear. From the mid-1960s, they emerged as staunch advocates for the protection of marine environments and creatures, particularly sharks. They had huge international influence by bringing the underwater realm to ordinary people through their photography and documentaries (AG 11). Val was a long-time AG Society trustee and many of her articles have appeared in the magazine and on the website.

Kim McKay and Ian Kiernan

Ian was appalled by the pollution he saw while representing Australia in an around-the-world yacht race in 1986–87. He gathered a group of friends, including Kim McKay (now director of the Australian Museum), and planned a community-based response. Forty thousand Sydneysiders turned out for Clean Up Sydney Harbour on Sunday 8 January 1989. The event went national the following year and almost 300,000 people got their hands dirty for Clean Up Australia. In 1993, with the support of the UN Environment Program, Clean Up the World was staged. Today this extraordinary Australian initiative has grown into one of the planet's largest community based environmental campaigns involving about 35 million people in 135 countries.



Peter Dombrovskis

Peter, who died in 1996, was an influential wilderness photographer. He emigrated here with his parents from Germany in 1950 and began taking pictures in the 1960s. His photograph *Morning Mist, Rock Island Bend, Franklin River* has become an iconic image of Australian wilderness since it was used in the 1980s campaign to stop the damming of Tasmania's remote and wild Franklin River. This landmark conservation battle spurred the creation of the Tasmanian Greens and is credited with helping Bob Hawke and the ALP win the 1983 federal election. Hawke's government halted the proposed dam that would have destroyed the part of the river captured in Peter's photograph (AG 117).

Helene Marsh

Queensland-based, marine mammal expert and conservation scientist Helene Marsh has a passion for dugongs. These seagrass grazing inspirations for the mermaid myth are found in great numbers along Australia's northern coastline (AG 118). Helene has led research into the primary threats to dugongs, of which there are only about 100,000 left worldwide. She has also contributed greatly to the science base for dugong sanctuaries and management in Australia. Helene is chair of Australia's Threatened Species Scientific Committee and leads a program looking for sustainable solutions to human impacts along the World Heritage-listed Great Barrier Reef.



Trevor Evans

After 20 years as a coalminer, Trevor downed his tools to embrace conservation full-time. In 1996, armed with an Ecotourism and Ecosystem degree, he bought 250ha of degraded NSW bush and created Secret Creek Sanctuary, which now runs conservation projects for many creatures, including eastern quolls. In 2001 Trevor co-founded the Australian Ecosystems Foundation Incorporation (AEFI) which now manages about 1000ha of land, including Secret Creek, where it is based. The AEFI has supported the reintroduction of species, such as the eastern quoll, previously extinct on the mainland, and plants up to 25,000 native trees a year along degraded lands.



Bob Brown

An enduring conservation figurehead, Bob has fronted many big battles in the past 40 years. He rose to prominence in the 1970s when he led the campaign to save Tasmania's pristine Franklin River from damming (AG 117). It attracted global attention and had long-term political ramifications. Bob entered Tasmanian politics in 1983, then went federal, founding the Australian Greens in 1992. He led the party until 2012, the year

the AGS recognised him with its Lifetime of Conservation award. Bob also founded private conservation group Bush Heritage in 1990, when he bought two blocks of Tasmanian forest. He first featured in AG in 1986 (AG 3) investigating Tassie tiger sightings. "We've been spending hundreds of thousands of dollars to try and find the tiger," he said. "Why not use that money to save species that are now nearly extinct?"

"The future will be either green or not at all."



Where THE WILD HORSES are

Historic icon, convenient resource or environmental vandal – brumbies are both revered and reviled across our continent.

STORY BY AMANDA BURDON
PHOTOGRAPHY BY JASON EDWARDS

Beauty is in the eye of the beholder when it comes to Australia's wild horse population. Horses arrived in Australia with the first European settlers, and their feral descendants now number at least 1 million.



Tempers flare as
competition for water
intensifies at Gilbert
Springs, south of Ntaria in
Central Australia. Dominant
stallions defend their mares
and offspring, and sport
numerous battle scars.





All the Aboriginal students perched on the steel fence around the dusty arena want to ride a piebald horse called Allan.

A three-year-old desert brumby, he's steady and surefooted, with just the right amount of spunk to test new riding skills; he's also the unlikely poster boy for a unique learning program. "Before we started offering the Certificate II in rural operations, most of these kids didn't have a good attendance record," says horseman and mentor Chris Barr, a teacher at the Ntaria School in Central Australia. "Now it's up by 500 per cent and the horses are a big part of that."

Twice a week the class travels to the remote outstation of Ipolera, south-west of Ntaria (Hermannsburg), which Chris aims to make as much like a working environment as possible. The students catch and gently break in wild horses, build fences, sleep out in swags and learn how to make saddles and bridles. One student was recently offered a job on an indigenous-run cattle station to the north, and several others see a future on horseback. "It's wonderful seeing the growth in these young people as they work with the horses and learn from them," Chris says.

Their ambitions were fuelled in April 2015 by a nine-day, 120km ride to Alice Springs to take part in the 100th anniversary ANZAC commemorations. Emulating their historical forebears, six students atop obliging mounts proudly wore Light Horse uniforms. "Half the horses had only been ridden for three months, but they all performed fantastically and the success of the ride entirely turned around community attitudes," Chris says.

It gave traditional owners a renewed appreciation of the wild horses that roam their rugged backyard – so much so that several communities are now working with the Central Land Council (CLC) to develop feral-horse management plans, which include mustering horses for sale as part of small-scale local enterprises. Before that, steeds that make up one of the largest wild populations in Australia were often left to die of thirst or starvation in the summer heat each year.

THERE'S NO SUCH problem in Kosciuszko National Park, where cooler year-round temperatures and summer snowmelt sustain lush grassy plains and whispering creeks within the headwaters of the Snowy, Murray and Murrumbidgee river systems. Here, wild mobs now estimated at 4000–8000 horses provide a thrilling sight for horse trekkers threading their way with Peter Cochran through shadowy forests of black sallee and mountain gums.

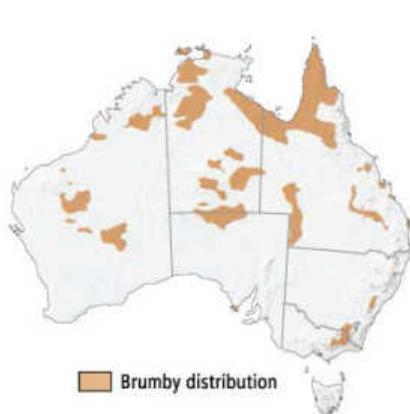
To Peter, a High Country cattleman with heritage dating back to European settlement, former member of Parliament and ardent brumby advocate, there's a spiritual connection between families such as his and the Snowy Mountains brumby. "It's a deep bond between the animal, the land and the people, and we are very protective of the brumbies," he says.

To see a sleek black stallion shepherd his mares and offspring to safety – whinnying defiantly as he canters away, head held high, mane and nostrils flaring – is to witness something truly free. Wild horses are deeply embedded in our national psyche and roam the landscapes of our imagination, made famous by writers such as Elyne Mitchell (*The Silver Brumby*) and Banjo Paterson (notably *The Man from Snowy River* and *Brumby's Run*). An introduced species first brought with European settlers, they are said to carry the bloodlines of horses exported to the British Army in India and the loyal beasts that carried our Australian Light Horse Brigade to success in the great cavalry charge at Beersheba in 1917.

Now numbering at least 1 million, our national herd – the world's largest wild population – can grow at a rate of up to 20 per cent a year in good conditions. With few known predators, numbers fluctuate with the seasons. Our largest populations today are in the rocky ranges and arid plains of the Northern Territory and tropical grasslands of Queensland. They also favour the temperate ranges of New South Wales, subalpine and alpine areas of both NSW and Victoria, and the arid northern pastoral zone and Coffin Bay in South Australia. In Western Australia they are found in the Kimberley, east Pilbara and the northern goldfields.

But are they wild horses or feral pests? Galloping across our continent, they polarise opinion like few other introduced animals. Even to describe them as a feral animal, instead of a brumby, raises the hackles of supporters such as Peter Cochran. "We would like to see the state government acknowledge that the Snowy Mountains brumby has a permanent place in the park and to legislate to protect it. The horses symbolise freedom and are a part of Australia's cultural identity," he says.

However, for the NSW National Parks and Wildlife Service (NPWS), brumbies are a major management challenge. ▶



Brumby distribution

Australia's 1 million feral horses have adapted to a range of landscapes, many to the north. Populations can grow at a rate of up to 20 per cent a year in a good season.



Ntaria School student
Marley Kantawara dreams
of a career as a stockman
at Ipolera outstation,
NT, while fellow student
Dion Pareroultja (below)
competes at the Kwala
Races in Hermannsburg.



"It's difficult for...ecosystems to compete with the romanticism of *The Man from Snowy River*."

The NPWS believes that the hard-footed beasts have an impact on the sensitive alpine and subalpine environments where nationally threatened sphagnum moss bogs support delicate creatures such as the she-oak skink and corroboree frog. There is also concern about the horses' role in degrading water sources, spreading weeds and compacting soils in spots where they congregate in the park's north-east and south. If they move onto the Main Range, 17 endemic species are potentially at risk.

"Horses are a majestic, beautiful animal in the right place," says ranger Rob Gibbs, who is overseeing the review of Kosciuszko's wild horse management plan. "But a lot of time and taxpayers' money is being spent trying to manage them. There are simply too many horses causing too much damage."

As both NSW and Victoria have sought to develop management strategies for public lands, the battle between conservationists and brumby defenders in recent years has at times degenerated into accusations and threats. Public surveys have illustrated the full breadth of views – from those who see wild horses as creatures of "mass disturbance" to those who regard them as "a triumph of nature" and a sacred link to a cherished heritage.

Rob believes that wild horse management is "tangled up with the dispossession and lingering resentment that cattlemen feel about losing their High Country grazing leases". Peter Cochrane contests that the horses didn't "begin to explode" until wilderness areas were declared.

Ironically, a 2013 report on the impact of horses in the Australian Alps concluded that their damage was "as bad as the worst historic grazing impacts to the high mountain catchments that triggered the 1940s removal of stock grazing from Kosciuszko National Park". Horses have cultural, social and tourism value, but people have to realise "that value comes at a cost", says Rob. "These ecosystems simply didn't evolve with large, hard-hoofed animals. But it's very difficult for native animals and ecosystems to compete with the romanticism of *The Man from Snowy River*."

ON ONE THING most people do agree. Australia's wild horse population needs to be reined in – especially in the more heavily populated and politically sensitive south-east. The question is how and by how much. Seasonal 'passive trapping' in national parks in NSW and Victoria, whereby horses are lured into trap yards with food and then trucked out, is both expensive (costing about \$1000 per horse) and labour intensive. It is also limited to more accessible areas.

About one-third of the horses trapped are Continued page 83 ▶





WILD HORSE DYNAMICS

Australia's brumbies are known for their keen eyesight and hearing, and have slightly shorter necks and backs than domestic breeds.

BRUMBIES GENERALLY belong to one of two social groups in the wild. The first is a harem that usually comprises one dominant stallion and three or more mares and their offspring, which tend to live near reliable water.

The second is the more changeable bachelor group: generally 1–3 males of two years or older, including retired males, who have dispersed from a harem and tend to range further afield.

In northern Queensland, horse mobs have been found to have home ranges of up to 10,000ha; in Central Australia that range may be 7000ha, and in south-eastern Queensland 2000ha.

Wild horses can travel vast distances to water or feed. "Some of our collared horses went five days without water and travelled 55km, with a foal at foot, to graze," says the University of Queensland's

Dr Brian Hampson, who radio-tracks horses in Central Australia.

"Up to 75 per cent of the horses in the desert die in a bad drought, so the 25 per cent that breed on are real survivors and benefit from 30 generations of adaptation to this harsh environment."

In contrast, wild horses in south-eastern Queensland seem to enjoy a more sedentary lifestyle due to the availability of good pasture, water and shelter. High horse density coupled with steady population growth has seen horses expand into new areas and survive well, says ecologist Dr Magdalena Zabek, who has studied wild horses extensively in Central Australia and southern Queensland.

"I think it is the ability to adapt to different environments, temperatures and food availability that has allowed horses to spread across the country," she says.







Immortalised by poet
Banjo Paterson, mountain
brumbies now have the
run of grassy Currango
Plain, in Kosciuszko NP. But
even Paterson wrote of
the horses being “a great
nuisance to stock owners”.



“We can’t just say that they are a pest. The history and mythology is important, too.”

collected by non-profit organisations that prepare them for re-homing and domestic life. Member groups of the Australian Brumby Alliance (ABA), formed in 2009 to lobby the government for humane management, have found homes for about 960 horses in NSW, Victoria, Queensland and WA during the past decade. Thousands more have made the trip to an abattoir. Even so, passive trapping has barely kept pace with annual reproduction rates.

As authorities struggle to come up with acceptable control methods, some argue that euthanasing horses mustered into a trap yard is more humane than carting them up to 2000km to the nearest abattoir. Others are putting their faith in the current trial of a drug that renders mares infertile. Certainly aerial culling – outlawed in NSW after the shooting of 600 horses in Guy Fawkes River National Park in 2000 – is the most contentious option of all. Although this method is still used periodically in remote regions, a public raised with domestic horses largely finds the idea of horses being pursued and shot from helicopters unpalatable.

But in northern Queensland, that’s what was being considered in late 2015 after brumbies were declared a road hazard. Along the busy Bruce Highway that fringes the Clement State Forest north of Townsville, two people died in separate accidents involving horses and the

Queensland government moved to protect public safety.

“Lethal control by specialist and highly trained Queensland Parks and Wildlife Service marksmen is considered the most humane and effective solution,” said Steven Miles, Queensland National Parks minister. Elsewhere in the state, graziers have another gripe about wild horses, claiming they are competing with drought-stricken cattle for food and water, and costing the industry anywhere from \$30 million to \$60 million a year.

Ecologist Dr Dave Berman, who has studied wild horses around Australia since 1984, believes they pose one of the greatest land-management challenges of our time. “They need to be tackled on a national scale and that approach needs to be holistic,” says Dave, who readily admits that his first showjumping horse was a brumby.

“We can’t just say that they are a pest. The history and mythology is important, too. They are a lovely animal but they are causing damage. There are too many horses breeding too quickly. We need to work with all the interest groups to find an agreed approach and consider all the methods available to manage our feral horses,” he adds. “Done properly, both shooting horses from helicopters and transporting them long distances can be acceptable. In places like the Snowy Mountains, with larger populations expanding, lethal methods of control are now necessary.”

High Country cattleman

Peter Cochran (top) is a staunch supporter of wild horses, some of which eke out an isolated existence in Central Australia (bottom).

ONE THING WORKING in their favour, however, is that Australia’s wild horses have proven themselves adaptable and easy to train. Revered for their stamina, agility and surefootedness, former brumbies compete in a variety of arenas, from endurance riding and pony club competition to bush racing and showjumping. Jill Pickering, ABA president, says they have been used to support disadvantaged youth, in equine-assisted learning and even to rehabilitate prisoners.

But the alliance is keen to see the identification of a “viable, sustainable population number that will not overtax the landscape... When brumby numbers are kept in check so that they don’t overrun the indigenous animals and plants, they help the land,” she says. “Their manure serves as a fertiliser and their cropping reduces the fire risk.”

People such as Erica Jessup, co-founder of the Guy Fawkes Heritage Horse Association, report increased demand for brumbies captured during trapping operations in national parks. “They have become very fashionable; they are the most versatile animals and we recently had a truckload go to SA and Gippsland,” she says.

Catherin McMillan, a portrait artist and brumby enthusiast from the NSW South Coast, prides herself in having owned a number of these “heritage horses” and currently has one in training. “Once they bond with you, they will jump through fire for you,” she says. “They are intelligent and so willing to please, and very patient with kids. My frail, elderly mother even rode one of my just-started brumbies. More people are starting to see brumbies as an asset and asking where they can get one.”

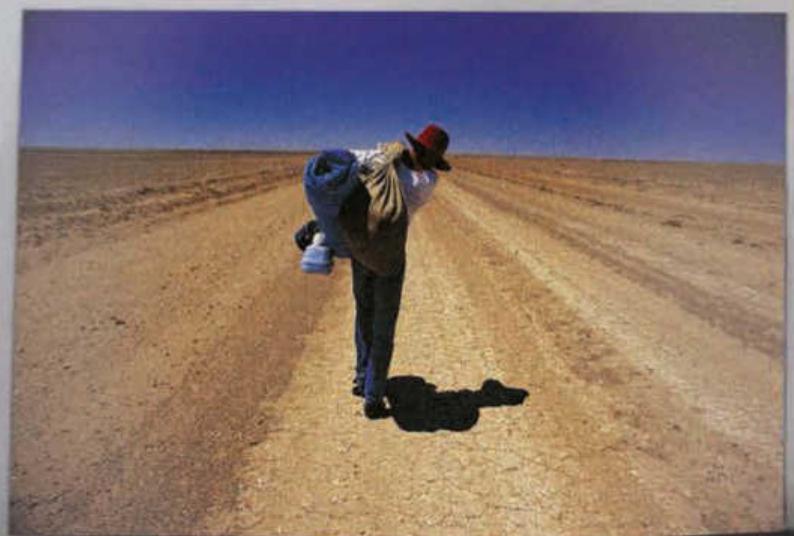
Attitudes – but of a very different kind – are also changing in the central deserts, according to Central Land Council spokesman Sam Rando. There was a huge outcry when an aerial cull was first mooted in May 2013 on Tempe Downs station, south-west of Alice Springs, to protect waterholes and cultural sites from feral horses. Some 24,000 people signed a petition in opposition.

“People were saying they should be captured and trucked to the coast and adopted out. They seemed to think that trucking was a benign option, but a lot of horses are killed or injured in the yards or during transport,” Sam says. “Indigenous people don’t like to see horses shot, but they see the degradation of country and horses starving or dying from a lack of water, and believe that shooting can be the more humane option, which has been supported by independent veterinarians. There is a lot of romantic, wishful thinking; the reality is much more difficult.”

Whichever side of the fence you sit on, wild horses are now an established part of the Australian landscape, just like feral donkeys and camels, deer and pigs. Land managers concede that they could never rid the country of all horses, even if they wanted to. That suits horse advocates, who regard them as noble emblems of the toughness and fighting spirit that characterises Australians.

For Antoinette Campbell, whose husband is Banjo Paterson’s only great-grandson, joining one of Peter Cochran’s riding treks in the Snowy Mountains in October 2015 was the fulfilment of a lifelong dream. “To read Banjo’s poetry and then experience the horses in the High Country, one cannot help but feel an amazing connection with these magnificent animals and the rawness of the plains that are their home,” she says. 

 **FIND** more of Jason Edwards’ images of Australia’s brumbies at: www.australiageographic.com.au/issue130





30 YEARS OF AUSTRALIAN GEOGRAPHIC

Every picture tells a story

Hidden behind the lens, AG's skilled photographers have travelled the length and breadth of the nation seeking out the best vantage points from which to capture images that will best illuminate the stories we love to tell. For our anniversary edition, we invited them to nominate their favourites and tell us why.

Colin Beard *The man from Turkey Creek AG 12, 1988*

IT WAS SUMMER on the Birdsville Track and the temperature was 52°C. At Mungerannie station, near Marree in SA, there was a radio message waiting for writer Paul Mann and me from the police at Leigh Creek south – there was a man walking alone on the track. He'd packed up his swag and walked out of the cattle station that morning with only 1L of water.

He was wearing a bright red felt hat, which we easily spotted a couple of kilometres along in the flat desert landscape. Paul was driving and I asked him to pull up short and allow me to jump out. The man in the red hat looked back briefly and I signalled him to keep going as I took the photo that would become a signature image

for AUSTRALIAN GEOGRAPHIC for many years.

The man was Graham Childs, a quiet, gentle stockman from a cattle station at Turkey Creek in the Kimberley. He'd walked and hitch-hiked down the Tanami and Birdsville tracks to visit his mother, who lived in Cessnock, in the Hunter Valley. When I asked him how he enjoyed the visit, he replied, "Only stayed two days, couldn't stand the big smoke."

He camped with us that night and showed us how to find wild yams and berries and elusive water soaks. He explained how he had learnt to survive in the desert while living for three years with an Aboriginal community near Turkey Creek.

THE COHORT OF photographers commissioned to shoot a major feature story for AUSTRALIAN GEOGRAPHIC still remains a small one, despite 30 years of publishing. Until recent times, the journal was a quarterly publication and even the change in frequency to bi-monthly in 2012 still leaves a full set of all 130 issues taking up not much more than 1.5m on any foundation subscriber's bookshelf.

It's a rarified group of talent that has forged and maintained the journal's reputation for excellence in photography. Our commitment to using the best people and sending them into the field to gather original material, rather than relying on desk research or stock imagery, remains very much at the core of how we create stories. Photographers relish the opportunity to become immersed in a particular subject – or to spend time in a remote location – and, ultimately, are thrilled to see their work reproduced with care and respect across the pages of AUSTRALIAN GEOGRAPHIC.

Many of the photographers who shot features for the early editions are still shooting for us today, including the likes of Bill Bachman, who has covered more major stories for us than any other snapper. For this article, Bill revisited King Island in Bass Strait in October 2015 to reconnect with the close-knit community there on a special day of celebration (see page 89).

Colin Beard's classic images also coloured the pages of many of our early issues, including his beautiful portrait of the northern NSW town of Moree (AG 1), and his engaging photos of the Birdsville Track (AG 12). We asked Dean Saffron, a more recent recruit to AG's ranks, to visit Colin at his home on Queensland's Sunshine Coast, to photograph the veteran shutterbug and find out more about his famous swagman image (see previous page).

On the following pages, some of our best-known contributors share moments and photos from their most memorable assignments, and reveal something of what it's like to be an AG feature photographer in the field.

**CHRISSIE GOLDRICK
EDITOR-IN-CHIEF**



Peter Aitchison | *Dooy Holmes AG 7, 1987*



WHEN AG ASKED me to shoot a story on the alternative residents of Nimbin, in northern NSW, I didn't think it was a good idea. There was a tropical cyclone blowing off the WA coast, which I knew would bring heavy rain across the continent. I requested a four-wheel-drive, but the car-hire company at Ballina only had a little red Ford Laser.

I attended a meeting with one of the communes to obtain their cooperation; the men were quite defensive but the women were easier to deal with. I assured them that they wouldn't feel like fish in a fish tank and that I'd explore how all the communities were working alongside each other – from the older-generation farmers to the newer alternative ones that established themselves after the 1973 Aquarius Festival. As the meeting finished, thunderclouds moved in and I didn't see the sun for the next week and a half.

I spent a lot of time pushing the little red car out of mud or driving across country creeks and flooded roads, hoping not to get swept away. Sometimes I just abandoned it and hiked cross-country with my heavy camera pack on my back. The assignment had all the ingredients of a true adventure. I got around and visited many communities.

I photographed Dooy Holmes and baby Jemima in poor light during a short break in the weather. I asked AG for extra time to wait for better weather, but they needed the photos quickly. Then, when I tried to leave, I couldn't. I was stranded. I had to organise a helicopter to get me to Coolangatta Airport because I had another big assignment waiting back in Sydney. The flight was rough and even the co-pilot was airsick. My cameras and I were subjected to extreme conditions and I was worried about what I had shot, but when I finally saw this photo, I knew I had a winner.



Bill Hatcher

Styx Valley AG 103, 2011



PHOTOGRAPHY IS often like a treasure hunt where a keen eye, patience and time in the field will bring the rewards. Exploring the tree-clad mountains in Tasmania for a feature on the Australian forestry industry with writer Ken Eastwood – and often in the company of big-tree hunters such as Brett Mifsud – you always had to be ready for the unexpected.

Negotiating this country, my eyes were focused on the ground, hoping for a decent footing, as much as they were looking up, searching for massive trees. On the hunt for 400-year-old, 90m-tall giants, I walked kilometres, often negotiating steep ground and crossing swift streams. This photo is the kind of revealing shot that gave me a fulfilling sense of discovery. In this case it was a giant *Eucalyptus regnans* rising in the soft light from a carpet of tree ferns. I composed this photo in a matter of minutes, and then headed off in search of the next treasure.

Mark Spencer

Rapunzel's Tresses

AG 45, 1997



THIS IMAGE of Rapunzel's Tresses (also known as The Shaving Brush) stands out in my memory for its documentary value. Sub-terrestrial flooded caves such as McCavity in Wellington, NSW, are totally black, and these hidden realms had likely never been seen before by anyone.

These caves are physically demanding to get into, require experience and special training to negotiate safely, and are hard to photograph successfully. Lyn Vincent models here with a light. Her husband, Neil, was holding a remote flash (strobe) behind the flowstone for added light.

The photograph enabled a broader appreciation of the size and splendour of this calcite structure than what is typically possible to achieve while diving. That's why it's so special. It reminds me of the huge time-span of Earth's geological history compared with our own lives, and it remained hidden from humans until relatively recent times.



Don Fuchs

Lurujarri woman

AG 112, 2013



I WAS IN BROOME for a special assignment – the 82km Lurujarri Heritage Trail. I was waiting in the grounds of the old 'native hospital', with fellow walkers and members of the Goolarabooloo community, when writer Dallas Hewett called me over to meet Therese Roe. She was the sister of the late Paddy Roe, whose vision made this cross-cultural experience possible.

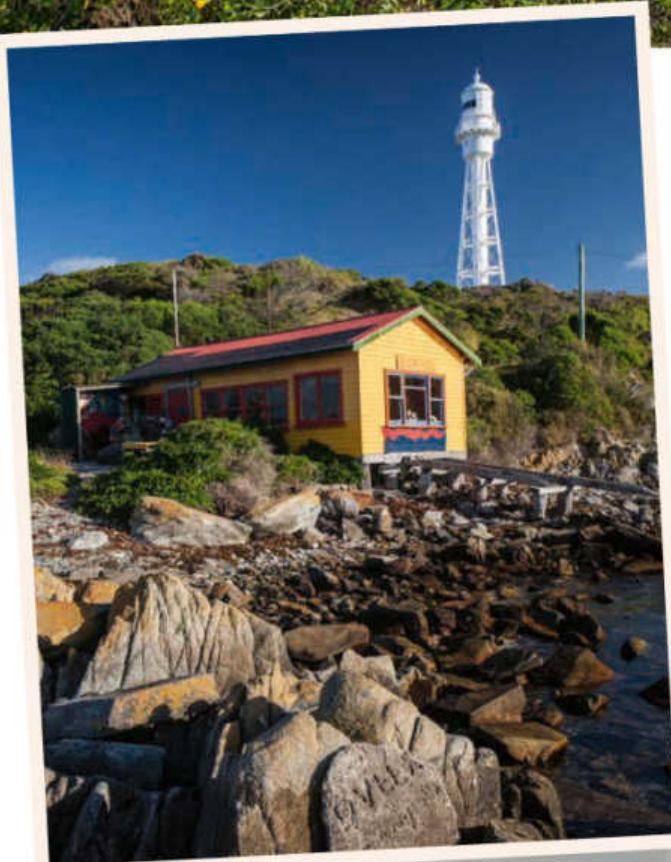
During an interview with Therese, in her home in the old hospital building, she grabbed a picture frame containing four photographs and sat down heavily on the bed. She pointed her finger at a serious-looking young man and said, "This one – he do a bad thing. He kill himself."

As she spoke, I took the photograph. I barely remember pressing the shutter, but I can still hear the deep, resigned sorrow in her voice and the look in her eyes. This brief, intimate and very sad moment in her home captured the plight of Aboriginal people for me in a single image: a daily struggle with depression and suicide, domestic violence and abuse, racism and poverty.





Bill Bachman | *King Island AG 95, 2009*



THE BOATHOUSE, a colourful wooden building nestling beside the harbour in Currie, King Island's main town (left), was featured in several photos in a story I shot in January 2009. Less than a week after I photographed it, it burnt to the ground. Knowing it had been rebuilt and seeking a postscript to our 2009 story, I returned to the Tasmanian island in October 2015 to find a new structure almost indistinguishable from the original (above). Fortunately, the building was insured and it rose again from the ashes, thanks to a big community effort.

"I was absolutely staggered at the way everyone came together to rebuild the boathouse," says local Caroline Kininmonth. "Its loss devastated the locals – everyone felt the soul of the island had been taken away."

Now known as "the restaurant with no food", it's stocked with all the tools needed for everything from a picnic to a dinner party. Locals and visitors alike are welcome to use it any time on a BYO-tucker basis, with an honesty box for donations for the building's upkeep.

Sitting on the upturned boat (above, L-R) are commercial fisherman Paul Jordan, kitesurfer/fisherman Ben Hassing, artist Robin Eades and Tasmanian Parks and Wildlife head ranger Shelley Graham (with baby on lap). Among others who were featured in the original story are King Island Dairy's head cheesemaker Ueli Berger (front centre, at left) and, standing next to him, artist Caroline Kininmonth.



Dean Saffron

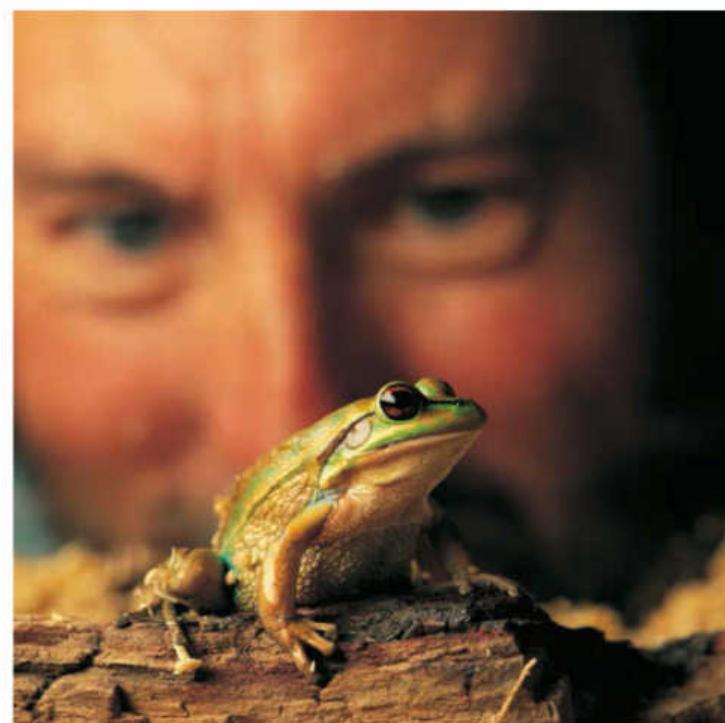
Rogue wave AG 107, 2012



IT WAS WITH a mixture of trepidation and curiosity that I was welcomed aboard the *Diana*, a deep-sea trawler, by her crew, to head out into Bass Strait on an assignment. I felt like a Hemingway character following schools of fish and fixated on the hunt. Conditions in the open ocean were so varied. One moment it was a vast glassy lake teaming with birds gliding the thermals and within hours 10m waves were threatening to engulf us. This contrast is probably why this is my favourite AG shoot.

One day the crew finished work and indulged in a bit of thrill seeking. Wearing raincoats, they stood on the bow while the ship heaved through the heavy swell. I was high on the observation deck when suddenly a huge wave enveloped the lads. I was looking through the lens as the wave also broke over me, completely ruining my lens. I was lucky to save the memory card and this image.

I have immense respect for the crews labouring at the mercy of the elements. It's not easy being on a small vessel, with five other guys for weeks at a time, out in dangerous seas. It teaches you about yourself, reliance on others, the division of roles, hunting and foraging and the link between these things and the natural world.





Mike Langford



*Green and gold bell
frog AG 48, 1997*

I WAS WORKING WITH herpetologist Arthur White on a feature about the endangered green and gold bell frog. I wanted to make the frog look heroic, while making man look like the predator.

The story was about how frogs were indicators of clean and healthy environments and how their habitats were disappearing due to contamination by humans. I put a soft box on the flash inside an enclosure and lit the frog within with really nice soft light to bring out its beautiful colours.

In the background, I lit Arthur with a harsh flash that made him look menacing. The narrow focus makes the frog appear sharp and Arthur blurry and unrecognisable, so he could be viewed as a symbol of the human threat. The shot became the opener for the feature, and another image from this assignment was selected for the cover of the 25 Years of AG Photography book in 2010 – and I'm incredibly proud of that.

David Hancock



Speaking up AG 116, 2013

ONE OF THE things that I truly regret is not learning any Aboriginal languages, despite living in the NT for nearly 30 years. I know a smattering of Yolngu Matha, the language from north-east Arnhem Land and, similarly, Bininj Kunwok, from western Arnhem Land, but I ought to be able to converse with the Aboriginal people I meet.

When I hear the lyrical sounds of Aboriginal people talking, I am taken with the beauty of their language. Frequently, their words go deeper and mean more than our own technical and commerce-oriented talk. I photographed these women in the dry bed of the Hanson River, near Ti Tree in Central Australia. They were Anmatyerre and Warlpiri speakers and were working with non-Aboriginal linguists to revive their languages so future generations can understand and speak them.

Like our native flora and fauna, many Aboriginal languages have become extinct and we're all the worse off for it. Those who have made the effort to learn one or more indigenous language see this country in a way that the rest of us never will.



Thomas Wielecki *Road train AG 68, 2002*



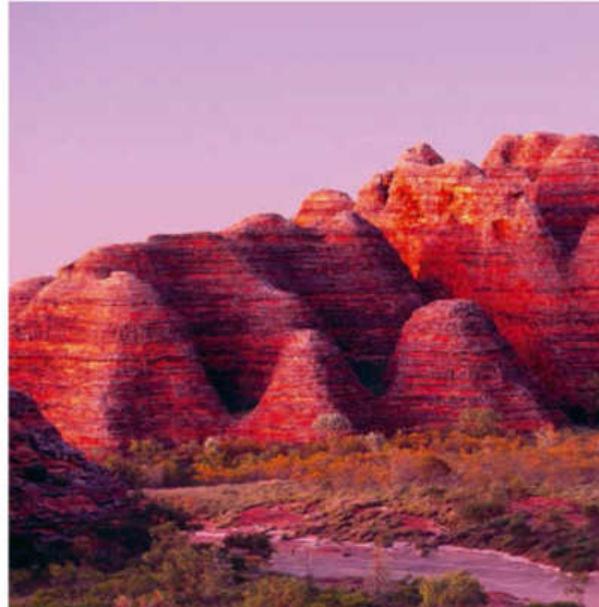
IT WAS MY FIRST Job for AG – a story about the people that drive the nation's huge road trains. We'd arrived at the Hay Plain in NSW at dawn. The landscape was as featureless and flat as the road ahead. The best way to capture the enormity of the place was from above; I only had the truck we were travelling in to stand on.

I climbed on the roof of the cab barefoot – it was polished and slippery. I had a look from up there but it was too still and quiet. I needed movement to truly capture the endless transit of a trucker's life. I asked the driver to drive at normal speed. I had my back against the trailer, and my feet glued to the surface of the cab's roof like a gecko's feet to a window. It felt like being on the bow of the *Titanic*.

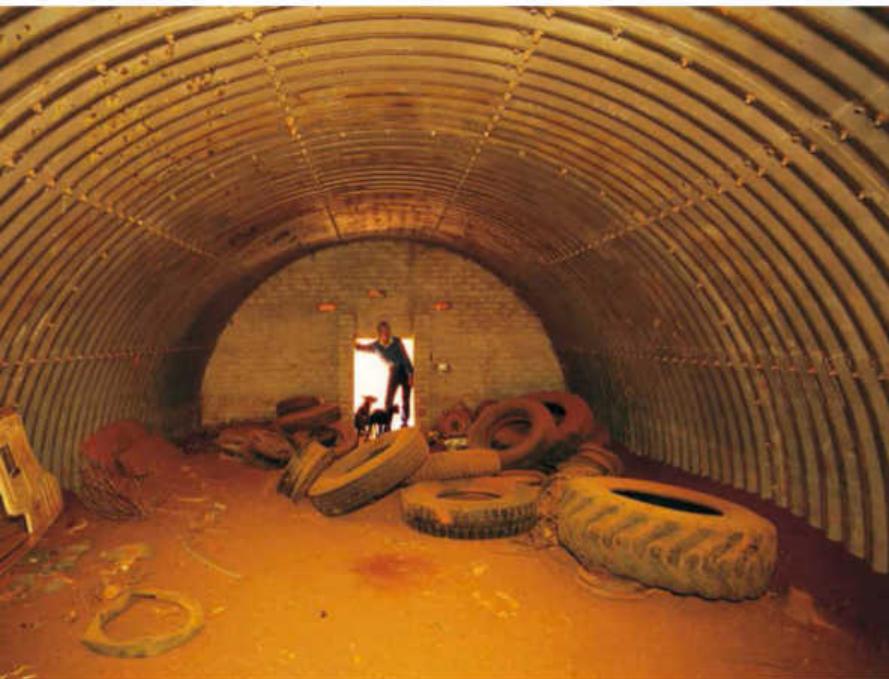
Then the sun broke the horizon. To get the truck's bright paintwork and fittings in the foreground, I used the widest lens I had, a 30-year-old, 18mm manual lens that I picked up at a garage sale for \$20. The greatest bonus of all was that the shot was used to open the story. From a technical viewpoint, this is just a snapshot – there's no lighting technique and the composition is simple – but it's my most memorable for the magazine.



Nick Rains
*Cover,
AG 86, 2007*



I WAS EXCITED to shoot a story on Purnululu in the Kimberley in 2006 because it was, and remains, one of my favourite places. The beehive shapes are, of course, spectacular, but from a photography point of view, they can be difficult to arrange into a balanced composition. I spent quite a bit of time exploring various viewpoints, looking for a scene that captured a sense of place and could stand alone as a 'hero' shot. Once I found this vantage point, just to the south of Piccaninny Creek, I knew I had a strong image, so I returned in the pre-dawn light and was delighted when the resulting shot was selected to be one of the journal's earliest photographic covers.



Barry Skipsey | *Bunker AG 83, 2006*



SHEEP FARMERS, Japanese rocket engineers, goldminers and scientific boffins made this assignment in the Woomera Prohibited Area of SA memorable. The people I met were as diverse as the landscapes writer Ken Eastwood and I traversed. I was shooting with high-end digital by then, so I was surprised when AG insisted I shoot film. I'd not worked with it for four years. Can you imagine these days, shooting in excess of 80 rolls of film and not seeing the results until they hit the lightbox? We travelled with a Geiger counter to check radioactivity levels, and it sometimes gave us good reason not to hang around, because the needle occasionally went off the scale.

A cup of tea with workers on the nation's second-largest sheep station, Commonwealth Hill, was followed by safety training for a 1.2km journey underground into the Challenger Gold Mine. Hundreds of bunkers such as the one were built for pastoralists in the Woomera Prohibited Area in the 1950s. We learnt that upon the announcement of a rocket launch, rather than dashing inside the bunkers, locals would line up deck chairs and eskies on the roofs for a good view of the light show.

**Learn about Barry's
AG Anniversary song!
Go to page 22.**



Esther Beaton

*The charm of cane toads,
AG 44, 1996*



HOW CAN ANYONE be charmed by a cane toad? I can. That's because cane toads are Queenslanders and I've always had a soft spot for them. When I came to Australia 30 years ago, I set off with my husband on an archaeological expedition to outback Queensland. For a greenhorn from Los Angeles, this land of true adventure was a culture shock.

During the cane toad assignment for AG many years later, I recalled those first adventures. Even though I was now studying toads, not ancient artefacts, the people there still represented those uniquely Aussie values that I had come to admire so much: doggedness, laissez-faire, irreverence, a wry humour, and coping against the odds. Of the many assignments I've done for AG, I voted for this image as my favourite because the cane toad job moved me the most.

Photography is about the moment, and although I strive for beauty and design, it's emotion that's primary. That assignment was my first opportunity to rediscover what I loved about Australia. I'd only planned to stay three years. Why did I keep postponing my return 'home' to California? I finally realised I was charmed by the people. Sure they have loyalty and all the other good stuff, but always there's irreverence. Let's not take anything too serious, mate. And yet, somehow, despite the words and jokes, and no matter how tough, the job always gets done. But will they ever get rid of the cane toad?

SEE more of AG photographers' favourite photos online, at: www.australian-geographic.com.au/issue130



PRESERVATION SPIRIT

The wrecking of one of the first merchant vessels to arrive after the First Fleet led to a remarkable tale of survival on Tasmania's Furneaux Islands.

~

STORY BY SANDY GUY PHOTOGRAPHY BY CAM COPE

Matthew Flinders' hand-drawn 1798 map (above) marking the Sydney Cove wreck later led archaeologists to the survivors' camp.



One of the Sydney Cove's two main anchors and a cannon were recovered in 1978, during a preliminary survey of the wreck by marine archaeologists. The relics were sent to be conserved at the Queen Victoria Museum.

IT'S EASY TO SPOT a born-and-bred Furneaux Islander. In 30-knot winds locals will walk upright. Visitors, on the other hand, will be bent over, says Aboriginal ranger Cindy Pitchford. "Thirty knots is a breeze on the islands."

The Furneaux Group comprises more than 60 islands and rocky islets scattered across eastern Bass Strait that are routinely blasted by wild winds. They lie in the path of the Roaring Forties – westerly gales that rip around the Earth between the latitudes of 40° and 50° south.

It was windy even by Cindy's reckoning when 69-knot (128km/h) cyclone-force winds tore across the islands in 2011. But wild storms have always lashed these waters between Victoria and Tasmania. In 1797 Captain Gavin 'Guy' Hamilton encountered what he described as "a perfect hurricane", as he guided his leaky vessel the *Sydney Cove* from the raging Tasman Sea towards the shallower waters of the islands, where his crew might have a chance of survival. Here, on 9 February, it was grounded at the southern end of Preservation Island.

No-one could have known it at the time, but this ship's sinking would set a colony's commercial wheels in motion, starting a wave of migration that led to the settlement of Tasmania.

IT'S DIFFICULT TO imagine such tempests when, after a two-hour boat journey from Flinders Island, I arrive at the same spot some 217 years later. It's a flawless April day: the sky is cloudless, the ocean glass-like. Here on Preservation Island I hope to learn more about one of the most intriguing yet little-known sagas of Australia's early maritime history.

There's just a whisper of a breeze as Cindy, 36, a trainee Tasmanian Parks and Wildlife Service ranger, navigates *Panamuna*, a 6.5m aluminium cruiser towards the island. Covering just 207ha Preservation lies 133km north-east of Launceston. The Furneaux Group ranges in size from this, to 65km-long Flinders Island, interspersed by several tiny backyard-sized islets.

Cindy and ranger-in-charge Wayne Dick, 58, launch a tender to take us to the island's shore where a white sand beach is lapped by gin-clear waters, granite boulders are daubed with vivid orange *Caloplaca* lichen and tussock-covered hills rise behind. The scene was different here in February 1797, when 46 exhausted *Sydney Cove* crew staggered ashore from a longboat pitching in freezing waters. Their ship was sinking fast 350m offshore – about where *Panamuna* was anchored.

The *Sydney Cove* sailed from India, on 10 November 1796, bound for Port Jackson. Captain Hamilton was accompanied by chief mate Hugh Thompson, second mate 'Mr Leisham', supercargo William Clark, at least four British sailors, including John Bennett, and 44 unnamed Indian 'lascar' seamen. The ship carried a cargo of tea, ceramics, rice, tobacco, textiles, a pedal organ, a horedrawn buggy, a horse, cattle and more than 7000 gallons (31,500 litres) of alcohol, including Madeira wine and rum. ▶



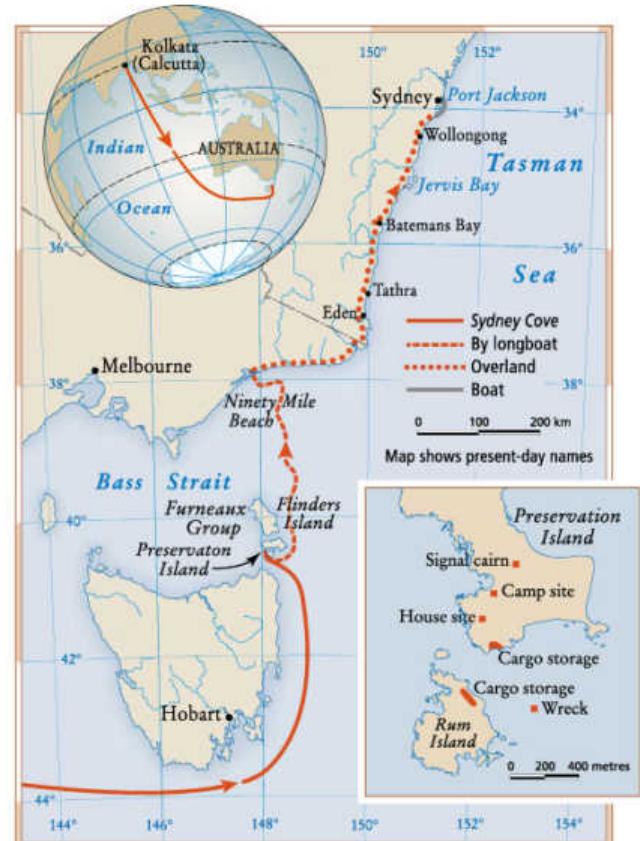
David Thurrowgood (above), objects conservator at the Queen Victoria Museum in Launceston, holds alcohol recovered intact during the excavation of the *Sydney Cove*. Securely corked more than 200 years ago, it is among the world's oldest bottled alcohol from a shipwreck.

Tasmanian Parks and Wildlife
Service ranger Wayne Dick (right) looks for safe anchorage for the cruiser *Panamuna*. He is approaching the *Sydney Cove* shipwreck site, just off Preservation Island, TAS.





A historic watercolour of the camp of the *L'Uranie* shipwreck survivors at the Falkland Islands in 1820 (above), gives an indication of what the Preservation Island camp might have been like. A 2002 excavation (left) of the site of the Sydney Cove survivors' camp.



In 1797 the crew set out from Calcutta, India, bound for the new colony at Port Jackson. They took a circuitous route, across the Indian Ocean and around south-western Australia, before grounding at Preservation Island three months later. Seventeen survivors, led by chief mate Hugh Thompson, then attempted an 800km journey, by rowboat and foot, to Sydney to summon help.

Their desperate cries were heard by fishermen who rescued them and took them to Port Jackson.

It was one of the first merchant ships to set out for remote Port Jackson, established with Australia's First Fleet of almost 1500 marines and convicts nine years earlier. By 1796 the population had risen to more than 4000, and they were hungry for European goods – particularly alcohol.

When the British government first planned New South Wales it intended to supply the new colony itself. But officials and shareholders of the East India Company – created in the 1600s by merchants who traded with the East Indies – objected. The company jealously protected its monopoly east of the Cape of Good Hope, at Africa's southern tip, and regarded the Port Jackson colony as encroaching on its sphere of influence. Difficulties obtaining reliable food and equipment stocks from England for the new colony forced the government to consider India as an alternative supply source, which led to speculative cargoes on ships such as *Sydney Cove*.

Hamilton had taken his ship from the Bay of Bengal, around Australia's south-west coast, down through the Roaring Forties and towards southern Tasmania. At the time, neither he, nor other mariners, knew Tasmania was an island.

ON 13 DECEMBER, about five weeks into its journey across the Indian Ocean, *Sydney Cove* sprang a leak amid gale-force winds. The stormy weather and damage increased as it lurched around Australia's south-west coast in late January. The weather became so violent that Mr Leisham was pitched overboard to his death by a wildly tossing yardarm, and several Indian seamen, already weakened by scurvy, were literally worked to death manning the pumps trying to keep the vessel afloat.

Further damage meant *Sydney Cove* was taking on more water than could be removed, and on 8 February Hamilton made the decision to ground it in shallow water off the coast of Preservation Island, where the ship's skeleton lies today.

"The crew was in a desperate situation," Wayne tells me, as we stroll along the beach where they landed in 1797. "There was little hope of rescue – the grounding of *Sydney Cove* at Preservation Island put the crew at least 80–100km from a very sparsely used shipping route."

Stuck on the tiny island, buffeted by gales and heavy rain, the crew shivered beneath tents made from the ship's sails. They equipped the longboat with what supplies they could salvage before despatching it northwards to Port Jackson, the continent's sole European settlement and only hope of rescue. On 27 February, Hugh Thompson, William Clark, three European



A convict couple at Port Jackson, sketched in 1793. These people represented the new consumers that merchant ships, such as the *Sydney Cove*, would be providing supplies for.

sailors, including John Bennett, and 12 lascars set out to attempt to row more than 800km north to the fledgling colony.

The remaining crew's flimsy tents were shredded by storms. Aware they would not survive the oncoming winter, they set about building a house. It was a wise move, because four days after leaving the island the longboat was smashed to pieces at the northern end of Victoria's Ninety Mile Beach, leaving its luckless crew stranded some 600km short of their destination. Wrecked a second time on an inhospitable shore with little food or water, the weary mariners continued their journey on foot through hundreds of kilometres of rugged, unmapped country.

Fortunately, William Clark kept a diary of their march; a dozen pencilled notes recording what is thought to be Australia's first overland trek by Europeans. On 18 March he recorded the crew's first close encounter with Aboriginals: "We this day fell in with a party of natives, about fourteen, all of them entirely naked. They were struck with astonishment at our appearance and were very anxious to examine every part of our clothes and body...they opened our clothes, examined our feet, hands, nails, etc., frequently expressing their surprise by laughing and loud shoutings."

This fascinating narrative describes some of the first contacts with Aboriginal bands on Australia's southern coast (some friendly and some not), perilous river crossings and gruelling hikes while surviving on a meagre diet of shellfish and plants. Of the 17 men who survived the longboat wrecking, only three survived the 10-week trek: William Clark, John Bennett and one Indian sailor.

In a scene worthy of a Hollywood blockbuster, the three exhausted men crawled along a rocky shore near Port Hacking, 30km south of what is today Sydney. Their desperate cries were heard by fishermen who rescued them and took them to Port Jackson, where they arrived on 16 May 1797.

ON PRESERVATION ISLAND, Cindy climbs across rocks overshadowing the tranquil beach, and soon returns with a shard of Chinese porcelain. "Almost certainly from the *Sydney Cove*," Wayne says, turning it over in his hands. Later, they lead us across tussock grass pitted with muttonbird burrows to massive granite boulders at the island's south-west. Here in 2002 a team led by Mike Nash, a maritime

5. Tobacco

Excavation of the stern revealed remains of a cask with about 3kg of processed tobacco rounded into plugs for transportation. Tobacco was keenly sought but difficult to obtain in the colony.

6. Sheepskins

A lack of livestock at the colony meant leather was limited. At least six sheepskin hides were recovered from the bow area.

7. Indigo

During excavation of the stern, divers raised samples of a bluish substance later identified as indigo dye, used to colour textiles.

8. Textiles

Before the Industrial Revolution, textiles were one of India's most valuable exports. None were recovered, but Captain Hamilton mentions them in the cargo log.

9. Tea

Tea was introduced to Europe from China in the early 17th century. Hamilton's account says 43 chests of Chinese tea were taken on the first salvage voyage, but 20 were lost. Five more were later taken to Port Jackson.

10. Musical organ (not shown)

A small piano forte arrived at Port Jackson aboard the First Fleet's HMS *Sirius*. Just as precious to wealthy settlers would have been a musical organ Hamilton says was salvaged from the Sydney Cove.

11. Horsedrawn buggy and mares

Seven horses came with the First Fleet, but by 1791 only four



shipwrecked crew, including hairbrushes, a pewter spoon, brass fishhook, coconut-shell water dipper, clay pipes, sunglasses and measuring weights. Some personal items were recovered from the stranded crew's campsite on Preservation Island.

20. Rudder

When Sydney Cove ran aground the rudder was 'unshipped' and fell to the seabed. The rudder and associated metal fittings were recovered in 1977 and are now displayed at Launceston's Queen Victoria Museum – the largest item salvaged from the wreck.

21. Sheathing

Sydney Cove's timber hull was protected from marine borers by a coating of an Indian resin known as chunam. Over this was layered thin sacrificial planking. And over this was placed a layer of imported woolen felt, which acted as a backing to sheets of copper-alloy sheathing attached with metal tacks.

22. Pumps

Sydney Cove had two large pumps to remove water from the bilge. These were made from 6.5m-long hollowed tree trunks. One still remains at the wreck site.

23. Firearms (not shown)

Firearms in the form of muskets and pistols were carried on board. A number of timber cartridge holders were recovered from the wreck, together with musket balls. Some of those found at the crew's campsite had been modified to make sinkers for fishing.

16. Cannon

While Sydney Cove's voyage followed a route with little threat of armed action, some deck guns and small arms were maintained. Four iron cannons and two timber and metal gun-carriage wheels were recovered.

17. Tools (not shown)

Timber sailing vessels needed constant maintenance. Various tool parts recovered include a bone net-needle, chisel, carpenter's scribes and wooden handles.

18. Ship maintenance (not shown)

Finds of Sydney Cove maintenance equipment include twine coils, a whetstone and buffalo hide remnants, perhaps for joining timber with crude hinges and protecting the rope shrouds of the rigging from chafing on the timber.

15. Anchors

Three anchors were commonly carried on small merchant vessels. The largest of the ship's anchors – 'the sheet' – was kept for emergencies and as a spare if the working anchor was lost. The sheet was normally stowed alongside the foremast rigging channels. The other two main anchors were positioned closer to the bow.

13. Rice

When Sydney Cove sank, the longboat was launched with a store of rice, firearms and ammunition. Daily rations for the crew left behind were limited to one cup of rice per man. They also ate muttonbirds, wallabies, wombats and Cape Barren geese.

19. Personal items

Archaeologists found a range of personal items connected to the

An officer's mess (above) on board a ship of war, painted by Augustus Earle in about 1820, gives a sense of what conditions were like for sailors aboard the Sydney Cove, a ship of similar dimensions. Rudder (above, right) of the Sydney Cove on display at the Queen Victoria Museum in Launceston.

14. Candles and soap

Bacterial, chemical and physical deterioration destroyed most perishable goods such as soap and candles. Hamilton documented that 12 boxes of soap and candles and two of waxed candles were salvaged. With little livestock (or tallow) at Port Jackson, such commodities would have been luxuries for the well-to-do.

12. Livestock

Transporting livestock by sea was difficult. Between 1788 and 1793, 104 of 140 cattle sent to the colony died en route. The Sydney Cove excavation revealed animal bones from cattle, pigs, sheep and birds.

10. Musical organ (not shown)

A small piano forte arrived at Port Jackson aboard the First Fleet's HMS *Sirius*. Just as precious to wealthy settlers would have been a musical organ Hamilton says was salvaged from the Sydney Cove.





The view from above, looking north across Rum Island to Preservation Island, with Cape Barren Island on the horizon. The Sydney Cove shipwreck site lies off the small rock outcrop at the middle right.

The wreck and surrounding area were declared a historic site.



Jon Addison, history curator at the Queen Victoria Museum, discusses bottles, and other items in the museum's collection, that were recovered from the shipwreck by archaeologist Mike Nash (right).



archaeologist with Tasmania's Parks and Wildlife Service, unearthed the remains of a structure built by the *Sydney Cove* survivors.

The ship itself was discovered by Tasmanian divers on New Year's Day 1977. Three months later, the wreck and surrounding area were declared a historic site under the Tasmanian National Parks and Wildlife Act. Mike directed a regular program of excavation of the wreck between 1991 and 1994.

"By the end of the project, five expeditions had uncovered 95sq.m of timber structure, four iron cannons, three anchors, and artefacts ranging from leather footwear and animal bones to approximately 850 bottles and more than 50,000 fragments of porcelain," he says. "The wreck is still in good condition. The *Sydney Cove* was constructed from teak, so it's solid."

But funding restrictions at the time meant that his team was not then able to investigate land sites, Mike adds. "Interest in undertaking additional work was prompted by a 2001 project by the Mitchell Library in Sydney, aiming to electronically publish a number of maps and documents associated with the navigator Matthew Flinders."

A chart produced by Flinders in 1798 (see page 94) clearly shows the position of the campsite and house established by *Sydney Cove*'s crew. With funding through the Historic Shipwrecks Program and assistance from Adelaide's Flinders University, the site was excavated over nine days in 2002.

WE STEP GINGERLY across tussock-covered rises to the site of the camp, 150m from the beach, wary of disturbing tiger and copperhead snakes. We're here during the annual muttonbird season, when some 18 million short-tailed shearwaters arrive in Tasmania to breed in more than

200 colonies. Breeding from September to April, they make an annual round trip of about 30,000km between the Arctic and south-eastern Australia.

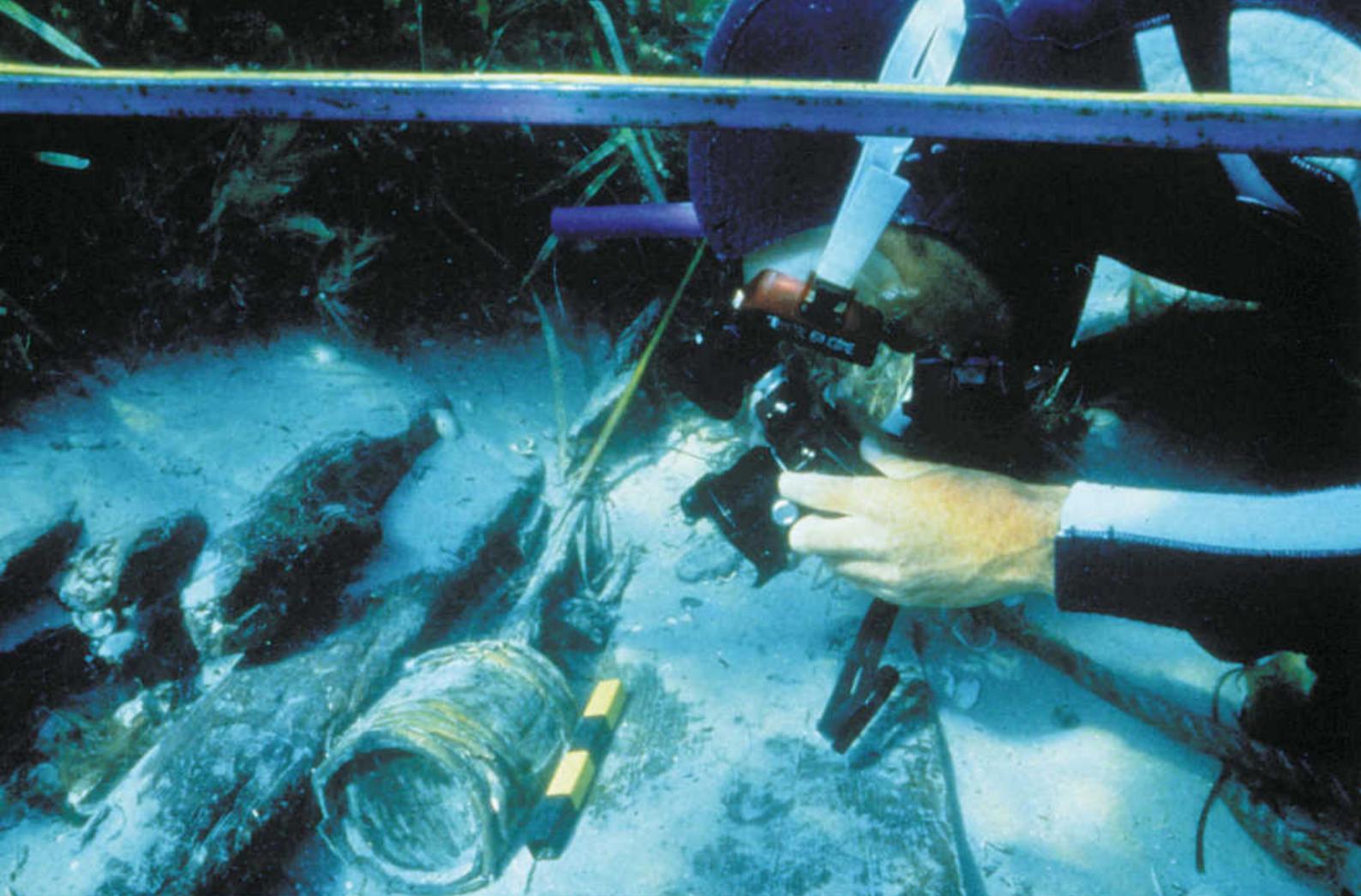
During the harvesting season in April, birders reach into burrows for chicks. Wayne demonstrates how it's done, pulling a fluffy grey chick from a burrow. He says *Sydney Cove* survivors, led by Captain Hamilton, would have likely added muttonbirds to their menu, just as Furneaux Islanders do today. A quantity of charcoal was found at the site, and excavated animal bones showed evidence of burning.

From the same site Mike's team uncovered pieces of glass bottles, ceramics, metal fastenings, earthenware, the remains of upright timber posts, and a brick hearth. "More than 1000 ships are known to have been lost in Tasmanian waters. But the *Sydney Cove* is by far the most important in relation to the artefacts uncovered," Mike says.

Further excavation of the site in 2006 revealed additional similar artefacts, as well as scattered bricks that indicated that the hearth had been large. There are also several stone cairns on the island that Mike believes may have been used to attempt to signal any approaching vessels.

Back at the beach, silent save for the squawking of seagulls, I watch a mob of pelicans clustered on Rum Island, an islet a few hundred metres away over the placid waters. Goods originally rescued from the ship were landed on the beach, says Mike, but after the crew was found to be (perhaps quite understandably) breaking into the casks of alcohol, most of the spirits were transferred to Rum Island, which derived its name from the cargo.

While survivors huddled on Preservation Island, 800km north at Port Jackson, hurried plans were being made for their rescue. ▶



Mike Nash (top) photographs a small intact timber cask before it is raised from the wreck in 1991. Divers (bottom) recover high-quality Chinese porcelain water bottles from the ship's watery grave.

Aboriginal elder Vicki Maikutena Green at home in Killecrankie, Flinders Island, with a collection of necklaces made from shells gathered across the Furneaux Islands. Some of her necklaces use up to 2000 shells.



ABORIGINAL HERITAGE

Many Tasmanian Aboriginals were taken to Flinders Island and perished in the process.

AT KILLIECRANKIE – 41km north of Flinders Island's administrative centre, Whitemark – we meet Aboriginal elder Vicki Maikutena Green. “There is a vexed history of race relations in Tasmania,” she says. “As a child it was so confusing – history said Truganini was the last Tasmanian Aborigine, yet we’re Aboriginal.”

Vicki is a descendant of Aboriginal women and their sealer partners. “When European pastoralists settled in Van Diemen’s Land they fenced off sections of fertile land for farming. Battles erupted as Aborigines lost more and more of their traditional hunting grounds,” she says. “In 1828 governor Arthur declared martial law, and Aboriginal clans were

systematically murdered, incarcerated or forced from settled districts.”

There was a misguided attempt from 1829 to 1834 to resettle and ‘civilise’ Tasmania’s remaining indigenous people, Vicki says. “About 230 Aboriginal people – who were either forcibly removed from their land, or surrendered to the government in states of exhaustion – were taken to Wybalenna on Flinders Island. Only 47 survived.”

Vicki and her relatives preserve their forebears’ stories and customs. In her lounge are woven baskets of native grasses and bull kelp, and exquisite necklaces of shells gathered from the Furneaux Islands.

She hopes to see an Aboriginal cultural centre established at



Vicki stitched a superbly fashioned quilt called leipa, which is the Fire Creation Dreaming story.

Wybalenna, on the island’s west coast, where all those dispossessed Tasmanian Aboriginals had perished. Currently the site is home to a small chapel, a former commander’s house and a windswept graveyard that is the resting place of many of Vicki’s forebears including Mannalargenna, the last leader of the Trawl-wool-way people of north-eastern Tasmania, who died in 1835.

After four months on Preservation Island, the bad luck continued.

The earliest commercial
products exported from Port
Jackson (Sydney) were sealskins
and oil from the Furneaux
Islands. In 1798 sealers on the
Nautilus camped at Cape Barren
Island, and set about killing
and skinning seals. The ship's
first cargo arrived back in Port
Jackson in December with 5200
skins and 300 gallons of seal oil.



Governor John Hunter despatched the two-masted schooner *Francis*, accompanied by the longboat the *Eliza*, to Preservation Island, where they arrived on 10 June 1797, to ecstatic scenes among the long-suffering castaways.

AFTER FOUR MONTHS stuck on Preservation Island, the bad luck continued. Hamilton and 14 crew, along with some salvaged cargo, departed on 21 June 1797 aboard the *Francis*, while six lascars boarded the *Eliza*. In heavy gales the ships separated: the *Francis* returned to Port Jackson, but the *Eliza* was never seen again.

The gutsy John Bennett, who survived the trek to Port Jackson, had returned to Preservation with the rescue ships and stayed behind at the lonely outpost with five of the Indian sailors to protect *Sydney Cove*'s remaining cargo. It took three voyages over a nine-month period to rescue all the crew and cargo.

Joining the third voyage was navigator Matthew Flinders, who – along with George Bass – would discover that Tasmania was an island the following year.

Back in Sydney, word was out that a ship full of rum had sunk, and that the islands where it happened swarmed with seals. Within months, the Bass Strait islands had become a magnet for ex-convicts, deserting seamen and sealers keen to cash in on the bountiful pickings.

Seals were killed for their oil for use in lights and machinery and their skins to supply the then-expanding fur markets in Europe and Asia. The lucrative sealing industry provided the catalyst for Port Jackson to emerge from the shadow of penal servitude and move into trade and commerce, and with it came considerable economic growth.

But all of this came at the cost of untold Aboriginal lives and resulted in the eradication of three species of seal in the area: the New Zealand fur seal, Australian sea lion and the Southern Elephant seal. Only the Australian fur seal now remains on the Furneaux Islands. By 1800 some 200 sealers were operating in and around Bass Strait, where the seal slaughter continued for more than a decade. Many settled at Kent Bay on Cape Barren Island, the first European settlement south of Sydney.

Traumatic and tragic as it was, the sinking of *Sydney Cove* stimulated exploration of the region and the establishment of Australia's first export industry. It also led to the discovery of a passage through Bass Strait, which opened up an important new shipping route between NSW and both Europe and Asia.

The shipwreck also encouraged European settlement of Tasmania: Lieutenant John Bowen established the first colony at Risdon Cove, near Hobart, in September 1803. And although Truganini, who died in 1876, was widely considered the last of the original Tasmanian Aboriginals, her people did not disappear entirely. Surviving Aboriginal women and their subsequent unions with sealers lured to the region formed a distinct community on Flinders and other islands. Today, there are thousands of descendants of this community, including our guide Cindy.

I help her reload the tender on *Panamuna*, where it's anchored above the skeleton of *Sydney Cove*, for our journey back to Flinders Island. And we leave the picturesque scenery behind us and the relics that hint at a tragic and significant history. **AG**

AG THANKS Flinders Island Tourism and Business Inc., Michael Buck and Lois Ireland; Flinders Council; Mike Nash; Tasmania Parks and Wildlife Service and the Queen Victoria Museum, Launceston.

Australian GEOGRAPHIC

Out late
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THE 2016 Australian Geographic ANZANG Nature Photographer of the Year competition is open for entries from Wednesday 6 January 2016 to Friday 26 February 2016. This prestigious contest is run by the South Australian Museum in Adelaide in partnership with AUSTRALIAN GEOGRAPHIC.

The winning photos will appear in the September–October 2016 issue of AUSTRALIAN GEOGRAPHIC and at the exhibition at the South Australian Museum and other venues.

Visit www.australiangeographic.com.au/ANZANG for details on how to enter, categories, entry fees, competition rules and terms and conditions associated with the holiday prize. Entries can only be made online. Hard-copy or emailed photographs cannot be accepted.

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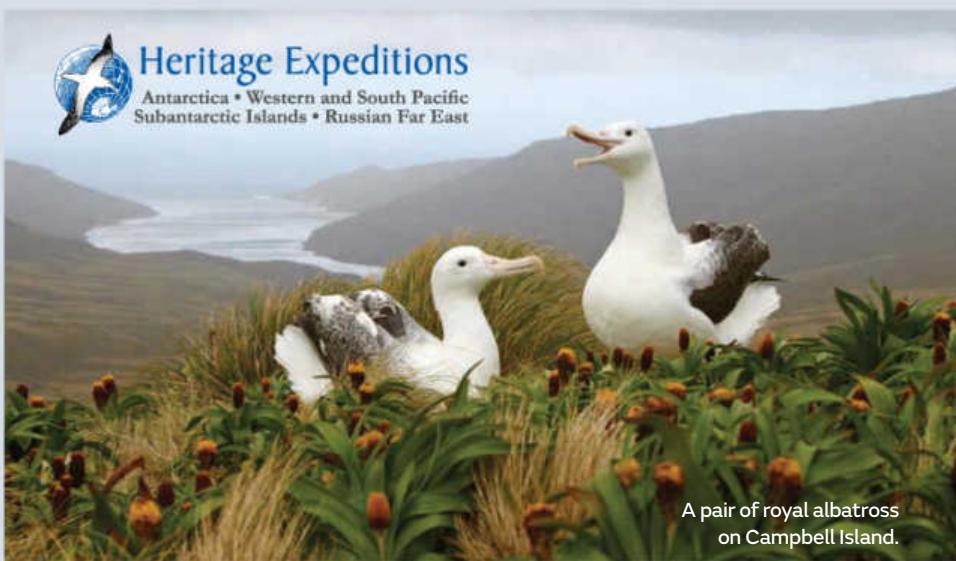
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Competition opens 9am (ACDT) on Wednesday 6 January 2016 and closes at 5pm (ACDT) on Friday 26 February 2016. An entrant may submit up to four entries in each of the competition's sections. The same or substantially similar entries may not be entered in more than one section of the competition. All photographs must be taken in the ANZANG bioregion. The major prize must be redeemed on the dates specified. For the purposes of these rules, the 'ANZANG bioregion' means Australia, New Zealand, Antarctica (including the subantarctic islands) and the New Guinea region. For full terms and conditions go to www.anzang.samuseum.sa.gov.au/competition/. Please see www.anzang.samuseum.sa.gov.au/privacy for location of the South Australian Museum's privacy policy. The promoter is the South Australian Museum (organiser).

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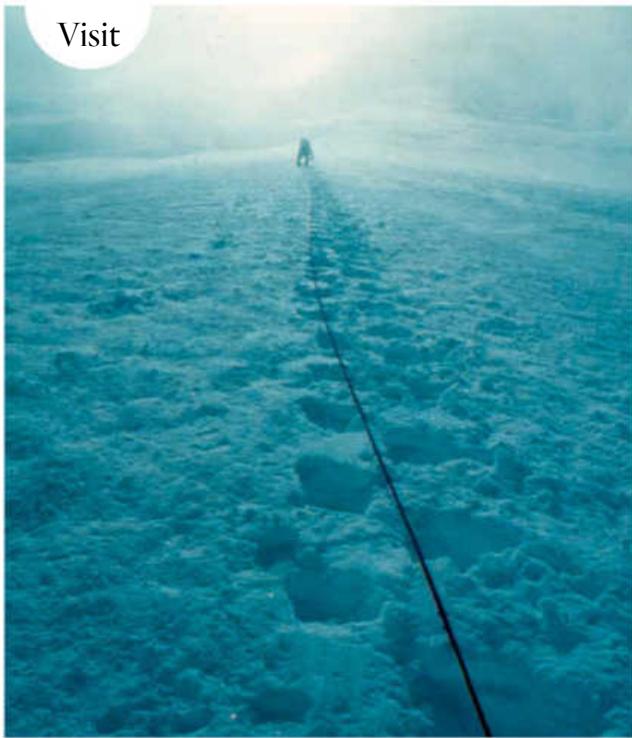
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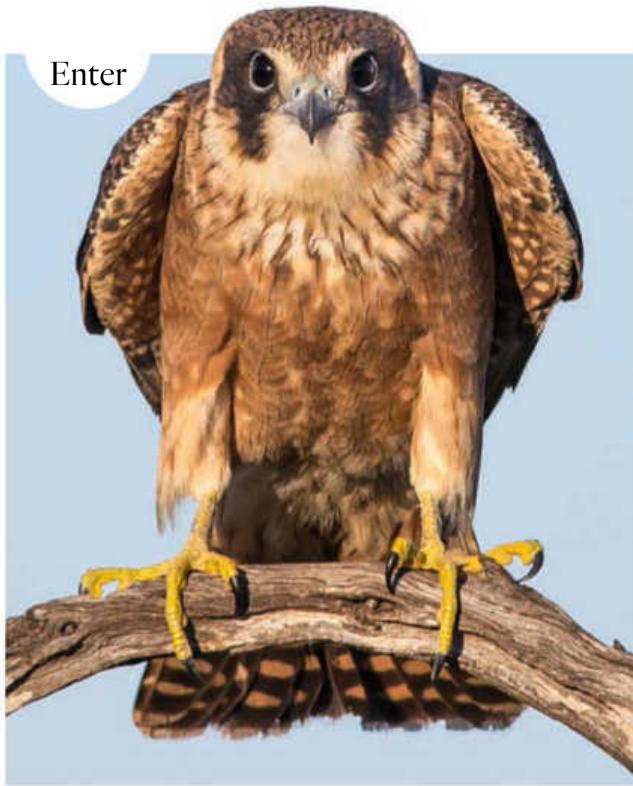
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February–July 2016

WHAT DOES it feel like to sail solo around the world? Or to spend three years crossing Central Asia by horse, with a dog as your only companion? How about painstakingly re-creating Shackleton's heroic Antarctic expedition? Meet Australia's most famous and inspiring explorers in an exciting program of 21 Trailblazer Talks, and hear their tales of endurance and bravery. For the full list and to book, go to: www.australian-museum.net.au/trailblazers-australias-50-greatest-explorers or call the Australian Museum ticket desk on 02 9320 6225.

The Trailblazers: Australia's 50 Greatest Explorers exhibition is at the Australian Museum, Sydney, until 18 July.

TRAILBLAZERS ACCOMMODATION OFFERS

Pullman Sydney Hyde Park has partnered with the Australian Museum to offer exclusive accommodation and ticket packages for AUSTRALIAN GEOGRAPHIC readers. Prices start from \$357 and include accommodation, a buffet breakfast for two and a double pass to the Trailblazers exhibition. For details visit: www.pullmansydneyhydepark.com.au/ausgeo



2016 Australian Geographic ANZANG Nature Photographer of the Year

THE NATION'S foremost nature photography competition opens on Wednesday 6 January. Entrants have until Friday 26 February 2016 to submit their images, and will have the chance to win more than \$20,000 in cash prizes and an amazing voyage of discovery to the Subantarctic Islands with Heritage Expeditions. There are nine categories, plus a portfolio prize and a junior section. See page 108 for a full list of categories and visit our website to find the entry costs, see previous winning entries and to enter your photos in this prestigious competition. For more information, visit: www.australiangeographic.com.au/ANZANG

View

The Wild Life of Tim Faulkner

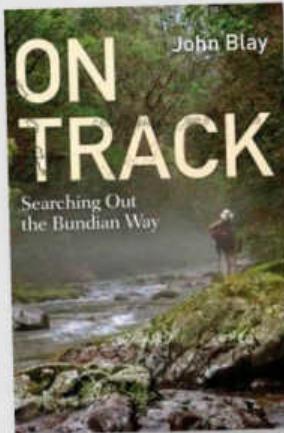
Season 1, DVD set, \$19.99

JOIN TIM FAULKNER, the AG Society's 2015 Conservationist of the Year (see page 23), as he interacts with a menagerie of Australian animals. Tagging platypuses, wrestling crocs and saving the Tassie devil is all in a day's work for the wildlife expert and general manager of the Australian Reptile Park and Devil Ark.



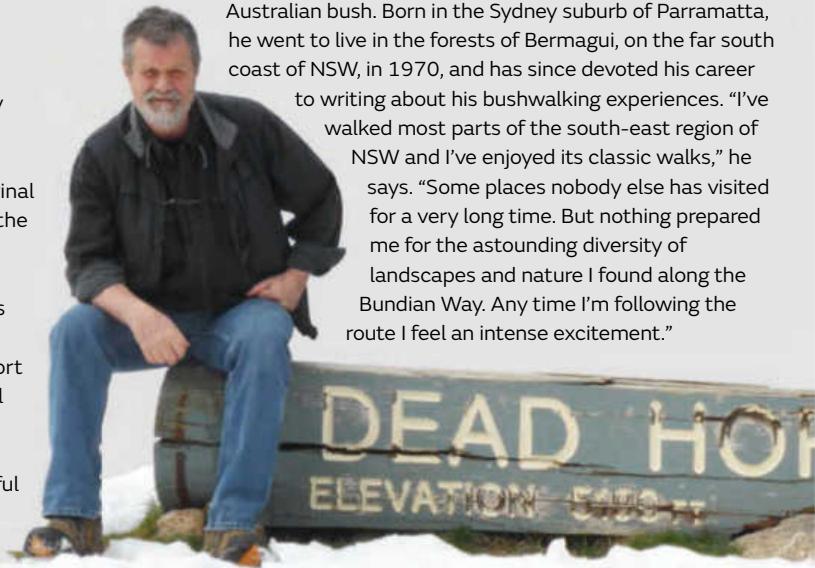
Read

On Track: Searching out the Bundian Way, John Blay, NewSouth Publishing, \$39.99



THIS IS WRITER and naturalist John Blay's account of his journey to rediscover and reopen the Bundian Way, a 360km Aboriginal pathway connecting the High Country around Mt Kosciuszko with the New South Wales far south coast near Eden. With the support and guidance of local Aboriginal leaders, John spent more

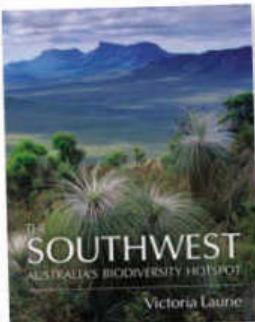
than a decade exploring these challenging and beautiful landscapes with little idea as to where, or how far, he would be walking each day.



Author Profile

SEVENTY-ONE YEAR OLD John Blay is passionate about the Australian bush. Born in the Sydney suburb of Parramatta, he went to live in the forests of Bermagui, on the far south coast of NSW, in 1970, and has since devoted his career to writing about his bushwalking experiences. "I've walked most parts of the south-east region of NSW and I've enjoyed its classic walks," he says. "Some places nobody else has visited for a very long time. But nothing prepared me for the astounding diversity of landscapes and nature I found along the Bundian Way. Any time I'm following the route I feel an intense excitement."

The Southwest: Australia's Biodiversity Hotspot, Victoria Laurie, UWA Publishing, \$45



IN SOUTHWEST WA, there lies a vast triangular area of land containing one-third of Australia's plant species. It's been declared one of the world's 34 biodiversity hotspots, and this isolated part of Australia is considered to be under exceptional threat from habitat loss. Author and journalist Victoria Laurie examines the south-west one area at a time, incorporating photographs and the testimony of scientists into her descriptions of the peculiar characteristics that make this region so precious.

Dr Karl's Short Back & Science, Dr Karl Kruszelnicki, Pan Macmillan Australia, \$32.99



SCIENTIST AND communicator Dr Karl breaks down some of the biggest questions you never knew you cared about, from whether or not the shape of a wine glass affects a wine's flavour (it does) to why synthetic shirts smell after sweating (it all comes down to bacteria). Skilled at making science accessible to the public, *Dr Karl's Short Back & Science* is both entertaining and educational.

Download



Welcome to Country iPhone app, Weerianna Street Media, Free

THIS FREE APP offers iPhone users a 'Welcome to Country' video introduction to Aboriginal tribes and language groups across Australia. The app covers 30 of the 500 or so groups, and more will be added with future updates. Developed by Ngarluma man Tyson Mowarin, the app uses your phone's GPS to provide short videos outlining the basic cultural protocols for the region closest to you.

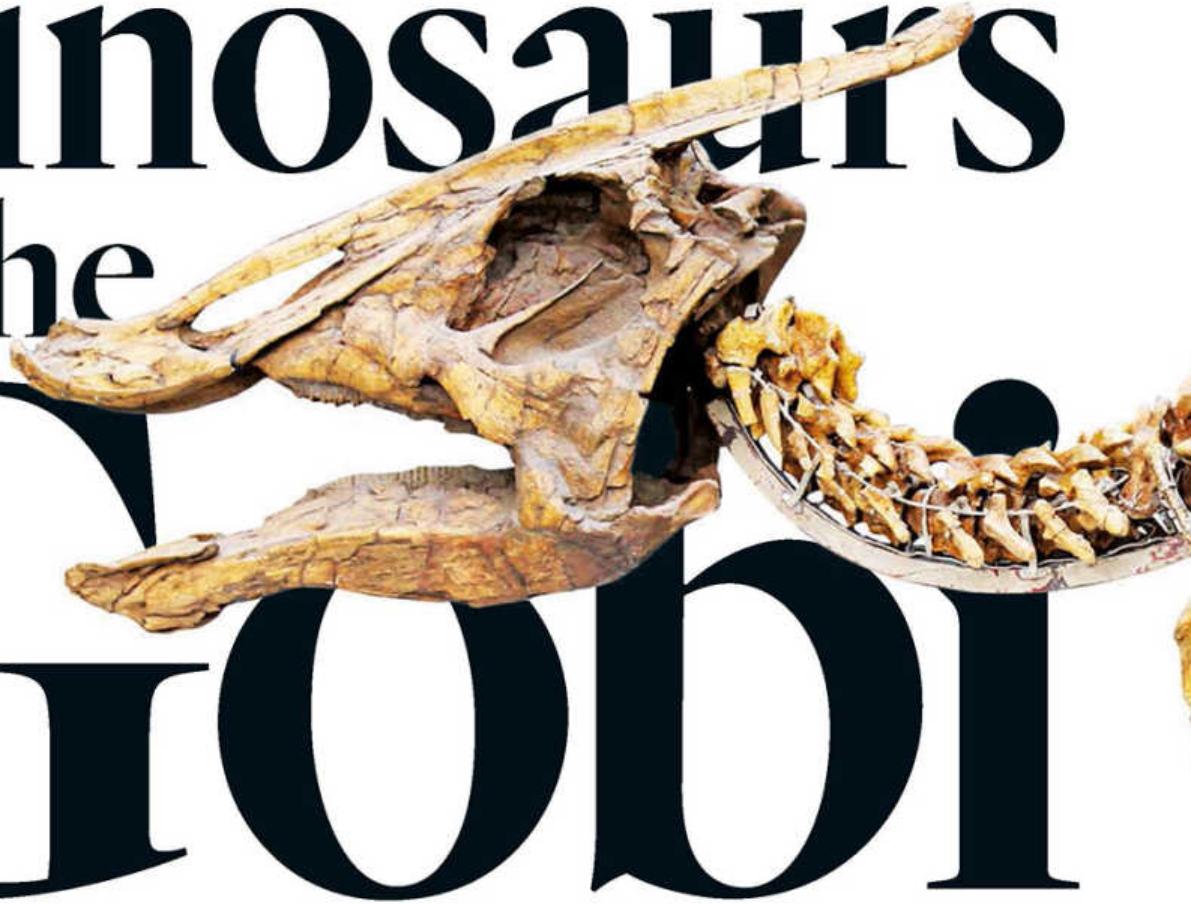
Enter Competition



WE'RE GIVING away 10 copies of *Oddball: Every underdog has his day*, thanks to Roadshow Entertainment. This inspiring film is based on the true story of the inventive chicken farmer from Warrnambool, VIC, who, along with his granddaughter, trains his dog to protect the penguins on nearby Middle Island. You can enter by downloading the free **viewa** app and using your smartphone or tablet to scan this page, or by visiting: www.australiageographic.com.au/issue130



Travel Dinosaurs of the Gobi



Join us on a thrilling adventure in the Central Asian wilderness to hunt for fossils with the Mongolian Academy of Sciences.

STORY AND PHOTOGRAPHY BY JOHN PICKRELL

DAY HAD TURNED to night, despite the sun being high in the sky, and I braced myself against winds, the like of which I had never experienced before. One of the Gobi Desert's legendary sandstorms had arrived, disturbing the day's fossil-hunting activities. Sheets of sand and dust pounded against us as we packed up our gear and retreated to our parked convoy of 4WDs. Such dust storms are not altogether surprising in the Gobi, and we were well prepared. I was covered up with long sleeves, a beanie and cargo pants, and my eyes were protected by both wrap-around sunnies and a pair of goggles. A bandanna tied across my nose and mouth helped keep the dust out.

The Gobi Desert is a starkly beautiful region, rich in mysteries and legends. Covering 1.3 million square

kilometres of southern Mongolia and the Chinese province of Inner Mongolia, it stretches south from the Siberian wilderness to the Tibetan Plateau. Conditions are not always ideal, but the thrilling experience of a sandstorm only added to the excitement of this adventure for me and a small and enthusiastic crew of Australian volunteers.

We were there to prospect for and collect dinosaurs for the Mongolian Academy of Sciences (MAS) on a fossil-dig expedition that was a collaboration between the academy, Odyssey Travel and the Australian Geographic Society. This April 2015 dig was on a small scale – with just a handful of paying participants – and was a recce for a much larger expedition, which will take place in September 2016 with 15 AG readers. I led the dig along with Dr Tsogtbaatar Khishigjav, renowned dinosaur hunter ▶



An exquisite specimen of the duck-billed hadrosaur *Sauroplophus* is currently on display at a shopping mall in Ulaanbaatar, while the natural history museum gets an overhaul. Spectacular fossils are the norm, rather than the exception in the Gobi, and the country has yielded more than 10 per cent of all the world's known dinosaur species.

1 Government House at the centre of capital city, Ulaanbaatar, is the home of the Mongolian parliament. The city's sprawling ger district can be seen on the distant hills. 2 Shaped by the flow of water, erosional 'badland' environments in the Gobi Desert are a brilliant source of Cretaceous-era fossils. 3 Renowned Mongolian dinosaur hunter Dr Tsogtbaatar Khishigjav spends months of each year in the Gobi.



and head of the MAS's Institute of Paleontology and Geology in Ulaanbaatar. The whole trip lasted 17 days, with eight days camping hundreds of kilometres from anywhere in the eastern Gobi. The rest of the time was spent in the capital Ulaanbaatar and visiting a series of significant fossil and geological sites, as well as the spectacular Gurvan Saikhan ('three beauties') mountains.

Mongolia is a country of contrasts; 800,000 of the 1.3 million inhabitants of the capital still live in traditional circular 'tents' in the city's sprawling ger district. Easy to pack away and transport, these gers or yurts have been the favoured dwellings of Central Asian nomads for millennia – but today they seem at odds with Ulaanbaatar's glitzy new skyscrapers and shopping malls, filled with luxury goods, shops and fine restaurants with wide selections of European wines.

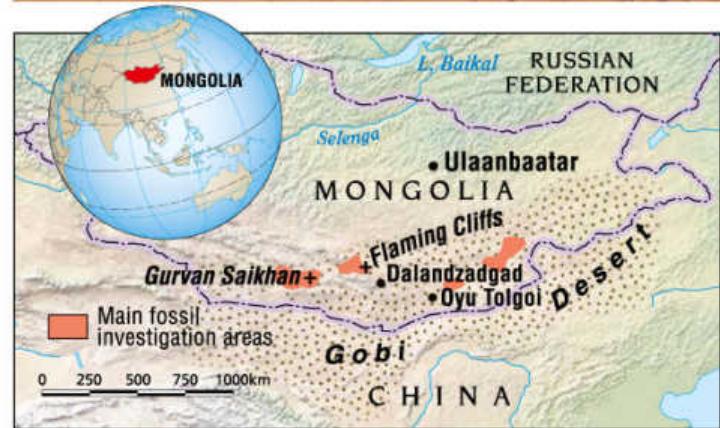
Since the fall of communism in the 1990s, mining has brought new wealth and rapid urbanisation to a country of only 3 million people, 45 per cent of whom are found in Ulaanbaatar, the only sizeable city. Much of the rest of the population still lives a traditional nomadic lifestyle, tending sheep and camels across the steppe and desert that covers the majority of Mongolia.

Oyu Tolgoi, a massive copper and gold mine in the south Gobi near the border with China (owned in large part by a subsidiary of British–Australian multinational Rio Tinto), is a great example of the wealth pouring in. It is claimed that this mine – supported by the new airport into which we flew from Ulaanbaatar – will account for 30 per cent of Mongolia's entire GDP when running at full capacity in 2021.

We had begun our adventure with several days in Ulaanbaatar. There we visited the Gandan Monastery, some museums and a shopping mall housing the incredible MAS dinosaur collection while the natural history museum is being renovated. We also spent time in the fossil preparatory lab of the Institute of Paleontology and Geology, stacked with specimens that technicians were slowly chipping out of great slabs of rock and sand. ▶



4



The Gobi Desert

The Gobi has a population density of just 0.4 people per square kilometre. It is a true desert with less than 193mm of rainfall a year and average maximum summer temperatures above 35°C.



4 Dig participants including Clint Coker (at centre of back row) and Doug Miller; and (in front row, L-R) John Pickrell, Margaret Thacker, Robbin Waterhouse and Dr Tsogtbaatar. 5 A collection of bones of a small carnivore. 6 The partial jawbone and attached tooth of a carnivorous *Alectrosaurus* was an exciting discovery.

7 Palaeontology assistant and student Mainbayar Buuvei faces off with the compressed fossil skull of a *Proroceratops*.

8 Mainbayar Buuvei and AUSTRALIAN GEOGRAPHIC editor John Pickrell wrap the *Alectrosaurus* jaw in plaster and hessian to ensure it travels safely back to Ulaanbaatar for preparation.

Seventy million years ago the Gobi was a river delta with seasonal flooding. In this illustration, apex predator *Tarbosaurus* – a relative of *T. rex* – looks out on a scene, which includes feathery *Velociraptors* (lower left), duck-billed hadrosaurs (lower right) and a herd of speedy *Gallimimus* (upper right).



ONE OF THE most exciting moments of the trip for me was the discovery of the partial jawbone of an *Alectrosaurus*. This rare, 6m-long carnivore was related to *T. rex* and lived in Mongolia about 80 million years ago, during the Late Cretaceous. A small piece of unusual reddish stone with pits along it had caught my attention and 30 minutes of carefully brushing sand away had revealed the front-left part of a lower jaw, which still had a single tooth attached to it. The pits I'd spotted were where nerves once attached to each tooth.

Alectrosaurus was first discovered in the Chinese part of the Gobi in 1923, and though teeth are common here, skeletal remains such as this had not been found in Mongolia since the 1970s. We spent much of the rest of that afternoon digging out a pedestal of dirt around this important specimen and then wrapping it in hessian and plaster for its return to Ulaanbaatar.

"There was a hope and expectation that I'd personally uncover something of interest. I was not disappointed," says Clint Coker, 57, a pharmacist from Noosa Heads, Queensland, who had no prior experience of digging or palaeontology, and whose top find was a series of dinosaur footprints. "Every day prospecting was like being a kid on a treasure hunt... Investigating every possible find, carefully brushing away the soil and exposing dinosaur remains, knowing that you were the first person to see them and that they were laid down 80 million years previously."

Although Tsogtbaatar was accompanied by some palaeontology students and assistants, we were unable to collect larger specimens

we found, such as the articulated legs of a duck-billed hadrosaur. We reburied these to hide them from fossil poachers – an ever-present threat in the Gobi (fossils are often hurriedly extracted and smashed, with flashier parts, such as skulls and claws, sent overseas to feed the black market for Mongolian fossils). But small and important specimens, such as pieces of rarer carnivorous dinosaurs and anything not well represented in the academy's collections, were carefully encased in plaster and collected.

Each year the winds and sandstorms scour off the surface rocks, exposing a new layer of fossils. This means there are constantly new things to find, but also anything left on the surface is likely to have disintegrated and blown away by the following summer.

All of us Australians on the dig were astounded at the fossils we left behind in the Gobi. At some of the sites we were literally tripping over pieces of herbivorous hadrosaurs – the kind of fossils experts can only dream of finding in Australia, where any small piece of dinosaur is a hard-won treasure. Here, Tsogtbaatar tells us, they already have large numbers of excellent specimens of these species and have no need of more in their collections.

Robbin Waterhouse, a retired doctor from Townsville, Queensland, said his interest in joining the dig was a long-held desire to see the Gobi and an excuse to wander in the wilderness. "The most surprising aspect of the trip for me was the ease of finding specimens, not to mention that we discarded anything that wasn't rare or in first-class condition," he says. "But a close second was having Dr Tsogtbaatar with us as resident expert."

We'd experienced a little of the thrill of discovery of those pioneering expeditioners.

Doug Miller, 61, a retiree from Brisbane who frequently volunteers at the Australian Age of Dinosaurs Museum in Winton, Queensland, says that for several decades he'd wanted to visit Ulaanbaatar and find a way to get on a fossil dig in the Gobi. "The opportunity to work with distinguished and dedicated palaeontologists like Dr Tsogtbaatar and his assistant Mainbayar was an unexpected bonus and added great credibility to the dig. The ease with which we found fossils was a surprise...and we had a couple of infamous Gobi dust storms to boot."

Responses to the experience from all the volunteers in our small group were varied but all enthusiastic. Robbin's partner Margaret Thacker, 73, a retiree who volunteers at the Museum of Tropical Queensland, says she had few preconceptions, but "the dig and people associated with it were far above my expectations. Especially the companionship and the way we all worked so well together, and that we were able to cope with the sandstorm and the tents blowing down with a sense of humour."

IN RECENT YEARS, a series of feathered species of dinosaurs have been discovered in the Gobi, helping firm up the evolutionary link between dinosaurs and birds. These include *Gigantoraptor*, a parrot-beaked 'oviraptorosaur', 8m long and 4m tall. Found in the Gobi in 2008, it is thought to be one of the largest feathered animals ever to have lived. Other oddities include a herbivore named *Deinocheirus*, almost as big as *T. rex*, but with massively long 2.5m arms, a weird hump on its back and a duck-like bill, possibly for sucking up aquatic plant matter.

"More than 90 species, a huge number, representing a large proportion of the world's dinosaurs, have been found in Mongolia," Tsogtbaatar says. "The Gobi Desert, in the southern part of Mongolia, is a relatively limited area, yet we have found so many kinds of dinosaurs in the last 80 years."

Early palaeontological forays into the Gobi were led by the American Museum of Natural History (AMNH) in the 1920s, and were the largest scientific expeditions ever to leave the USA. These must have been quite a sight, with great trains of camels and early motor cars slowly snaking across the landscape. In this windswept and unforgiving region of Asia they found a great cache of dinosaur bones, with the first specimens of *Alectrosaurus*, *Velociraptor* and *Protoceratops*. At the Flaming Cliffs, which we also visited on our 2015 expedition, they found the first fossilised dinosaur nest with 13 large eggs arranged in a circle. The AMNH has returned frequently on expeditions with the MAS since the fall of the Soviet Union, and many other important finds have been made, which have revolutionised our knowledge of dinosaurs.

Sitting around the campfire in the evenings, or inside the cosy ger at the centre of our small camp, we had time to reflect on the fact that although we had a few modern comforts, we'd also experienced a little of the incredible thrill of discovery that those pioneering expeditioners first felt when they stumbled across untold fossil riches hundreds of kilometres out into the wilderness of Central Asia. **AG**

MONGOLIA FOSSIL DIG 2016 SCIENTIFIC EXPEDITION



SPECTACULAR FOSSILS COME from the Gobi, but few people get to go there and hunt for them with professional palaeontologists! Join the AGS on this special scientific expedition, run in collaboration with the Mongolian Academy of Sciences and Odyssey Travel. Your hosts include John Pickrell, editor of AUSTRALIAN GEOGRAPHIC and dinosaur enthusiast, and Dr Tsogtbaatar Khishigjav, head of the Institute of Paleontology and Geology. We will take 15 volunteers into the heart of the Gobi, where we'll travel in 4WDs to a series of sites to discover and excavate fossils. Evenings will be spent enjoying meals cooked by the field chef around the ger in our camp. Prior to eight nights camping, the expedition begins in Ulaanbaatar, where we'll visit museums and a monastery.

DATES: 7–22 September 2016 (16 nights)

COST: From \$11,995pp – a proportion of which supports the work of the MAS and AGS

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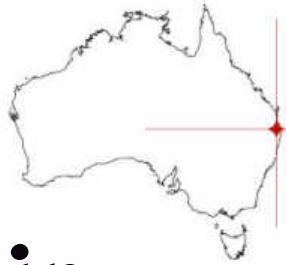


Tsogtbaatar
Khishigjav

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LAT LONG: 27°55'S 153°11'E

Tamborine Mountain Scarecrow Festival

Once a year Tamborine Mountain kicks up its heels when locals and visitors share in a colourful festival that celebrates creativity and community spirit.

STORY BY JOANNA HARTMANN PHOTOGRAPHY BY DEAN SAFFRON

AS THE SUN streams through eucalypts, bottlebrushes and palms lining Main Western Road on Tamborine Mountain in south-eastern Queensland, a small crowd gathers along the nature strip. It's a clear October morning and, like most spring days here, the cicadas hum and the lorikeets squeak as they flit in blazes of colour through patches of subtropical rainforest.

But today is no ordinary day. It's the first morning of the annual Tamborine Mountain Scarecrow Festival and there's an air of excitement. A car whirrs past the locals gathering on the nature strip and toots its horn. Everyone cheers and waves. It's almost 10am and since daybreak people have been stopping to see what Pippa Collins' family will put on show this year. They are known for their captivating scarecrows and have, in the past, won some of the festival's most prestigious awards.

From under her wide-brimmed hat, Pippa beams while stuffing straw into one of her creations. "We wanted to get some movement and colour into it this year," she says, adding finishing touches to a straw replica of Sydney's Luna Park. Hay-filled acrobats and clowns adorn the lawn in front of her parents' home.

Pippa's husband, Don Collins, and father, Peter Marks, fix coloured balloons to the display, rushing to finish the impressive artwork for judging. "We thought we had tons of time to get it finished, but of course we've had so many visitors already this morning and everybody drops in for a chat," says Pippa's mother, Mary Marks. "That is what this festival is all about."

Located in the Gold Coast hinterland, about an hour's drive south of Brisbane, Tamborine Mountain has three small villages: Eagle Heights, North Tamborine and Mount Tamborine. During the third weekend of October every year, from Friday morning until Sunday afternoon, these villages come alive as imaginative scarecrow sculptures spring up on footpaths, nature strips and pockets of council land. Most are set up along the festival's 17km-long 'Spot the Scarecrow Discovery Trail', which runs through all three villages.



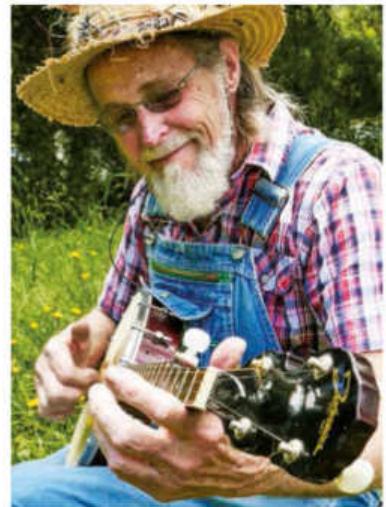
As the 2015 Tamborine Mountain Scarecrow Festival swings into life, husband-and-wife team Pippa and Don Collins (above) adorn their straw replica of Sydney's Luna Park with handmade acrobats, ballerinas, and scarecrow clowns.



On Gallery Walk, in Eagle Heights, winery staff (above, L-R) Angie Morris, Kylie Scott and Helaina Bench share a laugh in front of the broomstick-wielding scarecrow a colleague created for the 2015 festival.



The award for 'Best Creative' went to Don and Pippa Collins, and Pippa's parents, Peter and Mary Marks, for their replica of Sydney's Luna Park (left and centre).



Local musician Frank Allen (top right) plays a tune while fudge-makers Suzelle Gerber (far left, at left) and Marie Salisburg join in the festive spirit in Eagle Heights. The minions (above), and scarecrow (left) in front of the Zaria Theatre, were just some of the displays on Main Street, in North Tamborine.



Inspired by an old hedge trimmer, local resident Julie Wilkinson attaches her 2015 entry, 'Hapless Harry', a scarecrow cut in half, to her front gate.

The festival celebrates mountain life with roving musicians dressing as scarecrows to busk on the main streets, local artists showcasing their handicrafts and residents taking part in activities such as scarecrow-themed barefoot bowls and a bushdance.

"It's an event for the community, especially the children on the mountain," says festival founder Bernard Phare. He's lived on Tamborine for 25 years and launched the festival in 2008 to boost community morale following the global financial crisis. "Everyone was feeling low and so we thought we'd organise an event to get everyone together," he says. "The festival gives everybody a chance to get involved and to be inspired."

Bernard believes the best scarecrows are the ones that either make people smile or involve a lot of creativity. "My favourite this year is the invisible man," he says with a laugh. "There's just nothing there – only a hat hanging from a tree and a pair of boots."

Local resident Julie Wilkinson agrees that the festival inspires creativity. She retired to Tamborine about 18 months ago and is entering the festival for the second time. "One of the things that attracted me to Tamborine Mountain was the community spirit of the people here, and the quirky things they do," she says, attaching the bottom half of her scarecrow Hapless Harry to her front gate, next to an old, rusty hedge trimmer.

Her dogs, Bluey and Spud, sniff at the straw as Julie places Harry's top half on the fence alongside where she's secured his legs. "This fellow had a bit of an accident with a hedge trimmer," she says, smiling. "He cut himself in half." Julie hopes her scarecrow will encourage passers-by to laugh. "The festival really gets you out of your box, and out of the humdrum of everyday life," she says. "You start being creative and getting inspiration."

BEARINGS: TAMBORINE MOUNTAIN

Where: Tamborine Mountain is a 75km drive south of Brisbane and 45km west of the Gold Coast.

Population: About 6000

Festival location: Events take place all over Tamborine Mountain. The 17km 'Spot the Scarecrow Discovery Trail' runs through the villages of Mount Tamborine, Eagle Heights and North Tamborine.

Festival dates: From Friday to Sunday on the third weekend of October each year.

Year the festival began: 2008

Number of scarecrows entered in 2015: 150 (about 40 unregistered scarecrows also featured)

Next festival: 14–16 October 2016

Fees: Visitors can explore the 'Spot the Scarecrow Discovery Trail' and attend most events free of charge; entry to the Scarecrow Dance costs \$10 for adults and \$5 for children.

More information:

[www.tamborinemtncc.org.au/
tamborine-mountain-scarecrow-festival-2016](http://www.tamborinemtncc.org.au/tamborine-mountain-scarecrow-festival-2016)

Most people fashion scarecrows from materials found around the home and nearby. "The mulch I've used is from the vegie garden; the coat he's wearing is from a garage sale; and the lightbulbs I've used for his eyes came from in the shed," says Julie. "You've just got to use what you can find."

To create their Luna Park replica, Pippa, husband Don, and their children, Cassia, 7, and Maxim, 8, have been hunting for materials for months. "We love going to op shops and recycled tip shops," Pippa says. "All through the year we bring things home that could work for different themes." Their creation is made from 46 bales of hay from a nearby farm. "We found a farmer in a paddock baling hay not far from here, and he said that whenever we see it piling up, we can pick up bales from him," Pippa adds.

Scarecrows are traditionally used to scare birds, but Pippa says that the fresh hay is attracting birds and wildlife. "We've been visited by a scrub turkey that saw all of the hay in our shed and started making a nest," she says. "A koala also came down and just sat on the fence line. I'm sure he was enthralled about what we were doing."

As the festival's first day progresses, visitors and locals follow the scarecrow trail, "ooh-ing" and "ahh-ing" at the curious offerings on show. In Eagle Heights, tourists snap pictures of the colourful sculptures adorning Gallery Walk, the mountain's main shopping hub. One of the most intriguing on display is a wooden statue of Pinocchio with a mechanical nose that grows, made by local clock repairer Jimmy Dunn.

Amid the excitement, musician Frank Allen picks a tune on his banjo. He will be playing music all weekend, dressed as a scarecrow with a life-like effigy of a magpie attached to his straw hat. The 70-year-old has taken part in the festival for the past six years. "It's just so much fun," he says. "The whole place really comes alive and the kids just love it. It adds colour to the place."

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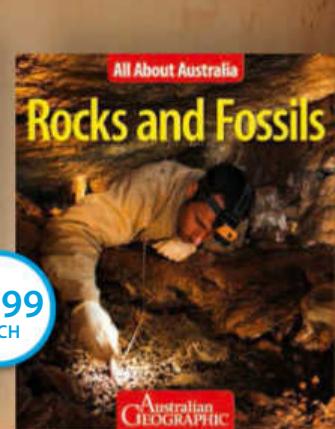
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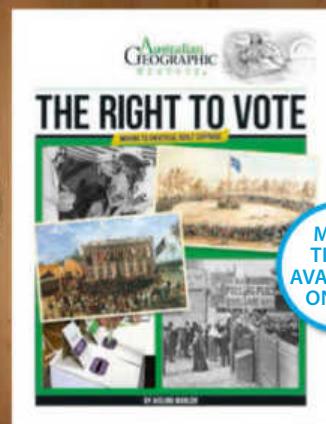
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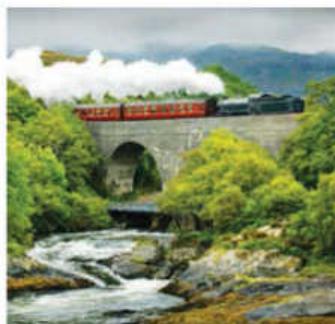
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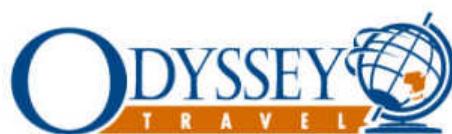
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Alienor Le Gouvello on her horseback trek along the Bicentennial National Trail.



The year in review

WELCOME TO 2016 and a new year of activities. A look back at 2015 reveals a record \$211,749 raised for conservation through our six annual fundraisers. This is great news for endangered species including the grey nurse shark and the red-tailed black-cockatoo. We also gave \$60,000 in sponsorships to recipients across many disciplines, some of whom feature in our new Geobuzz section. We are thrilled to have input from expert advisers Anna Rose, Tim Flannery, Chris Bray and Tim Jarvis when we consider applications to ensure your money is well spent. These sponsorships are financed through this journal and our other published products. We also raise revenue through scientific expeditions and partnerships with travel organisations that share our passion for helping Australia's wildlife. Through your subscription, donations and participation in our trips, we look forward to another successful year of giving back in 2016.

A handwritten signature of Jo Runciman.

Chair: Jo Runciman

Your subscription is essential to the work of the **Australian Geographic Society**.

EVERY SUBSCRIBER to this journal automatically becomes a member of the not-for-profit AG Society. Your subscription helps us fund the work of Australia's scientists, conservationists, adventurers and explorers. The Society also raises money through six annual fundraisers in AG retail stores and is supported via your direct donations.

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Who are the Australian Geographic Society?

Patron: Dick Smith AC

Chair: Jo Runciman

Secretary: Adrian Goss

Directors: Kerry Morrow, Andrew Stedwell, Jo Runciman

Advisory Council: Jo Runciman (chair), Chrissie Goldrick, Adrian Goss, Ian Connellan, John Leece OAM, Tim Jarvis AM, Anna Rose, Todd Tai

Society administrator: Nicola Conti

THE SOCIETY runs two sponsorship rounds per year – in April and November – in which its specialised adventure, science and community committees consider applications and disperse grants. These grants are directly funded through the Australian Geographic business.

The Society also awards the Nancy Bird Walton sponsorship for young female adventurers and hosts annual awards for excellence and achievement in conservation and adventure. It runs six wildlife fundraisers per year through AG retail stores and the AUSTRALIAN GEOGRAPHIC journal's multiple platforms. Each year the Society gives in excess of \$300,000 to Australian conservation and adventure.

Field notes

We're catching up with some of our sponsorship recipients so you can see how your contributions help conserve our natural history and keep the Aussie spirit of adventure alive.

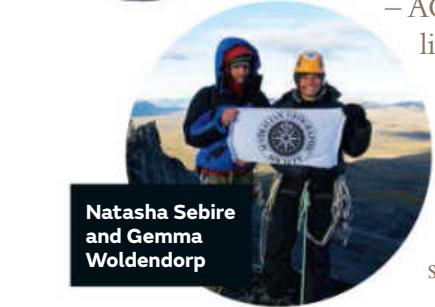
AFTER SUCCESSFUL trials in Svalbard – with help from AGS 2015 Lifetime of Adventure awardee Eric Philips – endurance cyclist **Kate Leeming**'s preparations for her Antarctic cycling adventure continue. To ensure she's ready to make the first bicycle crossing of the continent, she's hitting the gym and cycling on the roads, trails and beaches around Melbourne. She is also reaching out for sponsors to help her complete her training and gather the equipment needed before setting off in November. To offer her your support, visit: www.kateleeming.com

Kate Leeming

Alienor Le Gouvello began her 'Wild at Heart' journey in November 2015. Her solo horseback trek began at Healesville, Victoria, and will take her north on the Bicentennial National Trail, which, at 5330km, is among the world's longest tracks. Alienor hopes to bring attention to beautiful Australian brumbies and see them better managed.



Darren Le Roux



**Natasha Sebire
and Gemma
Woldendorp**

Darren Le Roux received a grant in 2012 to assist his PhD project on the effectiveness of nesting boxes as alternatives to tree hollows. He built 144 boxes of varying sizes, affixed them to trees and monitored them for two years. The results suggest that nest boxes can't fully replicate the features of natural hollows.

From July to September 2015, **Natasha Sebire** and **Gemma Woldendorp** – AGS 2009 Spirit of Adventure awardees – explored the impressive and little-known granite walls and towers of the Chukotka region of eastern Russia. The area was closed to outsiders for 20 years until recently. The intrepid duo climbed three new routes on the walls of the Commander and General peaks, ranging from grade 17 to 23. Along with these successful first ascents, the pair filmed the expedition and plan to make a short film sometime this year.

PHOTO WORKSHOPS

MAY 2016



CHRISTMAS ISLAND

Who: Chris Bray Photography (7 nights)
Australia's Galapagos: A tropical island paradise of birds, crabs, snorkelling, blowholes, waterfalls, beaches and more!

AUGUST 2016



ALASKA

Who: Chris Bray Photography (12 nights)
Bears catching salmon so close they'll splash you, glaciers, waterfalls, puffins, eagles, floatplanes, otters, ice and a private ship!

FOR MORE INFORMATION ON PHOTOGRAPHIC SAFARIS:

www.australiageographic.com.au/travel/travel-with-us

—
**WANT
TO GET
INVOLVED?**
—

THE BEST WAY to support the Society is by subscribing to this journal (see page 26) and purchasing our products sold through Magshop and the Australian Geographic retail stores. Participating in our scientific and travel partner trips is also a great way to enjoy unique experiences while helping to raise funds for the Society.

CONTACT AGS administrator
Nicola Conti at society@ausgeo.com.au or visit our website at www.australiageographic.com.au/society



Discover Australia

Your Society
Jan·Feb 2016



The AG Society's expedition program and those of its selected travel partners provide informative, inspiring and unique experiences for readers. Your participation in these adventures supports the Society's mission to foster the spirit of discovery and adventure and contributes funds to our work.

AG SOCIETY SCIENTIFIC EXPEDITIONS

LORD HOWE ISLAND SCIENTIFIC EXPEDITION

COME WITH the Society to the South Pacific to survey biodiversity. Run in partnership with Pinetrees Lodge and the Lord Howe Island Board, this scientific expedition is a unique opportunity for 20 readers to enjoy bushwalks and nature experiences, while also helping scientists from the Australian Museum to survey endemic snails,

beetles and other insects that are thought to be close to extinction. Many species on the island remain undescribed or unrecorded, so the expedition stands to make a significant contribution to conservation. Opportunities for coral and bird surveys will be available and evening lectures will be provided.



DATES: 16–23 October 2016

COST: From \$4250pp

INCLUSIONS: Return airfares from Sydney; local transfers; seven nights accommodation and breakfasts, lunches and dinners at Pinetrees Lodge; sunset drinks and afternoon teas; bushwalking activities

BOOKINGS: Contact Pinetrees on 02 9262 6585 or info@pinetrees.com.au

TASMANIAN DEVILS SURVEY

WE RETURN for a third season of field work with University of Tasmania scientists Dr Menna Jones and Professor Chris Johnson. The Arthur River is one of the last areas still untouched by Devil Facial Tumour Disease (DFTD), and Menna's

study aims to detail the changes that occur as the disease moves through. Volunteers will assist with field work including trapping, species counts and vegetation surveys, and enjoy visits to the nearby wild coastline.



DATES: 5–12 March 2016

COST: \$3630pp (twin share); AGS members \$3300

BOOKINGS: Call Curious Traveller on 03 6234 4918, email info@curioustraveller.com.au or visit www.curioustraveller.com.au

GOBI DESERT FOSSIL DIG

JOIN US in remote Mongolia to hunt for dinosaurs! We will take 10–15 volunteers into the heart of the Gobi, where rocks are exposed from the early Cretaceous, a key period of dinosaur evolution. We'll travel in 4WDs to a series of sites to discover and excavate fossils. Evenings will be

spent enjoying meals cooked by the field chef around the ger (yurt) at the centre of camp. Prior to eight nights camping in the desert, the expedition begins in Ulaanbaatar, where we'll visit museums and the Gandan Monastery. Find more details about this expedition on page 117.



DATES: 7–22 September 2016 (16 nights)

COST: From \$11,995pp (twin share)

BOOKINGS: Call Odyssey on 1300 888 225, email info@odysseytravel.com.au or visit www.odysseytraveller.com.au

TRAVEL PARTNER EXPEDITIONS

SOUTH-EAST ASIA ADVENTURE

A ONCE-in-a-lifetime adventure awaits on this expedition cruise from Manila to Darwin. Explore the Philippines, Indonesia and Malaysian Borneo. Discover the unique ecosystem of Puerto Princesa,

encounter Borneo orangutans and be intrigued by a fascinating overnight stay in Torajaland. On board, enjoy an all-inclusive lifestyle and the services of an expert expedition team.



WHO: APT Small Ship Expedition Cruise

DATES: June 2016 (17 days)

COST: From \$14,440pp

BOOKINGS: Call 1300 278 278 or visit www.aptouring.com.au/southeastasia

ANTARCTICA – IN SHACKLETON'S FOOTSTEPS

IN MARCH 2017 the Society will partner with Aurora Expeditions for a special voyage to South Georgia and the Antarctic to mark 100 years since the conclusion of Sir Ernest Shackleton's epic adventure in 1917. This will commemorate his famous journey across South Georgia to

rescue crew stranded on Elephant Island. We'll follow his route, offering a small group the chance to walk in his footsteps. You will be led by a team of expert guides, naturalists and historians, who will interpret the wildlife and history of this remarkable destination.



WHO: Aurora Expeditions

DATES: 8–25 March 2017 (18 days)

COST: From US\$14,300pp

BOOKINGS: Call 1300 076 131, or visit www.auroraexpeditions.com.au/AG2017

Exclusive member benefits

Your Society
Jan-Feb 2016



AUSTRALIAN GEOGRAPHIC subscribers are eligible for a fantastic range of benefits and discounts to attractions and exhibits, which we will be detailing every issue in these pages. Be sure to check back next time!

SPECIAL DISCOUNTS FOR SUBSCRIBERS

SEA LIFE, WILD LIFE AND TREETOP WALKS

- AG MEMBERS get a 20 per cent discount on standard entry to these Merlin Entertainments group attractions and others (see www.merlinattractions.com.au) by showing this page at ticket desks.

- SEA LIFE Sydney Aquarium
- SEA LIFE Melbourne Aquarium
- WILD LIFE Sydney Zoo
- Illawarra Fly Treetop Adventures
- Otway Fly Treetop Adventures
- Underwater World SEA LIFE Mooloolaba
- WILD LIFE Hamilton Island
- The Sydney Tower Eye
- Manly SEA LIFE Sanctuary

Offer not available with online tickets and cannot be used in conjunction with any other discount, offer, group, family, concession, multi-atraction tickets or for advance bookings. Present this page at admissions to redeem. Valid to 31/12/16. Promo code 1371

20%
DISCOUNT



50%
DISCOUNT



TRAILBLAZERS: AUSTRALIA'S 50 GREATEST EXPLORERS

- SHOWING AT the Australian Museum, Sydney, until 18 July 2016. AG subscribers will receive a 20 per cent discount on adult and family ticket prices – you must present the latest issue of AG at the admission desk to redeem this

20%
DISCOUNT

offer. Also complementing the exhibit, and beginning in March, will be the Australian Geographic Festival of Adventure, featuring 21 weeks of events, films and lectures. See page 110 for more details and www.australianmuseum.net.au.

THE ART OF AUSTRALIAN GEOGRAPHIC ILLUSTRATION

- THE ART of AG Illustration brings together treasured artworks from the past 27 years in a beautiful compendium. From cutaways of historic ships, to imagined visions

of eras past, these illustrations display our world in stunning detail. Full price \$59.95, but AG members get it for \$29.95, by going to: www.magshop.com.au/AGsociety130

TRAVEL PARTNER DISCOUNTS

CRUISE ALASKA'S INSIDE PASSAGE

- DISCOVER THE best of Alaska's Inside Passage aboard a small-ship expedition! On this trip you will cruise through the spectacular narrow straits, remote islands and glacier-carved fjords – as well as enjoy close encounters with

wildlife and daily shore excursions to explore nature reserves and local communities. Book your expedition before 29 February 2016 and receive a \$500 tour credit per couple to spend on a selection of premium North American tours.



WHO: Aurora Expeditions

DATES: 20–31 May 2016

BOOKINGS: Call 1300 076 131 or visit: www.auroraeexpeditions.com.au

\$500 TOUR CREDIT

SPICE ISLANDS AND RAJA AMPAT EXPEDITION

- COMBINING OUTSTANDING natural scenery, diverse wildlife and fascinating histories, our Raja Ampat and Spice Islands expedition is a unique journey of discovery and adventure. Embark Coral Discoverer

in Darwin, at the commencement of our 12-night voyage to Biak, West Papua, and be among the first to experience these rarely visited islands. Conditions apply for discount. Enquire for more details.

SAVE
25%



WHO: Coral Expeditions

DATES:

18 March 2016, Darwin-Biak;
30 March 2016, Biak-Darwin.
BOOKINGS: Call 1800 079 545, email reservations@coralexpeditions.com or visit: www.coralexpeditions.com



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Deep Gully Shiraz Cabernet 2014 South Australia

With its impeccable delivery, you'll be bowled over by the decadent dark fruit flavour in this exciting new exclusive crafted with cricket enthusiasts in mind.

Peter Lehmann 'Pastor's Son' Shiraz 2014 Barossa Valley, SA

Rare parcel of peppery Shiraz from the late 'Baron of the Barossa' and former International Winemaker of the Year, Peter Lehmann. Superb.

Willoughby Park Shiraz 2011 Frankland River, WA

"Juicy and rich" 91pt gem from a leading 5 red-star estate in pristine WA, and ideal served with sizzling steaks fresh off the grill. Good to go until 2023!

Dark Corner Durif Shiraz 2015 South Eastern Australia

Winemaker David Joeky has perfected the dark art of marrying black Durif and spicy Shiraz to give a richer, denser, more profound red.

Blackstrap GSM 2014 McLaren Vale, SA

Darker than the local molasses and loaded with ripe plums, this is magical mouthcoating McLaren Vale at its very best. Drink solo or with kangaroo burgers.



Readers of Australian Geographic are invited to taste a dozen reds from quality estates in classic regions, delivered to your door by the Australian Geographic's own wine service ... at below cellar-door prices.

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King of the canyon

52 ABOVE THE CENTRE

ANDREW GREGORY'S trip to the Red Centre coincided with record-high October temperatures. When he arrived at Kings Canyon to capture aerial photos, it was 40°C and the rim walk was closed. The next day it was cooler and the walk was open early in the morning. Andrew hiked to the top so that he could fly his camera drone (which took the above image of him) through the narrow gap near the Garden of Eden and out along the walls. "It was tricky because there's a big gum tree growing in the middle of the narrowest part of the canyon, but I skinned above it and flew out for more than half a kilometre," he says. Getting permits and approval to fly in national parks was Andrew's biggest headache. Regulations prohibit aircraft or drones from taking off in certain parks, he says, so he couldn't get permission to fly at Uluru or Kata Tjuta. Kings Canyon was easier, but Andrew had to notify rangers and discuss flight plans with helicopter pilots who were doing scenic flights.



High above the High Country

72 WHERE THE WILD HORSES ARE

FOR OUR feature story on brumbies, writer Amanda Burdon (above) and photographer Jason Edwards flew by helicopter into some of the more inaccessible parts of Kosciuszko National Park to observe horses and their impact on the river systems and plains. From the air they saw large mobs, including some magnificent grey roans and quite a few foals born only weeks earlier. "We also

saw where the horses had been wallowing in the creeks and degrading the creek beds, and the braid of tracks that they use across the plains to access food and water," says Amanda. "We had gone from 40°C-plus days in Central Australia, to the Snowy Mountains, where it hovered at about 5°C degrees or lower overnight. It just went to prove how hardy and adaptable these horses are!"

PARTING SHOT

Born under a lucky star

Since its inception in 1986, AUSTRALIAN GEOGRAPHIC has had a significant influence on how we perceive Australia, says former associate editor PETER MEREDITH.



WHEN AUSTRALIAN GEOGRAPHIC made its debut in January 1986, I was dazzled. I took a copy with me on a road trip and got my first good look at it as I sat in bushland beside the Deua River, in south-eastern NSW.

I joined its staff a few months later and stayed for eight years, becoming an associate editor. I still regularly write for AG, and I've watched it grow into an institution that has not only influenced the way Australians see Australia, but also gained the clout to play an active role in protecting environmentally significant places. It did that despite early scepticism about its approach and the fact that it was born under an ominous portent.

At the time, Halley's Comet was back after a 76-year absence. The first issue carried a 10-page article celebrating its return. Comets were once feared as harbingers of doom, but that didn't faze founder Dick Smith. In his inaugural column, he wrote that we needed a publication "that not only shows Australia in a positive way, but inspires our young people to share in the great adventure of being Australian".

Dick was confident this buoyant vision would excite readers and instil a sense of pride in their youthful nation. It would do that by depicting Australia's iconic landscapes, its people, animals and plants through stunning photography and meticulously researched articles. It would revere national archetypes – the battler, the bushman, the digger – and emphasise the virtues of a gritty life on the land,

and the values of the intrepid pioneers.

Not that this editorial approach was new. AG was filling a gap left by the demise of *Walkabout* magazine, which took a similar line during its 1934–74 lifetime. Although AG was not modelled on *National Geographic*, there was an overseas magazine that Dick acknowledges influenced his publishing philosophies. If he emulated anything, he says, it was *Canadian Geographic*.

Aside from these inspirations, for Dick the biggest driver towards a positive approach was what he saw as a negativity pervading Australia's media. He'd had enough of negative stories. He was going to publish good news, even though experts warned him that people didn't want it and it wouldn't sell.

Optimism was in the air in the mid-1980s. Political and economic transformation was revitalising a stagnant nation preparing to celebrate its 200th birthday. The stock market was booming, house prices were soaring, *Advance Australia Fair* had been decreed the national anthem, Australia had won the America's Cup yacht race, and Tasmania's Franklin River had been saved from damming. Dick himself had taken part in anti-dam protests, ferrying radio gear to campaigners by helicopter (AG 117). By the time of AG's fifth issue, in January 1987, it had amassed 90,000 subscribers,



PETER MEREDITH

is an award-winning journalist, author and editor. His stories have featured in more than 20 publications both here and overseas.

ers, an astonishing figure. And the subscribers kept coming, topping 200,000 by 1995.

A 2006 study titled *Red Earth, Blue Sky: Australian Geographic's image of Australia*, by Anna Warr of the University of Sydney, analysed the journal's photographic and editorial style. Anna found that the content did more than simply attract readers; it also shaped Australians' perceptions of themselves and their country. By presenting Australian subject matter in a positive fashion, AG "enables a process of identification and affirmation in its readers, which...reinforces a sense of belonging", Anna wrote, adding that the use of photography and "aesthetically pleasing and informative images" inspired pride in Australia.

As a writer, I believe that AG's text played as great a role as photography in this process. Part of its power undoubtedly lay in the style that contributors were explicitly instructed to follow. Using first-person pronouns ('I', 'me', 'we', 'us'), they were to be subjective, offering opinions and describing feelings when reporting.

As far as Dick is concerned, AG's most significant impact was on the powers that be. It successfully campaigned for the protection of the Coongie Lakes area in South Australia and against the building of a resort in Wilpena Pound. By championing nature in all its forms, this journal has encouraged Australians to cherish and safeguard it. So the doomsayers were way off the mark, and Halley's Comet turned out to have been a lucky star.

Antarctica & South Georgia



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