White roos
A family of rare albino wallaroos has been found at Mount Panorama

Power revolution
Communities are empowering themselves with green power

Facing the past
A team of researchers from UTS has breathed new life into an old mummy at the Australian Museum. Page 5
A lighter shade of pale
Macropod researchers have stumbled across a rare family of albino wallaroos living around Bathurst, writes Wendy Frew.

In the lead up to the iconic Bathurst 1000 motor race in October, a family of rare albino wallaroos has been discovered living around the Mount Panorama area in the Central Tablelands of NSW.

Albinism in wildlife is rare and the odds of any albino animals surviving in the wild are low, says macropod scientist Dr Daniel Ramp, director of the Centre for Compassionate Conservation at the University of Technology, Sydney (UTS).

The discovery comes at an interesting time. Dr Ramp is leading a UTNS kangaroo research program in Bathurst seeking ways to discourage kangaroos from jumping on to the Mount Panorama motor racing circuit during the annual October Bathurst 1000.

It was Bathurst councillor Jess Jennings who originally approached the Bathurst Kangaroo Project to identify an animal in a photo he had taken on his phone while running in the public reserve. Clearer images were immediately sought, with local wildlife photographer Tim Bergen discovering at least two albino wallaroos, a female and her joey.

“Knowing that the old Joseph Banks Park Nature Park at the back of the mountain had released all its macropods when it was shut down about 20 years ago, we made inquiries about any albino wallaroos that might have been there. “Sure enough, respected Bathurst naturalist and former ranger for the reserve, Ian McArney, confirmed that a male albino wallaroo had been resident at the park.

“Without an available female carrying the rare recessive albinism gene, that wallaroo’s direct offspring were never albino.

“Several isolated generations later there are now enough of the recessive genes in the Mount Panorama wallaroo population to come together to start producing albino wallaroos.”

Dr Ramp says the possibility of seeing more albino wallaroos in the precinct certainly raises the scientific value of the local macropod population.

“It is frequently thought that all albino animals do not survive long in the wild as their vision can be impaired and they can be observed more easily by predators. Despite living near a racetrack these rare wallaroos appear to be doing well and are healthy.

“Some residents have known of the animals for some time, and want to see them protected. The most important thing is to leave them alone, drive carefully in the Mount Panorama precinct, and keep dogs leashed when in kangaroo habitat,” says Dr Ramp. “These rare animals could well serve as an important flagship for the project.”

Actors keep it real with a dramatic take on university
BY MELINDA HAM

Increasing access to higher education for sections of the community that traditionally miss out on university is a pressing issue for Australia but a new theatre production being staged in high schools could help solve that.

By the end of this year, more than 8,000 year 7 students in 70 schools in and around Sydney and country NSW will have seen Onwards and Upwards, an interactive production from the Gibber Theatre in the UK.

The idea is to present university as something not only for those from wealthy families, says Dominic Nimmo, the lead actor in Onwards and Upwards.

“We hope to take it from a kid’s perspective … no matter who you are or where you live, higher education is achievable, if you want to attend it,” says Nimmo.

Gibber Theatre is working with TAFE and five universities – the University of Technology, Sydney (UTS), Macquarie, Sydney, Western Sydney and the Australian Catholic University – to target schools with low enrolments in university and TAFE. The program is part of a $21.2 million Commonwealth government program, Bridges to Higher Education.

Gibber has adapted its highly successful UK production to Australian audiences, adding references to celebrities such as Delta Goodrem, and Australian TV shows. The 40-minute live drama is combined with a video projected behind the actors, showing students what they can expect at university open days and directing them to useful websites.

“The kids seem to really relate to it,” says Nimmo. “It’s funny, they laugh at different jokes in Sydney than they do in the country areas – and at boys’ schools they are a little more cool and it takes time to warm them up.”

The point of the exercise is to provide accurate information and dispel myths about higher education, says UTS Widening Participation Co-ordinator Trudy Phelps.

“In some families it may be a case of the unknown – that no one has transitioned to higher education in that family – and we try to highlight the realities of what it is like.”

There is a cumulative impact from programs such as Onwards and Upwards, according to the 2014 Bridges interim evaluation report compiled by KPMG. Of the students who have participated in the production, Gibber reported that 87 per cent said they were more likely to stay at school to complete year 12 and 78 per cent thought they would fit in at university. And 84 per cent of teachers said they thought the performance would encourage students to engage more with their high school work.
Passion for the natural world clears the waters

A boyhood interest helps a young scientist unravel an environmental mystery, reports Marea Martlew.

A toxic legacy has hung over the picturesque northern NSW coastal hamlet of Urunga for almost 40 years. Although now obscured by dense vegetation, the forest of dead melaleuca trees at the edge of a wetland stands as a sad sentinel to a time when environmental protection was in its infancy.

In 1974, the owners of a mineral processing plant – opened in 1969 when prices for trace metals were high – abandoned the site. They left waste tailings containing antimony, arsenic, mercury and lead to leach into the wetland which contains endangered and vulnerable fauna species and feeds the Urunga lagoon.

As a youngster growing up in Urunga, environmental scientist Steven Leahy, now 31, could not have envisaged how this heavily contaminated one-hectare site would shape his career. It yielded contamination events, “I remember doing a project about the site when I was at Bellingen High School which must have stayed with me. But although most people recognise the environmental dangers of mercury, lead and arsenic, I don’t think they knew what antimony was,” he says.

This isn’t surprising. Although widely used in products we take for granted, such as flame retardants, brake-pad linings and, increasingly, microelectronics, antimony is a trace metal with no known biological function. A rare resource – 90 per cent of the world’s known supply is in China – it is also highly toxic and potentially carcinogenic.

For Leahy, an environmental chemist, expertise gained at CSIRO Land and Water during his industry placement, combined with his formative years in Urunga, resulted in an Honours project that he hoped would both push the boundaries in trace metal analysis and have environmental relevance.

“Despite its toxic potential we know very little about how antimony moves through the environment and current test methods generally aren’t sensitive enough to detect the minute background levels found naturally in uncontaminated waters. If you don’t know what is there, naturally you can’t establish baseline values against which to compare future contamination events,” Leahy says.

By combining classical chemical methods with cutting-edge technology at CSIRO, Leahy was able to develop, for the first time, a unique method to quantify dissolved antimony at background concentrations along the length of an uncontaminated Australian estuary. It’s an important step towards understanding the bigger picture of how a difficult-to-measure, potentially toxic, contaminant could affect a whole estuary and will enhance environmental monitoring by allowing the differentiation of contaminant and natural antimony sources.

In what has turned out to be exquisite timing a week after the young scientist received his testamur and prestigious award from UTS, the NSW Crown Lands department announced that a remediation plan for the contaminated site in Urunga had been agreed and final approval sought through the NSW Department of Planning.

“People might say that antimony isn’t such a big deal, why bother? However we know demand for resources keeps growing, Australia has under-exploited antimony reserves in the mid-north-coast NSW catchments. For development to be sustainable we need to protect the environment for future generations, so investigating and monitoring trace metal contamination is important.”
The winds of change

Community energy projects are flourishing across Europe but in Australia it is proving a long and rocky road to energy independence, reports Wendy Frew.

Denmark isn’t the sunniest place on the continent. The Australian continent, that is. The tiny township clinging to Western Australia’s southern coast is rainy for about a third of the year. So, it wasn’t a big surprise when, in 2003, wind energy emerged as the most viable form of renewable energy for the local community.

The community has long been known as a green town. Craig Chappelle, chairman of directors of Denmark Community Windfarm Ltd (DCW) says Western Australia’s southern coast is 60 years old so there are massive community’s reliance on fossil fuels. districts power and reduce the community-scale wind farm

Craig Chappelle, chairman of directors of Denmark Community Windfarm Ltd (DCW) says Western Australia’s southern coast is 60 years old so there are massive community’s reliance on fossil fuels. districts power and reduce the community-scale wind farm on that electric transmission line and the infrastructure is about 60 years old so there are massive power losses as the electricity travels 400km down the line to us.

Denmark now has two wind turbines and has permission to build another two. There’s a certain synchronicity too in the town’s green energy choice. Denmark’s European namesake is the birth place of the global wind industry. Against the backdrop of the oil crisis, Denmark began developing commercial wind power in the 1970s. Wind power now provides just over 30 per cent of the country’s electricity, much of it coming from community energy projects.

In neighbouring Germany, fears of another Chernobyl prompted hundreds of thousands of people to invest in citizens’ wind farms and other kinds of independent renewable energy schemes. Scotland is another notable adopter of community energy. Until recently, it has been a very different picture in Australia, says Ison, a senior research consultant for the Institute for Sustainable Futures at the University of Technology, Sydney. In 2009, there were just three or four community energy projects on the drawing board, says Ison, an expert in the field of community energy and energy policy.

Now, there are 10 projects operating and over 50 in development, and in June about 300 people attended Australia’s first major community energy congress in Canberra, she says. “The congress brought together people who were interested in starting community energy projects, drafted a national strategy for developing the sector and created the Coalition for Community Energy which will deliver the national strategy. “Individual projects might be small but they can be replicated across many communities and their influence ripples through the community and eventually influences policy and electricity retailers to source a combined 4,000GWh of power from renewable sources by 2020, or what was projected in 2010 to be 20 per cent of Australia’s electricity demand. At the time of writing a Coalition government review of the target was underway, headed by professed climate change sceptic Dick Warburton. The renewable energy industry and green groups fear the government has already made up its mind to cut the target. Incumbent power companies claim the target costs jobs and pushes up power prices. But experience around the world shows renewable energy can help smooth out the spikes in wholesale electricity prices on very hot and very cold days because that is when renewable energy tends to be available. In other words, renewable energy can help keep electricity prices down.

Removing the renewable energy target will make it tougher for the green energy sector.

Regrettably, cutting or removing the target will make it tougher for the renewable energy sector to grow, says Ison. “Clearly, current uncertainty in Federal government policy settings are not helping,” she says. “All the more reason for the Coalition for Community Energy to help the sector develop a range of business models for new alternative energy projects.

“Globally we are seeing huge innovation in the business models for renewable energy. Because of government policies in Australia, selling electricity into the grid for smaller community energy projects is not economically viable so these projects need to sell energy directly to electricity users,” Ison says.

In Denmark’s case, locals decided to form a limited company rather than a co-operative structure. The company issued 1.2 million shares at $1 each and it now has 116 shareholders, most of whom are local residents. DCW will pay its first dividend this year, after just 15 months of operation, says Chappelle, and some of the profits will be returned to the community for other projects.

“We calculated that after the first year of operation we had provided 55 per cent of domestic electricity consumption, which was slightly better than our projections,” he says. “In overall terms, we are providing 35 to 40 per cent of commercial, industrial and residential consumption for the entire district. It’s not bad for two little 800kW turbines.”
A forensic examination

BY WENDY FREW

It was a perfect March morning the day Meiya Sutisno and her team of researchers began examining the body. Sydney's sun was still strong enough to heat up the pavement on William Street but down in the bowels of the Australian Museum the atmosphere was very different. A member of the museum's staff pulled away a sheet to reveal the body, bound in the rags of antiquity, looking small and fragile as it lay on an autopsy table. The feet were pulled close together, the shoulders appeared hunched and the head tilted slightly down. A few feet away lay the sarcophagus that had housed the mummy. The researchers and museum staff moved carefully around the body, speaking quietly. The only other sound in the room was the hum of an air-conditioner.

And so began the work that would continue for the next five months to unravel the mystery of the museum's mummy. Who lay beneath the bandages? How old was the body? How did this person die and why were they encased in the sarcophagus that had housed the body, bound in the rags of antiquity, looking small and fragile as it lay on an autopsy table. The feet were pulled close together, the shoulders appeared hunched and the head tilted slightly down. A few feet away lay the sarcophagus that had housed the mummy. The researchers and museum staff moved carefully around the body, speaking quietly. The only other sound in the room was the hum of an air-conditioner.

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Profit and progress are putting the Great Barrier Reef at risk

Developing a huge coal port on the Queensland coast will inevitably cause further damage to the world's largest coral reef system, writes David Booth.

Last month the Federal government approved what will become Australia's biggest coalmine and one of the biggest in the world, covering 200 square kilometres and producing about 60 million tonnes of coal a year. The Carmichael coalmine in the Galilee Basin of Queensland, operated by India's Adani Group, has been hailed by the Federal government for its economic benefits but its impact extends well beyond exports and jobs; it will have a colossal environmental footprint on the basin and the Great Barrier Reef.

Adani's plan to expand port facilities at Hay and Abbot points, and its desire for the biggest bulk carriers to navigate a multitude of small shoals and reefs that make up the World Heritage-listed marine habitat put the reef at great risk from coastal clearing, dredge spoil dumping and hazardous shipping. Already, up and down the Queensland coast, harbours are being dredged, spoil is being dumped in the ocean and fine sediments are smothering coral and seagrass habitats — all in the name of the state's increased coal and gas exports.

The coal industry says the best environmental impact work shows the effects of the construction dredging and more than 14 million tonnes of subsequent spoil dump a year would be contained well away from the reef. However, as is usually the case with such studies, the project brief would not have examined the long-term effects of the spread of fine sediment across the reef.

But the science is clear. Water quality on the Great Barrier Reef and adjacent coastal waters is already declining, thanks to the 600,000 tonnes of spoil entering the ocean from Queensland rivers every year, largely due to land clearing for agriculture.

This pales in comparison with the amount of sediment expected to be dumped near the reef from dredging works associated with the port development.

Suspended sediments will destroy marine life on the reefs, killing corals and seagrass, and leaving room for algae lime to move in. The Great Barrier Reef is one of the richest and most complex natural systems on Earth, beloved of Australians and a valuable part of our tourism industry. But it is already in its worst shape since records began because of overfishing, agricultural run-off, the invasion of the Crown of Thorns starfish, rising water temperatures connected to climate change, and ocean acidification. Coal port sediment dumping could be the straw that breaks the reef's back.

The lack of regard for the environment is clear when you consider the alternatives. Industry flatly rejected dumping dredge spoil on land rather than in the sea.

Nor would it consider the much less environmentally destructive (but more expensive) option of suspending pipelines on trestles, requiring only a fraction of the sediment removal.

It is worrying that the Federal government is paving the way for the Queensland government to have the final say on development proposals, despite the state being a major beneficiary. It is a clear conflict of interest. Meanwhile, the Great Barrier Reef Marine Park Authority will have a reduced advisory role.

Even if we discard the intrinsic worth of the Great Barrier Reef and simply weigh up the economic benefits, the cost of higher mining exports is potentially massive losses in the equally lucrative tourism and commercial fishing industries. Expanding Queensland's shipping ports may seem to make economic sense but the real cost to Australia may be too much to pay.

For Australia, rethinking the productivity of materials holds promise for what is a challenging time for traditional manufacturing.

David J. Booth is Professor of Marine Ecology at the University of Technology, Sydney and president of the Australian Coral Reef Society.

Creative undercurrents

Art

What does a Chilean mother mourning with a portrait of her missing child who disappeared during the Pinochet years have in common with Microsoft founder Steve Jobs holding up an image of himself on a laptop? They are among the hundreds of contemporary images that artist and art lecturer Tom Nicholson has collected during the past decade. He is fascinated by Nicholson says. “Some artist and art lecturer Tom Nicholson has collected during the past decade. He is fascinated by Nicholson says. “Some

Warburton, Michael Lindeman and Alex Martinis Roe.

I thought it would be interesting to show design students and other visitors to the gallery the extensive research that these artists go through in the execution of their work,” says Jasmin Stephens, the exhibition’s curator.

How they think through the narrative and storytelling process, asking the questions: who does my work speak to, what is it saying and what is the context?”

George Egerston-Warburton, 26, from Western Australia, has created a diorama that combines a naively painted tropical background, a toy horse and material from his studio. Stephens says Egerston-Warburton is exploring the idea that while dioramas in museums traditionally depict grand battles, here the artist has juxtaposed his scene with some mundane, everyday objects, such as a power cord, from his studio.

“Dioramas have fallen in and out of fashion, and are sometimes regarded as corny, unsophisticated or old-fashioned, but the public has always loved them,” Stephens says. “Egerston-Warburton’s diorama is very naive and very playful; it won’t be the grand and inspiring ones expected of museums. And that’s not lost on him.”

Meanwhile in Canadiana, feminist artist Barbara Campbell has typed out six times the entire manuscript of Joseph Conrad’s novel Heart of Darkness on 20 five-metre lengths of Chinese rice paper. She maintains that women’s labour always underpins a man’s creative genesis.

This long scroll of paper hangs in front of a video of Disneyworld’s self-effacing self-portrait using a letter from Sizler restaurant management commending him on his dishwashing certification, and an open letter to the viewer questioning the artist’s role in society.

far and wide: Narrative into Idea is at UTS Gallery Monday to Friday, 12pm to 6pm, Level 4, 702 Harris St, Ultimo, until 16 October.

Jungle Book ride, a reference to the 1978 filming in the Philippines of Francis Ford Coppola’s Apocalypse Now, which dramatised Conrad’s novel.

Alex Martinis Roe presents a video of women involved in the Milan Women’s Bookstore Collective Circolo della rosa portraying an international feminist movement through the relationship of two individuals. Michael Lindeman creates a

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Facing a post-antibiotic world

Antibiotic resistance should be treated as a natural disaster, reports Leigh Dayton.

Imagine a world of untreatable bacterial infections, including epidemics and pandemics.

The risk of total antibiotic resistance should be treated as a natural disaster like bush fires or floods. Photo by AAP Image/David Crosling.

Every year, Australians are given more than 22 million prescriptions for antibiotics, representing one of the highest rates of use in the world. Although Australia does not collect nationwide data on antibiotic use, experts estimate about half those prescriptions are unnecessary. The reasons this happens are “complex,” says Maurizio Labbate, a microbiologist at the University of Technology, Sydney (UTS), Carolyn Michael, a UTS micro-ecologist, and Dale Dominey-Howes, a disaster risk expert at the University of Sydney.

In a paper published in the Australian Journal of Emergency Management, they suggest many doctors inappropriately prescribe antibiotics to treat viral infections, which the potentially life-saving drugs cannot cure. Therefore, patients demand prescriptions to treat colds, flu and other conditions for which this class of drugs is ineffective.

“Modifying community behaviour is probably the easiest and cheapest way to tackle the antibiotic resistance problem,” Dr Labbate says.

“We need to look at this problem with fresh eyes,” says Dr Labbate. That’s why he and his colleagues want to collaborate with social scientists to determine how the public perceives the risk of antibiotic resistance and what factors shape the community’s perceptions – for instance, age, sex, cultural background.

They could then work with emergency managers to communicate to the community the risk and appropriate responses. “Modifying community behaviour is probably the easiest and cheapest way to tackle the antibiotic resistance problem,” Dr Labbate says.

It’s also urgent. “Imagine a world of untreatable bacterial infections, including epidemics and pandemics.”

Time to prevent this dystopian future is running short. How short? “The US Centres for Disease Control predicts the era of antibiotics will be over within a decade or two,” says Dr Labbate.

“A decade or two.”

The first line of defence

BY LEIGH DAYTON

Every year, Australians are given more than 22 million prescriptions for antibiotics, representing one of the highest rates of use in the world. Although Australia does not collect nationwide data on antibiotic use, experts estimate about half those prescriptions are unnecessary. The reasons this happens are “complex,” says Maurizio Labbate, a microbiologist at the University of Technology, Sydney (UTS), Carolyn Michael, a UTS micro-ecologist, and Dale Dominey-Howes, a disaster risk expert at the University of Sydney.

In a paper published in the Australian Journal of Emergency Management, they suggest many doctors inappropriately prescribe antibiotics to treat viral infections, which the potentially life-saving drugs cannot cure. Therefore, patients demand prescriptions to treat colds, flu and other conditions for which this class of drugs is ineffective.

“A National Prescribing survey found 62 per cent of patients did not know that overusing antibiotics can acquire drug-busting powers from resistant bacteria. Then these tough-to-treat microbes invade the world: people, farm animals, seafood, fruit and vegetables – not to mention soil, water and air. The result could be devastating – antibiotics that don’t work when people need them.

Already, so-called superbugs can be “multiply resistant” to three or four antibiotics, says Dr Labbate, adding that those causing 5 per cent of Australian infections in hospitals are multiply resistant. For example, the WHO report says “treatment failure” of the “last-resort antibiotic” for gonorrhoea has been confirmed in Australia and nine other nations. Similarly, people infected with a methicillin-resistant strain of the bacterium Staphylococcus aureus are 64 per cent more likely to die than people with a non-infectious form, according to the WHO.

Clearly, it’s imperative that existing antibiotics be used carefully, as the more they’re used the more bacteria developed resistance to them. Bacteria can become antibiotic-resistant if they undergo random mutations which, by chance, protect them from antibiotics. Alternatively, the highly promiscuous microbes can acquire drug-busting powers from resistant bacteria.

“This slow outbreak” began during World War II, soon after a Cambridge University team led by Australian Howard Florey produced significant supplies of penicillin, the first antibiotic. As more antibiotics became widely available, more bacteria developed resistance to them.

Then these tough-to-treat microbes invade the world: people, farm animals, seafood, fruit and vegetables – not to mention soil, water and air. The result could be devastating – antibiotics that don’t work when people need them.

Alarming WHO report

Faced with a post-antibiotic world

Dr Labbate says the key advantage to “rebranding” antibiotic resistance as a natural disaster like bush fires, flooding and cyclones is that developed countries such as Australia have effective and organised emergency risk-management processes for such events. It makes sense, he argues, to adopt similar mechanisms to prepare for and handle the problem of antibiotic resistance.

A disaster-oriented strategy would broaden and strengthen national and international protocols established by health officials and hospitals for handling sudden disease outbreaks because although antibiotic resistance is a “slow outbreak”, as it increases, the chances of a sudden and disastrous epidemic or pandemic rise.

This “slow outbreak” began during World War II, soon after a Cambridge University team led by Australian Howard Florey produced significant supplies of penicillin, the first antibiotic. As more antibiotics became widely available, more bacteria developed resistance to them. Bacteria can become antibiotic-resistant if they undergo random mutations which, by chance, protect them from antibiotics. Alternatively, the highly promiscuous microbes can acquire drug-busting powers from resistant bacteria.

Then these tough-to-treat microbes invade the world: people, farm animals, seafood, fruit and vegetables – not to mention soil, water and air. The result could be devastating – antibiotics that don’t work when people need them.

Already, so-called superbugs can be “multiply resistant” to three or four antibiotics, says Dr Labbate, adding that those causing 5 per cent of Australian infections in hospitals are multiply resistant. For example, the WHO report says “treatment failure” of the “last-resort antibiotic” for gonorrhoea has been confirmed in Australia and nine other nations. Similarly, people infected with a methicillin-resistant strain of the bacterium Staphylococcus aureus are 64 per cent more likely to die than people with a non-infectious form, according to the WHO.

Clearly, it’s imperative that existing antibiotics be used carefully, as the more they’re used the more resistant bacteria become. Unfortunately, that’s not happening.

“Imagine a world of untreatable bacterial infections, including epidemics and pandemics.”

Time to prevent this dystopian future is running short. How short? “The US Centres for Disease Control predicts the era of antibiotics will be over within a decade or two,” says Dr Labbate.

“A decade or two.”

The first line of defence

BY LEIGH DAYTON

Every year, Australians are given more than 22 million prescriptions for antibiotics, representing one of the highest rates of use in the world. Although Australia does not collect nationwide data on antibiotic use, experts estimate about half those prescriptions are unnecessary. The reasons this happens are “complex,” says Maurizio Labbate, a microbiologist at the University of Technology, Sydney (UTS), Carolyn Michael, a UTS micro-ecologist, and Dale Dominey-Howes, a disaster risk expert at the University of Sydney.

In a paper published in the Australian Journal of Emergency Management, they suggest many doctors inappropriately prescribe antibiotics to treat viral infections, which the potentially life-saving drugs cannot cure. Therefore, patients demand prescriptions to treat colds, flu and other conditions for which this class of drugs is ineffective.

“A National Prescribing survey found 62 per cent of patients did not know that overusing antibiotics can acquire drug-busting powers from resistant bacteria. Then these tough-to-treat microbes invade the world: people, farm animals, seafood, fruit and vegetables – not to mention soil, water and air. The result could be devastating – antibiotics that don’t work when people need them.

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