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# explore

*nature*

*culture*

*discover*

## LUDWIG LEICHHARDT IN AUSTRALIA

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# A STRONG *year*



At around the time you are reading this I will be in St Petersburg visiting the State Hermitage to thank them for lending us *Alexander the Great: 2000 Years of Treasures*, and investigating how we might build on the success of that exhibition.

Alexander was indeed good for us. It was our most popular cultural exhibition ever, contributing to annual visitation of more than 400,000 people for the first time since admission charges were introduced in 1991. There are more wonderful major exhibitions in the pipeline that we'll be announcing soon.

## AWARDED

It has been a strong year in other ways too, with three Museum staff receiving major awards. My congratulations go to Dr Robin Torrence, who received the International Council of Museums Australia award for International Relations for her archaeological work in Papua New Guinea; Dr Jeff Leis, awarded one of fish biology's highest honours, the Pieter Bleeker Award for Excellence in Indo-Pacific Ichthyology; and Cultural Collections Manager Dion Peita, recipient of the Institute of Public Administration Australia Award for his innovative work with Pacific youth. In addition, long-serving Museum volunteer Heather Joynes has been awarded the Medal of the Order of Australia for service to arts and crafts, particularly embroidery.

## NATURE AND CULTURE

In May this year we announced a major project to sequence the koala genome in collaboration with the Queensland University of Technology. The Koala Genome Project demonstrates the potential of collection-based DNA work to help ensure the future of one of Australia's most iconic species. On the cultural front, a new display in the Museum showcases the first of several contemporary works from Erub (Darnley) Island in Torres Strait on the theme of 'ghost nets' – abandoned fishing nets that continue to kill wildlife. The Museum has commissioned the works thanks to financial support from the Australian Museum Foundation. Local artists are incorporating the nets into powerful statements of cultural identity and strong environmental themes, as the Museum's Scott Mitchell explains in this edition of *Explore*.

## NEW MUSEUM

Perhaps most importantly of all, this year we have commenced detailed work on the New Museum project. We need to build on our strengths in several key areas, such as by increasing our work on wildlife genomics, focusing more holistically on lifelong learning, engaging more strongly with the first peoples of Australia and the Pacific, and boosting our capacity to host the very best of the world's travelling museum exhibitions. The New Museum project looks at how we might achieve these aims by better utilising spaces within existing Museum buildings and redeveloping the eastern end of the Museum site. Over the next 12 months I'll be saying more about what the New Museum entails and seeking your thoughts on it.

## FRANK HOWARTH PSM

Director of the Australian Museum

# musings



## Above

Underwater photography or trickery? Hurley used an aquarium for these early 'underwater' shots. Photo by Frank Hurley. Australian Museum Archives. VV3243

## HATCHETS OF THE SYDNEY BASIN

A team from the Australian Museum and University of New England has pinpointed Peats Ridge, 100 kilometres north of Sydney, as an important source of basalt in making Aboriginal stone hatchets. Using non-destructive X-ray fluorescence (pXRF), the composition of 96 specimens from the NSW Central Coast was compared with 75 geological specimens from the Sydney Basin. Archaeologist Tessa Corkill said nearly half the 96 hatchets were made from Peats Ridge basalt, yet some were found at locations up to 60 kilometres away. The study provides new insights into exchange systems and social networks among Aboriginal groups on the NSW Central Coast.

## FRANK HURLEY'S UNDERWATER PHOTOGRAPHY

In 1922 photographer Frank Hurley travelled to the Torres Strait and Papua in search of new images and film footage for a remake of his popular film *Pearls and Savages*. The Museum's fish scientist Allan McCulloch went with him to collect specimens and ethnographic objects. Sharing an interest in experimental photography, the two men took with them a large aquarium for the marine life they wanted to photograph and film. After much trial and error they produced some of the world's first 'underwater' photographs.

Read more about Hurley's underwater photography and see examples at [australianmuseum.net.au/blogpost/Museum/Museum/Frank-Hurley-underwater](http://australianmuseum.net.au/blogpost/Museum/Museum/Frank-Hurley-underwater)

## A TALE OF MIGRATION

Mysterious pottery pieces found from New Guinea to Samoa provide evidence for the migration of people from South-East Asia to the Pacific around 3000 years ago. Named Lapita, after an important archaeological site in New Caledonia, the pots continue to intrigue and inform debate about the settlement of the Pacific. The story of Lapita pots is just one of many fascinating tales to be found in a landmark book, *Feathers of the gods and other stories from the Australian Museum*, to be published by the Museum later this year.

Find out more about Lapita pots at

[www.australianmuseum.net.au/movie/Lapita-Pot-Reconstruction](http://www.australianmuseum.net.au/movie/Lapita-Pot-Reconstruction)

# LUDWIG LEICHHARDT

## *in Australia*



IN OCTOBER THIS YEAR AUSTRALIA AND GERMANY WILL CELEBRATE THE BICENTENARY OF THE BIRTH OF A REMARKABLE INDIVIDUAL – THE ECCENTRIC AND ENIGMATIC LUDWIG LEICHHARDT, SAYS ARCHIVIST **ROSE DOCKER**.

He became a legend in Australian history for his voyages of exploration and spectacular disappearance without trace while crossing the Top End in 1848, but Ludwig Leichhardt's legacy to Australian science and its early development is just as intriguing and enduring.

In January 2013, Foreign Minister Bob Carr announced that the Alexander von Humboldt Foundation would award Ludwig Leichhardt bursaries to two Australian researchers to undertake work in Germany. These represent the culmination of a seed of scientific collaboration planted by the 28-year-old Prussian naturalist 170 years earlier – when his feats of exploration and collection left a trail of inspiration spanning two continents.

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**Above**

Leichhardt gave the Museum two specimens of the Spectacled Hare-wallaby, *Lagorchestes leichardti* (now *Lagorchestes conspicillatus leichardti*) in 1846. Illustration by John Gould, *Mammals of Australia*. Photo by Stuart Humphreys. Australian Museum Research Library 799.



*“Doctor’ Leichhardt, as he came to be known, was a magnet for science enthusiasts”*

#### ARRIVAL

Leichhardt arrived in Australia in 1842. Well travelled and university educated but without formal degrees, great wealth or high connections, he possessed a large collection of books, a small collection of rocks and minerals and a blazing determination to explore the Australian continent to its very centre. 'I have become my own geologist, botanist, woodcutter, tree feller, cook, washerwoman, groom and plant drier', he wrote.

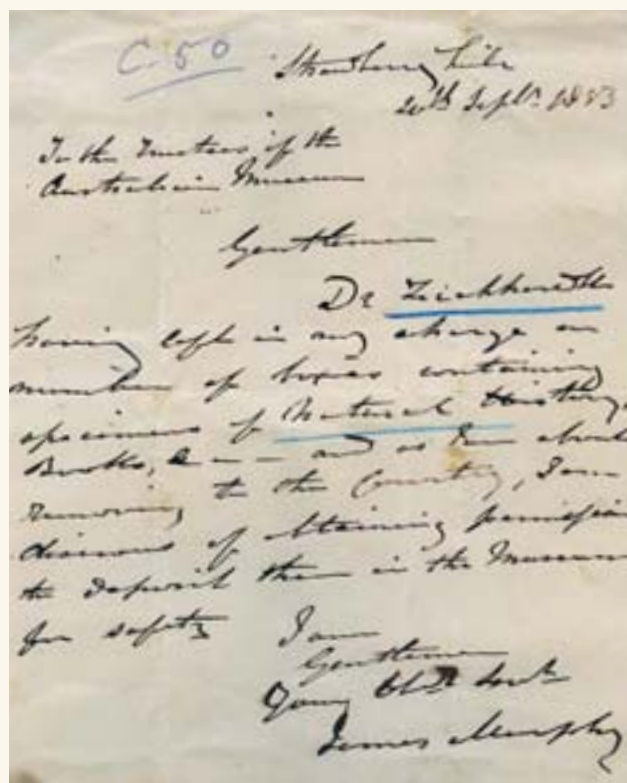
He soon contacted the Secretary and Curator of the recently established Australian Museum, William Branwhite Clarke, boasting of the collections he and a friend, Lieutenant Lynd, had already amassed, '... botanical collections ... a considerable number of shells, birds, some reptiles, and if we go on in the same rate will soon create a new Australian Museum'.

The Museum was then little more than a single room in the new Court House at Woolloomooloo, opened to the public only on Wednesdays and with a sparse array of specimens. Science collection and research activities in the colony were in their infancy. As perhaps the colony's best-educated scientist at that time, the multilingual 'Doctor' Leichhardt, as he came to be known, was a magnet for science enthusiasts.

One admirer, Alexander Walker Scott, later Chairman of the Museum Trust, invited the Doctor to his home at Ash Island near Newcastle. Amazed by the abundance of its zoological and botanical beauty, Leichhardt remarked 'perhaps – I'd be content to live and die there ...' For Scott's young daughters Helena and Harriet, who would go on to become renowned scientific illustrators, this must have been an inspiring visit.

#### FAME

In 1845, Leichhardt, supported by donated goods and finances and a small group of men, completed his first pioneering voyage of exploration from Moreton Bay (Qld) to Port Essington (NT). Among the party was John Gilbert, official collector for the famous English naturalist and artist John Gould. Despite the incredible hardships of the 14-month expedition, the two scientists collected voraciously and recorded detailed scientific observations as they went.





#### Opposite top

Entomologist Alexander Walker Scott described and named this moth, *Milocephala* (now *Ptilocephala*) *leichhardtii*, after the German explorer. Illustration by Harriet Scott. Photo by James King. AMS 193\_23

#### Opposite bottom

Leichhardt's friend James Murphy deposited Leichhardt's relics at the Museum in 1853, where they languished for a time until Curator Gerard Krefft resurrected and displayed them with the prominence he thought due such a scientific luminary. Photo by James King. AMS7/IN53

#### Left

Ludwig Leichhardt, illustration by W Baker.

In 1846, the Australian Museum Trust heard that Dr Leichhardt 'had collected and presented' to the Museum various natural history specimens. Two of these, specimens of hare-wallaby, were presented by Leichhardt but collected by Gilbert. Extant in the Museum's collections today, they were used by John Gould to describe a new species.

Gilbert unfortunately perished on the Port Essington expedition, but Leichhardt sent many of his other collected specimens back to Gould, who dominated Australian ornithology from 1837 until his death in 1881. Gould owed much of his research collections to the industrious efforts of collectors like Gilbert and Leichhardt.

Returning to Sydney after the Port Essington expedition, a remarkable journey of scientific discovery, Leichhardt was embraced as a hero. He was certainly the most famous man on the continent and news of his achievements would reverberate internationally. Europe was excited by the prospect of the scientific riches apparently still for the taking around the Pacific. In the decade following Leichhardt's final foray, the Austrian Novara Expedition – the first large-scale, global scientific mission – docked in Sydney. During their month here, members of the scientific contingent visited the Museum and exchanges of zoological and ethnographic material were planned and scientific observations shared.

#### LEGACY

Also following in Leichhardt's wake were several of his countrymen who would make a mark on the development of the natural sciences in the colony. Gerard Krefft, soon to be Curator of the Australian Museum, joined William Blandowski on an expedition of discovery to the Murray and Darling rivers in 1857. Traversing rugged terrain and collecting along the way, they must have appreciated the great significance of Leichhardt's earlier mission.

Krefft became a life-long admirer of Leichhardt and in the 1860s established a public display of 'Australian Relics' in the Museum featuring the explorer's personal effects, including his passport, university notes, diaries, family bible and the original manuscript of the famous *Overland Journey to Port Essington*. In a letter to a newspaper in 1881, Krefft wrote 'I do not think any person living knows as much about Leichhardt as I do'.

Under Krefft's guidance, the Museum began to build an international reputation as a scientific establishment. He introduced a program of regular specimen exchanges with institutions all over the world and in the succeeding decades of the 19th century the Museum's links, particularly with German institutions and individuals, flourished.

Leichhardt's disappearance in 1848 acted as a catalyst for other journeys of exploration. In Melbourne for example in 1865, the famous German-born botanist Ferdinand Von Mueller suggested that it would be 'an eternal stigma on the history of Australia' if the fate of the lost explorer was not resolved. He encouraged 'a union of eminent Victorian ladies' to take up the fundraising cudgels, and funds were sought and raised in Leichhardt's name. Over the years, various expeditions of Leichhardt seekers would eventually arrive back with little or no trace of their quarry but armed with scientific observations and zoological and botanical specimens which greatly enriched the natural history knowledge of the colony.

By 1917, the immediate memory of Leichhardt's valuable explorations was beginning to fade. Most of his remaining personal effects were transferred from the Museum to the Mitchell Library in Sydney. Today the Museum's Research Library holds eight volumes of Leichhardt's personal book collection and they are currently on display in the Museum's Atrium along with the hare-wallaby specimens.

As an 'itinerant preacher' giving public lectures at the School of Arts in Sydney in 1842, Leichhardt encouraged his audience to expand their horizons and 'think about more than making money'. In the end he may have expanded his own horizons a bit too far – but what an enduring legacy to Australian science he left in the process.

ROSE DOCKER ARCHIVIST

*See Leichhardt's possessions on display in the Museum, ground floor, until 3 November.*

# THE YEAR OF THE



# polychaete



FOR THOSE WHO REMEMBER, 1983 WAS THE YEAR OF THE ASH WEDNESDAY BUSHFIRES, DAVID BOWIE'S *SERIOUS MOONLIGHT* AUSTRALIAN TOUR AND BOB HAWKE'S LANDSLIDE ELECTION VICTORY.

For a select few, however, it was the year of the inaugural International Polychaete Conference, when more than 90 biologists from 18 countries descended on the Australian Museum for a marine worm talkfest.

'It was really exciting to be getting together with colleagues from all over the world for the first time and to focus specially on polychaetes', remembers Dr Pat Hutchings, a senior principal research scientist at the Australian Museum.

## DIVERSITY

Pat is a systematist who describes, classifies and names the organisms we share the planet with. 'Back in 1983, the research techniques were pretty basic, just looking at species under a microscope and describing them.'

Thirty years on, Pat has had no trouble convincing the organising committee to return to the Museum for the 11th triennial International Polychaete Conference (known as IPC2013).

'Today we use the latest techniques in molecular biology and scanning electron microscopy (SEM) to work out where worms have come from and which groups they are related to – not an easy task given the limited fossil data for these soft-bodied animals.'

Nearly 5000 new species of polychaetes have been described since the first conference – many of them by Pat and her colleagues at the Museum and other Australian institutions – doubling the number of known species to around 10,000 species today.

'Increasingly we are finding that many widely distributed species actually represent suites of species, so the true diversity is even higher than that', Pat said.

Improved knowledge is not the only thing that's changed in the world of polychaete taxonomy – some of the students from the first conference are returning this year as senior scientists and even professors.

'In the case of one of the plenary speakers, I taught him as a student to dive in China in the early 1980s', Pat said. 'But a really exciting shift is that scientists are no longer just talking among themselves. This year's conference has a whole program of events where we're reaching out to people who need to know more about marine worms – which of course is everybody!'

## POLYCHAETES FOR THE PEOPLE!

The conference program includes a special evening where Australian Museum Members can find out more about polychaetes and meet the scientists (details, page 36).

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Dr Pat Hutchings, Senior  
Principal Research Scientist.  
Photo by Stuart Humphreys.



Fireworm, *Eurythoe complanata*, a complex of species found on coral reefs in the Indo-Pacific. If handled, the bristles break off exposing poison glands that cause allergic reactions in some people. Photo © Roger Steene.

## A CHEAT'S GUIDE TO POLYCHAETES

Become an armchair expert with these key facts about polychaetes.

Polychaetes are multi-segmented *annelids* (worms) with *parapodia* (small leg-like structures) for locomotion and often with *tentacles* for feeding or *branchial radioles* for feeding and breathing.

The name 'polychaete' is derived from the Greek meaning 'having much hair' (referring to the *chaetae* or bristles found on many species). Polychaetes are:

- pronounced 'polly-keets'
- the most common benthic (bottom-dwelling) marine animals (both species and individuals)
- mostly less than 10 centimetres long, but some species can reach 3 metres
- found in estuaries, inshore waters, the open sea and the deep ocean.

### WEBLINK >

Find out more at [www.ipc2013.com.au](http://www.ipc2013.com.au).

'We're also holding a workshop about how to identify invasive marine worms for non-specialists like fisheries staff, quarantine officers and port authorities', Pat said.

'Early detection is paramount because invasive worms transported by cargo ships, either as hull fouling organisms or in ballast water, have the potential to devastate our fisheries, aquaculture and tourism industries.

'The workshop will use the new digital identification guide we've developed with financial support from the Australian Museum Foundation.

'There'll even be a photographic display in the Museum Café highlighting the incredible colour, beauty and diversity of polychaetes.'

Pat has lost none of her passion for polychaetes since 1983. 'People in government need to know that polychaetes are very important animals that provide essential ecological services', she said.

'Some species process organic matter from the water or mud that would otherwise just accumulate. They convert this material into biomass to be consumed by fish and other predators. If it wasn't for polychaetes, our harbour would be a rotting, stinking mess.

'Certain polychaetes are also sensitive biological indicators of pollution and we can tell how healthy a marine environment is, just by seeing which species are present.'

### PROGRAM

This year's conference shows just how slick and professional marine science has become. For early-career scientists and students, there are pre-conference

workshops in photographing polychaetes and preparing material for SEM.

For taxonomy tragi-comics, there's a one-week course in the Philosophy of Biological Systematics funded by the Australian Bureau of Resource Sciences and presented by another alumnus from the class of '83, Dr Kirk Fitzhugh from the Los Angeles County Museum.

There's even a two-week taxonomy blitz at the Australian Museum Lizard Island Research Station to sample coral reef habitats and discover just which polychaete species are fuelling the reef's fragile ecosystem.

'Most of the material collected and identified during the Lizard Island workshop will come to the Australian Museum, which has the largest worm database and collection in the world', Pat said.

'Our understanding of polychaetes has certainly come a long way since I saw my first polychaete in the 1970s.

'We've been able to secure financial support for a number of students and early career researchers to attend this year's conference, thanks to the Australian Museum and the CSIRO's Wealth from Oceans Flagship.

'It is incredibly pleasing to see a new generation becoming interested in this fascinating group of animals and to be able to inspire some non-scientists with polychaetes!'

Thirty years on, David Bowie is back in the charts and another Federal election looms.

BRENDAN ATKINS EDITOR

Find out more about polychaetes at the special Members' seminar (details, page 36).

**Below**

A Goliath Stick Insect, *Eurycnema goliath*, hangs out in the animal house. Photo by Stuart Humphreys.

# *it's* ALIVE!

NOT ALL ANIMALS IN THE MUSEUM ARE STUFFED OR PICKLED, AS INTERN **NADIYE CICEK** DISCOVERS.



Don't expect live tigers anytime soon, but the Australian Museum has quite a collection of live animals on display – if you know where to look.

'Surprisingly, museums have been keeping live animals for a long time', says Chris Hosking, one of the Museum's interpretative officers. 'Some of the information we have about egg-laying and other biological processes were discovered by scientists keeping animals in the Museum.'

For some, the idea of live animals in a museum may seem odd, but the Museum's collection has grown to more than 50 species, thanks to the efforts of Martyn Robinson and others over the years. With a passion for things that creep and crawl, Chris was more than happy to show me around the live collection in the Museum.

**ON DISPLAY**

The Museum has three areas where visitors can see live animals on display. '*Surviving Australia* is where we have the majority of them', said Chris. 'They include freshwater crocodiles, lizards, frogs, marine invertebrates and a python!'

*“we can use live animals to create those lasting memories and get a message across”*

**Right**  
Interpretive Officer  
Chris Hosking wrangles  
a Freshwater Crocodile,  
*Crocodylus johnstoni*.  
Photo by Stuart Humphreys.

‘Also on Level 2 is *Search & Discover* where you can interact with stick insects (and maybe take a selfie or two!) and *Kidspace*, where the kids can interact with green tree frogs and hermit crabs.’

Chris is at pains to point out that the Museum still needs to collect ‘dead things’.

‘Sometimes people discount the Museum as a place of dead things. They forget that we’re not collecting them because we like dead things but because we need a record of what’s out there so we can help conserve it. Where it is relevant, we can use live animals to create those lasting memories and get a message across.’

Some of the creatures in the Museum’s care are quite rare. ‘One of my favourite animals that we have at the moment is the Crucifix Frog, *Notaden bennetti*, and these are kept in captivity in only a few places!’

#### BEHIND THE SCENES

The Museum recently established a new behind-the-scenes room for its expanding live collection, with areas for housing the animals when they’re not on display, preparing food, a workbench and all the other bits and pieces for developing displays.

‘The area is as natural as possible’, said Chris. ‘It has fluctuating temperatures and natural lighting as well as the background noise of chirping crickets, which we breed as live reptile food.’

The off-exhibit collection at the Museum began humbly, with just a cage or two on Chris’s desk. From there, a small office became home to the live collection and with further expansions the move to a new facility was needed.

Chris works hard to make sure that all the animals’ needs are met, and he enthusiastically describes the collection as ‘what gets me up in the morning’.

‘In designing the new animal room, we had to look critically at the needs of the animals and ensure it met all requirements for workplace health and safety, and animal ethics.’

The new room is a step in the right direction for Chris who dreams of developing the area into a self-sufficient and accommodating space for possible future exhibitions.

#### SURPRISE!

Chris said that most people get a small shock when they see live animals in the Museum setting. ‘People are surprised to see them. This is a powerful mechanism [for educating visitors] and people are more likely to remember things with surprise rather than something that fulfils an existing template.

‘Some don’t believe that the creatures on display are real and are left wondering. A typical comment from visitors meeting a freshwater crocodile in *Surviving Australia* is, “It’s a museum – they wouldn’t have a real one ... would they?”’

If you haven’t seen the live animal displays make sure to pop into the Museum with the family and take a look. You never know what you might find!

NADIYE CICEK INTERN, SCIENCE COMMUNICATION

#### WEBLINK >

For more information about caring for reptiles visit [www.australianmuseum.net.au/Live-Exhibits](http://www.australianmuseum.net.au/Live-Exhibits).

## CHRIS’S TIPS FOR BUYING A REPTILE

Licensed pet shops in New South Wales can now sell certain lizards, snakes and turtles. But before you buy a scaly pet, do your research!

**Why choose a reptile?** Reptiles are amazing animals, but think about it – they make very different pets to cats or dogs!

**What’s your commitment?** Any pet needs your commitment to care for them, and some reptiles can live for decades.

**Where will you keep it?** Reptiles need proper housing, heating and lighting. How much space will it need? How big will it grow?

**What does it eat?** Where will you get a continuous supply of live crickets, mealworms or frozen rats?

**Where’s the vet?** Reptile vets are not common and can cost more than other vets. Where can you take your reptile if it becomes sick or injured?

**What to look for** Only buy from a licensed supplier, not online. Does it (the animal, not the supplier) have all its toes (unless it’s a snake!), an intact tail and a generally healthy look?

**You need a licence!** For details, visit [www.environment.nsw.gov.au/wildlifelicences/ReptileKeepersLicence](http://www.environment.nsw.gov.au/wildlifelicences/ReptileKeepersLicence)



# the koala genome PROJECT

MAPPING GENOMES UNLOCKS  
CRUCIAL INFORMATION FOR  
BIOLOGISTS, BUT WHAT IS A  
GENOME AND HOW DO YOU  
MAP IT? **MAXINE KAUTER**  
EXPLAINS.

I once heard someone say, 'Asking what genomes are is like asking what megabytes are. We know they're important, but it's tricky to explain.'

As humans, *Homo sapiens*, we all essentially share a genome. Largely because of the Human Genome Project, we know they are very complicated things. I became fascinated with the concept of the genome earlier this year when the Australian Museum announced it had begun sequencing the Koala genome with research partners at the Queensland University of Technology (QUT). I'd never been so close to a Koala or its genome before and it sent me on a quest to discover more. Fortunately I've been able to quiz Museum researchers like Rebecca Johnson, Head of the Australian Centre for Wildlife Genomics at the Museum, and Andrew King, one of our technical officers in the Centre, to come up with some answers. What will it mean to have mapped it? How do we map it? And what does it have to do with museum science?

The Koala Genome Project makes the Museum the first institution in the world to have the Koala genome. In some ways it might seem strange that a museum would engage in this kind of work, but really, the use of genomics is a perfectly logical extension of museum science, which seeks to describe the natural world; genomic analysis is simply a method of deepening those descriptions. Thorough, accurate descriptions can only lead to more effective strategies for conserving threatened species like the Koala. In essence, mapping the genome is a way of describing a species at the molecular level.

## GENOMICS – A NEW LANGUAGE

Describing a species by mapping its DNA is a relatively new language. Since the double helix structure of DNA (deoxyribose nucleic acid) was famously discovered 60 years ago by James Watson and Francis Crick, its potential as a language for understanding biological processes has become widely recognised and embraced. By 1988, the Australian Museum had formed the Evolutionary Biology Unit, a forerunner of the Australian Centre for Wildlife Genomics, joining a growing number of natural science museums investigating the use of molecular biology for understanding their collections.

Late last year, the Museum formed a partnership with QUT to map the Koala's genome. A genome is a unique code that describes each species at a molecular level. It varies in length between species, and researchers suspect that the Koala's is around 3 billion characters long – about the same length as the human genome.

To read the code, our scientists first had to find a fresh Koala specimen and extract its organs for analysis. To do so ethically, the Museum partnered with the Port Macquarie Koala Hospital, which cares for injured and diseased koalas, and it was from one of these terminally ill animals that the necessary tissue was extracted for sequencing.

### Opposite

A taxidermied Koala, *Phascolarctos cinereus*, from the Museum collection keeps watch in the DNA laboratory. Photo by Stuart Humphreys.



*“it was vital to collect the tissues promptly and preserve them by snap-freezing in liquid nitrogen”*

DNA and especially RNA (ribose nucleic acid, another type of genetic material needed for the analysis) begin to degrade within minutes of an animal's death, so it was vital to collect the tissues promptly and preserve them by snap-freezing in liquid nitrogen. The frozen tissues were then transported to the Museum where the process of extracting the DNA began.

Attempting to map a genome 3 billion characters long is not a simple task. First, scientists prepare many copies of the genomic DNA, which at this stage is like a giant street directory with no place names or page numbers! They then cut the DNA into small pieces of varying lengths, some as small as 200 characters long, producing some 600 million pieces of data – much like separating the street directory into pages.

Specialist number-crunching scientists called bioinformaticians then re-assemble these pieces into their correct sequence using powerful computers to map the genome. The method relies on matching the overlapping sections of each sequence, just as adjacent areas in a street directory have overlapping areas between pages. This is the complicated and time-consuming process that is currently underway at the Museum. Eventually our scientists will be able to use the map to identify particular genes (the basic units that code for all of the Koala's characteristics), like finally being able to put names on the streets and suburbs.

#### **FIRST FINDINGS**

Assembling the genome will take some time, but we already have a large quantity of useful data. For researchers looking into diseases affecting the Koala, genes have been identified which could give scientists insight into why some populations, such as those in New South Wales, suffer from chlamydia and the Koala Retrovirus while others (in Victoria for example) are less affected. Other genes might tell us how the Koala is able to eat otherwise-toxic Eucalyptus leaves.

Understanding these processes at the genetic or molecular level will eventually assist with the development of conservation plans and strategies to preserve Koala populations. The data produced by the Koala Genome Consortium will be made freely available to researchers around the world. It is this kind of access to species-level information that is the core business of research here at the Australian Museum, and genomic sequencing aligns perfectly with that purpose.

#### **WHAT NOW?**

Contemporary genomics is a long way from *Jurassic Park*-style fantasies of unleashing prehistoric organisms onto the world. We may not be able to re-create a dinosaur, or clone your favourite animal, but the study of genomes offers hope for the preservation of many native threatened or endangered wildlife species.

**MAXINE KAUTER** PROJECT COORDINATOR, RESEARCH AND COLLECTIONS

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## **SUPPORTING THE KOALA GENOME PROJECT**

The Koala Genome Project is a joint initiative of the Australian Museum and QUT and is funded by the Australian Museum and its Foundation and Bioplatforms Australia.

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# on the RECORD

## EUREKA PRIZES SHORTLIST

Over one thousand entrants are competing in this year's Australian Museum Eureka Prizes for 17 awards that recognise outstanding achievement in science, from research and leadership to school science and communication. Stay tuned for the shortlist for this year's awards, to be announced on 2 August ahead of the Award Dinner on 4 September.

Follow the Eureka's at [www.australianmuseum.net.au/eureka](http://www.australianmuseum.net.au/eureka)

## SCIENCE UNLEASHED!

Celebrate National Science Week with the Australian Museum Science Festival. Activities begin on Saturday 10 August, with workshops, talks and interactive shows to unleash your family's inner scientist. The fun continues with science workshops for secondary schools (13–15 August) and primary schools (20–22 August), followed by a regional tour to Bathurst and other centres in November.

For full program details and bookings, visit [www.scienceunleashed.net](http://www.scienceunleashed.net)

## EUROPEAN FANWORM IN BOTANY BAY

Australian Museum staff have recently detected the European fanworm, *Sabella spallanzanii*, in Botany Bay, NSW. This invasive filter-feeding tube worm, originally from Europe, is thought to be distributed by cargo ships and recreational vessels. 'The European fanworm has the potential to alter native marine ecosystems and compete with native organisms for food and space', said the Museum's Anna Murray.

'In high densities it can impact aquaculture operations as a nuisance fouler and by competing with cultured filter-feeding species such as oysters and mussels.' The NSW Department of Primary Industries has classified the species as a reportable marine pest and is evaluating risk and control options for this latest discovery.

Read the full paper: A Murray & SJ Keable, 2013. First report of *Sabella spallanzanii* (Gmelin, 1791) (Annelida: Polychaeta) from Botany Bay, NSW, a northern range extension for the invasive species within Australia. *Zootaxa* 3670 (3): 394–5, available online at [dx.doi.org/10.11646/zootaxa.3670.3.10](https://doi.org/10.11646/zootaxa.3670.3.10).



### Above

Trevor Atkinson from Jollybops brings chemistry alive for brothers Emanuel (left) and Seth (right) at the Australian Museum Science Festival. Photo by Carl Bento.



# *from detention to* **REDEMPTION**

WHEN YOUNG PEOPLE LOSE TOUCH WITH THEIR TRADITIONAL CULTURAL VALUES, IT CAN SPELL TROUBLE. THE SOLUTION? RECONNECT THEM WITH THEIR CULTURE, SAYS THE MUSEUM'S **THELMA THOMAS.**

The Museum's Pacific Youth Reconnection Project began in 2009, when a working partnership was established with the NSW Department of Juvenile Justice in Fairfield.

The project aims to bring 'at-risk' young people from Pacific communities to the Museum to interact and reconnect with one of the world's most significant Pacific cultural collections and to encourage cultural awareness among young people from Pacific communities across the state.

'Yeah, if they don't know anything about their culture or they wanna learn about another culture, it's probably the best place to go ... just to get more knowledge about where they're from, where they came from and their ancestors and stuff.'

That's Billy [not his real name] speaking, a young Maori visual artist from Western Sydney, talking about the Australian Museum. Billy came to the attention of authorities when he was just 16 and ended up serving time at the Frank Baxter Detention Centre in Kariong. Billy was selected for the pilot program and over a six-month period visited the Museum's Pacific collections, where he gained cultural knowledge under the mentorship of Cultural Collections Manager Dion Peita and the Cultural Collections team.

'Yes it helped me a lot. I talk about it with my mum all the time and umm, yeah she's ... like when I brought home pictures

of [cultural objects], she kinda tripped out 'cos she hadn't seen these in a while', Billy said.

'She knew what they were and yeah ... she's seen that *patu*, the big one, the green one, and she told me more about my *pounamu* and my *tai ha* that my uncle gave me and yeah stuff about the family and tribes.'

## **DIASPORA**

Billy is just one of more than 400 people who have benefited from the project to date.

'The knowledge can help them think about their own culture and ... just connect more with their family ... 'cos their family would know more about [their culture]', Billy said.

The project ramped up in September 2012 when the Vincent Fairfax Family Foundation and the Australian Museum Foundation provided funds to enable a new project officer – yours truly – to take the program forward. And it's continuing to develop new initiatives aimed at connecting marginalised young people from the Pacific diaspora with the Museum's cultural collections.

The program has grown from on-site visits and tours of the collections to include outreach initiatives, community events and workshops. Participants attend workshops to gain skills such as weaving, airbrushing

**Left**  
Thelma Thomas and Billy  
in the Museum's Pacific  
store. Photo by Carl Bento.



## CULTURAL COLLECTIONS MANAGER WINS AWARD FOR PACIFIC YOUTH RECONNECTION PROJECT

Dion Peita, Cultural Collections Manager, recently won the Institute of Public Administration Australia Award for individual excellence, collaboration and partnerships for his work with the Pacific Youth Reconnection Project.

To date, the project has worked with Frank Baxter Detention Centre and Reiby Detention Centre to run cultural and creative workshops for young men in detention, and it stays relevant through a Youth Reference Group.

'These workshops are a great example of how different stakeholders can work together to support and engage with marginalised Pacific young people, utilising traditional knowledge and innovative methods', said Dion.

### Above

Dion Peita with Sue Leahy, a principal consultant with award sponsor ARTD Consultants. Photo courtesy IPAA.

Pacific designs inspired by the collections and traditional dance like the 'haka'. Many of these activities are designed and presented by the Cultural Collections team, with advice from a project reference group of students and ex-offenders.

'The reference group makes sure that we are providing initiatives and projects that are relevant to Pacific young people, and its members bring a diverse range of knowledge and life experiences', said project founder Dion Peita.

The reference group includes Billy, who joined on his release from detention and now helps plan the project's activities and run workshops. Billy incorporates cultural motifs into his art as part of his visual expression and has completed a triptych of artworks (etchings) featuring a fully carved Maori warrior face and Maori patterns that symbolically express his journey.

'My artworks are three pieces ... the first one is of a Maori face side-on with a *moko*, and he had a *ta kowhaiwhai* [a motif that represents growth] coming out of his mouth, which to me symbolises the breath of our ancestors.'

Even though he didn't say much about the artworks, it was quite evident how much effort Billy applied and how significant it was in expressing his life journey to date, a journey that Dion interprets as 'potential, conflict and enlightenment'. Billy is now set to undertake an apprenticeship in graphic design.

### COMMUNITY

The Pacific Youth Reconnection Project works because it engages not just young people, but community organisations and juvenile detention centres. A recent project at the Reiby Detention Centre used music and cultural collections to reconnect with young people, and involved community groups like Mission Australia's South West Youth Peer Education, the

South West Multicultural and Community Centre at Minto, and the NSW Council for Pacific Communities (SWSRAC).

Young people typically say that seeing objects from the collection reminds them of 'being at home and spending time with family'. Connecting with the communities that these young people return to is vital, and the project team travels to festivals – the Pacific Unity festival, Fiji Independence Day celebrations and Waitangi Day celebrations – with pop-up stalls to showcase the artefacts, talk about the workshops and network with community members and organisations.

The project team is also exploring potential synergies with other organisations, such as the University of Western Sydney's Pasifika Achievement to Higher Education (PATHE) group, which is all about engaging and encouraging students from Pacific backgrounds in their pursuit of higher education and vocational training goals. At these events, we set up displays of Pacific artefacts and talk to the young people and their families about the project while networking.

The project is quite diverse in its engagement and delivery methods. At this stage it is about trialling different things and evaluating what works and what doesn't. For me, one of the highlights is the opportunity to work with the Youth Reference Group to assist with the projects.

It is also rewarding to witness the reactions to the collections when young people interact with artefacts created by their ancestors and realise that they had the knowledge and skills to create objects that have survived for hundreds of years. Perhaps they too could harness, tap into or gain these skills and knowledge.

For me, this is what it is all about.

**THELMA THOMAS** YOUTH WORKER, CULTURAL COLLECTIONS AND COMMUNITY ENGAGEMENT

Send your query to the *Search & Discover* team, email [sand@austmus.gov.au](mailto:sand@austmus.gov.au)

# search > DISCOVER



**Q.** *I think I've found a meteorite, but how can I be sure?*

There are three simple tests you can use to tell a meteorite from a rock. First, is it magnetic? The high iron content of most meteorites means they will be magnetic. Second, is it heavy? Many meteorites are denser than ordinary rocks, and so feel heavy for their size. Third, does it have a crust? Most meteorites have a fusion crust, a thin coating of black glassy material, like the glaze on ceramic ware. If the answer to all three questions is 'yes', it's worth seeking a professional opinion from a Museum scientist. Unfortunately, most of the suspected meteorites we see in *Search & Discover* turn out to be slag or some other by-product of smelting; we call these meteor-wrongs.

MELISSA MURRAY

See some real meteorites on Level 1 of the Museum, just outside *Planet of Minerals*.



**Q.** *Someone sent me this photo, but is it real or fake?*

It is real! The snake is a Diamond Python, *Morelia spilota spilota*, and its diet consists of small mammals and birds, and the larger the python the larger its prey. Large pythons are known to eat possums, cats, dogs, pigs and even larger animals. They are known for their ability to ambush prey. The python holds the victim with its teeth, then coils its body tightly around, crushing the prey to death, a technique called constriction. After swallowing the prey whole (thanks to an expandable jaw), digestion can take from days to weeks, depending on the size of the meal. So it looks like this crafty python has caught itself a possum that should last a few weeks at least.

JAYME-ANN DEMENY



**Q.** *This unusual fish was found on a beach on Lord Howe Island. What is it?*

This is a Longnose Lancetfish, *Alepisaurus ferox*. Except its smaller fin and fangs, the lancetfish resembles a sailfish. Rarely caught by recreational fishers, it is common in the by-catch of commercial fishing operations. However, its soft, spongy flesh makes it inedible, so it is usually discarded at sea.

The species grows to 2 metres in length and feeds on other fishes, cephalopods (such as cuttlefish and squid) and crustaceans (shrimp). It is known to occur from the surface (at night) to depths of at least 1800 metres. Like many deep-sea fish species, its swim bladder is filled with oil rather than gas; oil compresses less under pressure allowing the fish to maintain neutral buoyancy at greater depth. Little else is known of the biology of the species, but it does have well-developed eyes.

SALLY READER

Meteorites are extremely important to science because they help us to understand the origins and composition of the solar system. Photo by Carl Bento.

A Diamond Python with possum.  
Photo © Roger Springthorpe.

The Longnose Lancetfish can move between the sea surface and ocean depths. Photo © Jimmy Maher.

MARTYN ROBINSON  
IS THE MUSEUM'S  
RESIDENT NATURALIST

# SAVING THE WORLD



**Above**  
The Northern Gastric Brooding Frog, *Rheobatrachus vitellinus*, was known from only one area in central Queensland and is now considered extinct. Photo by G Jenkins.

Sometimes people will say, when I am telling them about the plight of some animal or plant facing extinction, 'Does it really matter if a species goes extinct? After all, so many other animals and plants have already gone extinct and we're still OK.'

Well it is probably the case that less than one per cent of species that have ever existed are with us today. But maybe we're not OK, and sometimes we'll never know whether it matters. Here's one example where it does matter.

People undergoing major abdominal surgery often need particular medicines to turn off the digestive processes and others to restart their system. Prostaglandins are a class of compounds that can turn off the production of digestive acids, while caerulein is one that can be used to start up peristalsis and get the gut working again.

Interestingly, both compounds are produced by species of Australian frogs. To deter predators, the skin of the Green Tree Frog, *Litoria caerulea*, produces a compound from which caerulein is derived, and gastric brooding frogs in the genus *Rheobatrachus* produce a non-digesting prostaglandin that turns off the frog's digestion to enable its tadpoles to develop safely in the maternal stomach.

At least, it used to. While the Green Tree Frog is still found in good numbers, both species of gastric brooding frog are now thought to be extinct for reasons likely

to include destruction of its mountain-stream habitat, infection with the chytrid fungus, and perhaps even climate change – yet they were only discovered in the 1970s.

What is more, these two species were very likely to have produced different prostaglandins with different useful medical properties for humans. So any further development of their beneficial properties has been lost because we allowed them to go extinct (though watch this space as university researchers are attempting to resurrect one of the species by cloning).

Frogs are not alone in producing biological compounds that can save or improve human lives, and big business invests millions in the search for, and discovery of, new, naturally occurring pharmaceutical compounds each year – a process known as bio-prospecting.

So from a selfish, practical point of view it seems silly and short-sighted not to try to prevent extinctions. There are other arguments of course for preventing more species from going extinct as a result of our actions. The one I like best is aesthetic – all humans seem to need other forms of life and a healthy environment around us in order to feel happier and more at ease (just look around your office or home for potted plants, pets or pictures of the natural world!).

We need to embrace biodiversity. It is humbling to remember that humans are just one species and that we too will become extinct one day.

# A GOANNA'S BITE RECURS

**Right**  
Spotted Tree Monitor,  
*Varanus scalaris*.  
Photo by Allen Greer.



We used to believe that the only venomous lizards were the Mexican Beaded Lizard and Gila Monster of southern USA, but now we know better.

In Australia, bush lore had it that a goanna's bite would take ages to heal and then re-open on the anniversary of the bite. It turns out that neither of these beliefs is strictly correct.

The bites of goannas, other monitor lizards and some other lizards were known to swell and sometimes become infected, but people thought this resulted from bacterial infection caused by the goanna's dirty teeth and diet of carrion.

While possibly true for many monitor lizards (including goannas), it was less likely for others, like the dragon lizards, which feed largely on fresh insect prey and sometimes vegetation. A number of people had questioned this paradox, but the prevailing view was the same: bacteria!

Then one scientist – Dr Bryan Fry from the University of Melbourne – happened to be on hand when someone was bitten by a monitor lizard. He noticed that the swelling reaction was far too rapid to result from bacterial infection, so he began to investigate. Surprise, surprise: the saliva contained toxins (venom) and, what is more, he found glands dedicated to venom production in both monitor lizards and dragon lizards too.

Suddenly the story of the goanna bite's long-term healing problems began to make sense, because there is an anti-clotting component to venom which makes wounds slow to heal. And yes this can then be a site for bacterial infection – but only after the venom has started its work.

Furthermore, the goanna's giant Indonesian relative, the Komodo Dragon, *Varanus komodoensis*, which for years was thought to kill its prey by the chancy method of biting it and then waiting for bacterial

infection to take its toll before moving in to finish it off, is now known to be the world's largest venomous animal!

'Now wait a minute', I hear you say, 'does that mean we have to watch out for lizards as well as snakes?' The answer is 'no' for the vast majority of the latter and pretty much all of the former. Australian lizards should be regarded as being just as harmless as they ever were before this feature was discovered. The amount of venom that lizards (and most snake species) can inject is far too small to be any bother to humans.

As Bryan Fry said: 'If you were a 5- or 10-gram mouse, it would be different, but the venom from a monitor lizard [or any other Australian lizard] is not going to kill a human being.'

Of course, it is best to avoid being bitten anyway as they do hurt. *Never* try to hand-feed a goanna – they don't know where the food ends and your hand begins!

# MY HEART *is in the sea*

THE MUSEUM'S **SCOTT MITCHELL** TRAVELLED TO DARNLEY ISLAND, TORRES STRAIT, TO COMMISSION A NEW ARTWORK WITH A STRONG ENVIRONMENTAL THEME.



#### Opposite

The two ghost net sculptures with artists from the Erub Erwer Meta art centre. Left to right: Emma Gela, Lynnette Griffiths, Ellarose Savage,

Racey Oui-Pitt, Ida Wano, Kapua Gutchen, Florence Gutchen, Maryann Bourne, Jimmy Thaiday, Alma Sailor and Nancy Naawi. Photo by Louisa Anson, courtesy Erub Erwer Meta art centre.

## MAKING A DIFFERENCE

If you are thinking about making a bequest, or have already made one, please contact Kate Richardson on 02 9320 6456 or [kate.richardson@austmus.gov.au](mailto:kate.richardson@austmus.gov.au).

The day had started normally enough, sitting around the artists' table at the Erub Erwer Meta art centre on Darnley Island. Chatting and laughing, the ladies were weaving together pieces of old fishing net to make a new artwork for the Australian Museum. Florence Gutchen, one of the artists, announced she wouldn't be back after lunch. Then the bombshell: she is taking some family back to Papua New Guinea, a round trip by dinghy of more than 160 kilometres across the Coral Sea.

Visiting Darnley Island, you can't help but appreciate the profound importance of the sea in community life. There are more boats than cars, fishing is a way of life, and residents speak of childhoods spent diving for pearl and trochus shells. People still maintain and use the ancient stone fish traps that line the shores of the island and, like Florence, make surprisingly long journeys in very small boats. As another artist, Racy Oui-Pitt, said to me: 'My heart is part in the land and part in the sea'.

#### GHOST NETS

The new artwork will hang in the Museum's *Surviving Australia* exhibition. It makes a compelling acquisition: Erub's colourful depictions of Torres Strait marine life bridge the Museum's dual interests in nature and culture. Their use of ghost net gives us the chance to explore the way artists are helping to address a significant environmental problem.

Ghost nets, sometimes called 'walls of death', are abandoned pieces of fishing and trawler net. Sometimes many kilometres in length, the nets float through the ocean, trapping and killing animals in their path. Ghost nets are a particular problem in far north Queensland, where ocean currents

act like a giant, toxic whirlpool dragging nets from South-East Asia into the Gulf of Carpentaria. Fortunately, Indigenous communities across the region are leading the way in fighting back against this menace. Rangers are cleaning up net by the ton from beaches across the region, and art centres are experimenting with making waste net into useful, and often beautiful, objects.

#### BEGINNINGS

Darnley Island's first experiments with ghost net began in 2009, led by the centre's dynamic advisor Lynnette Griffiths, in collaboration with Ghost Nets Australia. Their first project, making utilitarian cushions for dinghies, was not a great success. But something about the material kept drawing Lynnette and the other artists back to keep experimenting. Eventually artist Maryann Bourne made a small ghost net bag decorated with crochet and shells and, as the artists made more ghost net bags, the inspiration began to flow. For Maryann, the possibilities for using this waste product seem endless: 'Once you have ideas, it just keeps going and going'.

It is startling to see the extent to which this deadly waste material has been woven (literally) into virtually all aspects of Erub's practice. Bags, clothing, hair clips, jewellery and sculptures of anything from animals to fish traps can all be made from ghost net. Look closely and you find it in unexpected places, like traditional *dari* headdresses and in the island's signature ceramic statues of 'little people' (*kebika legiz*).

#### NEW WORK

Despite the wide variety of ghost net art being produced there, Erub is best known for its large sculptures of marine animals. Erub artists are the leading practitioners in the use of ghost net to make large

sculptural pieces, and it is one of these works the Museum has commissioned. The new work will tell a contemporary story, created by the late George Mye, about two creatures that live in the waters off Darnley Island. Garom, the rock cod, and Daima, the mud crab, gaze at each other so much they fall in love and get married. It is a much-loved local story, depicted in murals in the local primary school and the subject of its own song.

One of the striking characteristics of the Darnley Island artists is the collaborative nature of their practice. At least nine artists were working on the Museum's piece while I was there, with plans to include more artists, local schoolchildren and other community members in the following weeks. The collaboration makes it physically possible to make the large sculptural works, but it also requires much discussion. There are good-natured debates over the details: how to make the work in pieces small enough to fit on the barge; how to make Garom's tail curve like a real rock cod; should the crab wear a wedding ring?

At four metres long, the new piece will make a significant visual impact. We hope that as well as showcasing the work of Indigenous artists on Darnley Island, it will raise awareness of the ghost net issue among the many people who visit the Museum each year. How appropriate, then, that the new work will be a love story, not only the love between a fish and a crab, but the love of a community for their ocean home.

DR SCOTT MITCHELL HEAD, CULTURE, CONSERVATION AND BUSINESS SERVICES

*The ghost net project is funded by the Australian Museum Foundation through the Patricia Porritt Bequest.*

VISITORS TO THE INDIGENOUS COLLECTION STORES AT THE MUSEUM ARE OFTEN FASCINATED TO FIND A SMALL YET SIGNIFICANT COLLECTION OF TOYS FROM ACROSS AUSTRALIA, SAYS COLLECTIONS OFFICER **REBECCA FISHER**.

# LET'S *play!*



**Left**

Gourd spinning top acquired by the Australian Museum in 1905 from Walter Edmund Roth, who collected it from the Cairns district, Cape York, Qld in 1900. E013805

**Opposite**

Toy tin truck with handle from Yuendumu, NT. Made by Neville Marshall Japanangka, aged 12, and collected in 1988. E085478

**Right**

'Yakal' game made of knotted pandanus, from Cape Grafton, Qld, and acquired from Walter Edmund Roth in 1905. E013844. All photos by Finton Mahoney.



The Indigenous collection at the Australian Museum holds around 20,000 items including more than 370 toys acquired between 1885 and 1990. The different types of toys, and materials used, are interesting because they demonstrate a shift from traditional items made from carved wood, shells and other organic materials to modern examples made from recycled bits and pieces including metal, plastic and even washcloths.

**ROTH**

In 1905, the Museum acquired around 30 toys originally collected by Walter Edmund Roth, from Cape York and Channel Country in Queensland several years earlier. Roth was a physician and anthropologist with an interest in Aboriginal people. Appointed Protector of Aborigines for the Northern District of Queensland in 1889, he travelled widely and recorded various aspects of Aboriginal culture.

There are several beautiful gourd spinning tops, some of which are decorated with red and white pigment. The gourds tops have a small hole pierced in the side so that they make a whistling sound when spun. Roth also collected baby rattles made of shells; dolls made from slightly bent sticks with twine skirts; and folded, Z-shaped pandanus leaves that imitate the flight of a boomerang when thrown.

As in all cultures, toys are designed to both amuse, educate and prepare the child for adulthood. Roth observed boys and girls playing at hunting and preparing food, the boys playing with toy boomerangs, spears, woomeras and shields while the girls played with dolls, baskets and digging sticks.

He also observed them enacting family situations in Cape York:

*Playing at 'Houses', 'Grown-up', 'Marriage', etc, is in one form or another as common among black children as it is among white ones. On the Upper Normanby, the youngsters pretending to be married will build an impromptu hut, and sit contentedly within its shade; suddenly a boy rushes forward to steal a [girl], over whose possession he and the husband now make-believe to have a fight. On the Lower Tully, the boys and girls will make miniature huts ... and finally go away in couples into the scrub. It is a game often being played, but whenever the parents catch them at it they generally give them both a good smacking.'* WALTER ROTH 1902

**MCCARTHY**

Forty years or so after Roth's visit to northern Queensland, a team of Australian and American scientists spent several months in the then little-known Arnhem region, Northern Territory (NT), studying Indigenous people, wildlife and the natural environment. The 1948 American Australian Scientific Expedition to Arnhem Land collected around 900 ethnographic objects, including more than 230 toys.

During the expedition, Museum anthropologist Frederick McCarthy collected 30 or so shell dolls at Hemple Bay, Groote Eylandt. While most are unornamented conical shells, several were wrapped in fabric. According to McCarthy, these were used by both boys and girls to represent the different members of their families and were moved about in various groupings. The larger shells represented the parents, while the smaller ones were the children. The shell dolls are similar to different-sized eucalyptus leaves in the collection from Yuendumu (NT), which children would arrange differently to represent various social groupings.

Also collected by McCarthy were 192 string figures from Yirrkala, which were largely used for amusement, but also ceremonial purposes. Different designs or patterns were created on the hands of the maker, usually a woman, with a looped piece of string. Each figure represented something different, including people and their activities, weapons, ornaments, animals and the natural environment, and were given different names.



### MODERN TOYS

There are some interesting modern toys in the collection which demonstrate the resourcefulness of children in remote regions of the country. These use various recycled materials and include several toy 'motor cars' and pull-along toys from Western Australia and the Northern Territory, made from metal tins filled with sand and held together with wire or fishing line and sometimes with a wooden handle. There are others made from broken toys on string, lids from metal flour tins used for target practice in Kintore (NT) and a ball from Ngaliyibama (NT) made from old 'chux' cloths tied into a cube shape with nylon rope and cassette tape.

While there are differences in the toys and games used in different areas of the country by Indigenous children, they all served the same purpose: to amuse and to educate. Kids of all heritages will always find enjoyment in toys, whether they are carefully and beautifully made, or quickly created from discarded materials. In this sense, our Indigenous toy collection is a wonderful snapshot of the changing nature of childhood from the late nineteenth to the twentieth century.

REBECCA FISHER COLLECTIONS OFFICER

### WEBLINK >

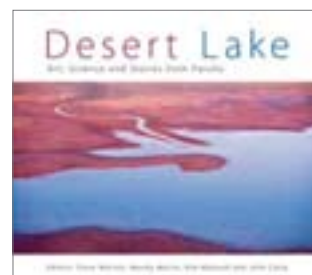
For further information and photo galleries, visit [www.australianmuseum.net.au/explore-magazine](http://www.australianmuseum.net.au/explore-magazine).

### Further reading

WE Roth, 1902. Games, sport and amusements of the Northern Queensland Aborigines, *Report of the Ninth Meeting of the Australasian Association for the Advancement of Science, held at Hobart Tasmania*.

C Haagen, 1994. *Bush Toys: Aboriginal Children at Play*. Aboriginal Studies Press, Canberra.

## reVIEW



### DESERT LAKE: ART, SCIENCE AND STORIES FROM PARUKU

edited by S Morton, M Martin,  
K Mahood & J Carty  
CSIRO Publishing, 2013

*Desert Lake* is a welcome return to the world of the Canning Stock Route and the *Yiwarra Kuju* exhibition (shown at the Australian Museum in 2012).

Combining artistic, scientific and Aboriginal perspectives, the book explores the landscape and people of Paruku, the large salt lake between the Tanami and Great Sandy deserts. Visually the book is a delight: the Aboriginal paintings and landscape photographs in particular seem to leap from the page. What also emerges is the value of a collaborative approach, and the way that the landscape itself (like the Aboriginal paintings) can be seen to hold many layers of meaning.

The interpretations of Indigenous custodians and scientists are not always compatible; however, *Desert Lake* combines them in a way which is always respectful and sometimes surprisingly complementary.

For anyone who enjoyed *Yiwarra Kuju*, and anyone interested in the interaction of science and traditional cultures, this book is a must.

SCOTT MITCHELL

# GOING WITH THE FLOW

CITIZEN SCIENCE ALLOWS PEOPLE TO COLLECT DATA AS PART OF RESEARCH PROGRAMS. HELPING TO TRAIN AND EDUCATE PARTICIPANTS IS WHAT ATTRACTED GREG MCDONALD TO HIS NEW ROLE AS STREAMWATCH COORDINATOR.

Greg McDonald. Photo by Stuart Humphreys.



Streamwatch is a program initially set up by Sydney Water to give community groups the capacity to monitor water quality in their local streams and waterways. As reported in the previous edition of *Explore*, Sydney Water has recently funded the Museum to run Streamwatch as part of its existing successful program of science education and 'outreach'.

## GROUPS

We have around 50 Streamwatch groups within Sydney Water's operational area, from the Illawarra in the south, to Hornsby/Pittwater in the north and west to the Blue Mountains. A good number are subsets of Bushcare and Landcare groups. In some cases the main driving force is the local council, while in others it's high school teachers and their classes. We even have a Scout group. Any Sydney-based community group with an interest in water quality and ecosystem health can apply to be involved.

The motivation to monitor water quality is as varied as the groups are diverse. It can be prompted by environmental curiosity through to health and safety concerns. By regularly going out and monitoring water quality, groups can identify trends, improvements, seasonal changes and disturbances. Using the monitored data, a Streamwatch group

can compare the results to national guidelines (ANZECC) and interpret the overall health of their local creek.

## DATA

As part of Streamwatch, groups collect data and upload it to the Streamwatch database. Relating these large datasets back to ecosystem health and the natural world can be both technically and conceptually challenging. I see this as a key aspect of my role, and I enjoy those 'light bulb' moments when sharing this understanding.

Originally, I studied environmental management with a focus on freshwater systems, but since then I've been up and down the countryside, mostly involved in the science of water quality and ecosystem health. My work has evolved into more of an educational role now, bringing science knowledge to the coalface.

Streamwatch is about information and understanding. Even groups monitoring water quality in the middle of urban Sydney – surrounded by leaky sewers, all sorts of stormwater pollution and industrial runoff – have a role to play in raising community awareness.

## CHANGE

Do people have a realistic expectation of the change they can bring about through Streamwatch? Well, the Cooks River Valley Association, one of the Streamwatch

groups, has a goal of having swimming as a safe activity once again in the Cooks River flowing through suburban Sydney. From a technical perspective, I see no reason why this can't be achieved in the context of our scientific, technical and engineering capacity.

As Streamwatch groups contribute to increased awareness, we'll see more emphasis on water-sensitive urban design, with better infiltration, treatment, storage and reuse of stormwater to reduce its impacts on water quality in waterways.

A current example is the Cooks River Catchment, where agencies have funded on-ground works like the Cup and Saucer Creek constructed wetland at Canterbury and riverbank restoration being carried out along reaches of the Cooks River.

We'd all like to see more of this through the landscape. Also the Chullora wetland is something worth investigating, but constructed wetlands are just one tool in a multifaceted toolbox for water quality that should include start-of-pipe as well as end-of-pipe solutions.

Change is something that requires a lot more than just information and education. It's a cultural shift that's required, and it needs a whole-of-community approach. I believe that Streamwatch can be a catalyst for that change.

GREG MCDONALD SPOKE TO BRENDAN ATKINS

# community-driven TIME CAPSULE

CREATING A 'TIME CAPSULE' FOR THE MUSEUM'S CULTURAL COLLECTIONS HAS HAD UNANTICIPATED BUT POSITIVE OUTCOMES.

**If you were asked to select objects for a time capsule that represents your culture to future generations, what would you include?**

This was the question we asked the Longgu-speaking people of Nangali, a small group of hamlets on the island of Guadalcanal in the Solomon Islands. We wanted to update the Museum's cultural collections from this area to ensure they represent the continuing dynamic histories of peoples in the Pacific region.

## TREK

Nangali is six or seven hours by boat from the national capital, Honiara; its houses are of bush materials, some on stilts, and surrounded by colourful gardens joined by pebbled areas and palm-shaded pathways. Residents Florence Watepura and Steward Bungana made the long trek to the Museum in 2012 to help University of Canberra researchers Deborah Hill and Elizabeth Bonshek with their research.

Historic objects have a way of stimulating memories and stories. By talking with them about items collected from their region in 1933, Deborah and Elizabeth hoped to learn more about the language and cultural practices of the region.

Returning home, Florence and Steward took photos of objects from the Museum collection and used them to discuss the time capsule project with the community and choose what sorts of things they could provide.

The two researchers Deborah and Elizabeth then visited Nangali in January this year. Elizabeth documented the making of carved wooden bowls which the villagers had chosen as objects best representing their cultural identity. Nangali is the only place locally where skill in wood carving continues.

## CARVERS

Of the five carvers in the village, only one, Isaac Pegoa, was active; another, Gabriel Ropo, came out of retirement for the project, while the others – Reuben Vigana, Peter Mete and Paul Zugia – were developing their skills.

Contrary to traditional practice, the men chose to work together as a group and in a public space so that the community could learn about and share in the experience. The direct involvement of sons, nephews and grandchildren in the shaping, carving and painting proved to be important in passing on cultural knowledge to younger generations.

The men worked intensively for seven days to produce a range of wooden bowls for the preparation and presentation of cooked food at formal occasions such as feasting. They also made a distinctive, rectangular-shaped *lali* bowl, used traditionally in large ceremonial feasting.





## REVIVAL

The bowls extend the Museum's historical collection with traditional forms not previously represented in the collection. One of the carvers, Peter Meti, was also keen to show Elizabeth traditional dancing using a woven 'shield'. In former times such shields would have been acquired through trade but are no longer made. Peter holds the weaving skills and knowledge to make them and, using this technique, constructed a tray which was purchased for the collection.

While the project fulfilled its aim of updating the collection, it also played a profound role among the Longgu people of Nangali village. Their visit to the Museum, the recording of traditional practices, and acquisition by the Museum of the objects made – all have fostered a broader concern, especially among young people, about the need to revitalise and reaffirm traditional values for contemporary generations.

This awareness is exemplified by one young villager who learned to operate the digital video camera during our field visit and made his own film of village activities. The video camera and a computer were donated by the Museum to the villagers to help them continue documenting their local lifestyles and practices.

Villagers are now valuing their traditional art practices more highly against a background in which people had increasingly come to view their own cultural practices as less important than those of the world outside.

**DR ROBIN TORRENCE**, SENIOR PRINCIPAL RESEARCH SCIENTIST,  
AND **DR ELIZABETH BONSHKE**, UNIVERSITY OF CANBERRA

**Right**  
Isaac Pegoa (left), master carver of Nangali with other villagers and bowls. Photo by Elizabeth Bonshek.

**Below**  
Peter Meti, carver, dancer and weaver. Photo by Elizabeth Bonshek.

**Opposite**  
The commissioned bowls at the Australian Museum. Photo by Finton Mahoney.





# FREEZE *frame*

IN THE FREEZING AND REMOTE POLAR REGIONS OF THE WORLD, IT'S HARD TO IMAGINE HOW LIFE CAN EXIST; HOWEVER, IT DOES – AND WITH GREAT VIGOUR.

I chose these evocative images as they seem to capture the essence of isolation and terror.

CATE LOWE

## WILDLIFE PHOTOGRAPHER OF THE YEAR 2012 EXHIBITION

See 100 awe-inspiring images, now showing at the Australian Museum until 7 October 2013.

Wildlife Photographer of the Year is co-owned by the Natural History Museum and BBC Worldwide.

### Left

*Living on thin ice* by Ole Jørgen Liodden (Norway). Ole had photographed polar bears more than 100 times around the islands of Svalbard, but on this particular summer evening everything came together to sum up the bear and its ice environment. 'The landscape, the shape of the ice floe, the form of the bear and the footprints were just perfect', said Ole. Photo © Ole Jørgen Liodden/*Wildlife Photographer of the Year 2012*.

### Right

*Snatch and grab* by Stefan Huwiler (Switzerland). Stefan hiked for five kilometres in thick snow in the Sinite Kamani National Park in Bulgaria to reach a hide known to be a golden eagle hotspot. He spent a long while watching a golden eagle eating a carcass. A red fox sidled up and tried to snatch the meal, but the eagle was having none of it. 'After a short, fierce spat, the fox fled with the eagle literally hard on its heels', Stefan said. Photo © Stefan Huwiler/*Wildlife Photographer of the Year 2012*.



MARINE BIOLOGIST **JEFF LEIS** HAS DEVELOPED A HEALTHY RESPECT FOR THE ABILITIES OF LARVAL REEF FISHES, WHICH HE'S BEEN STUDYING AT THE AUSTRALIAN MUSEUM LIZARD ISLAND RESEARCH STATION SINCE 1979.

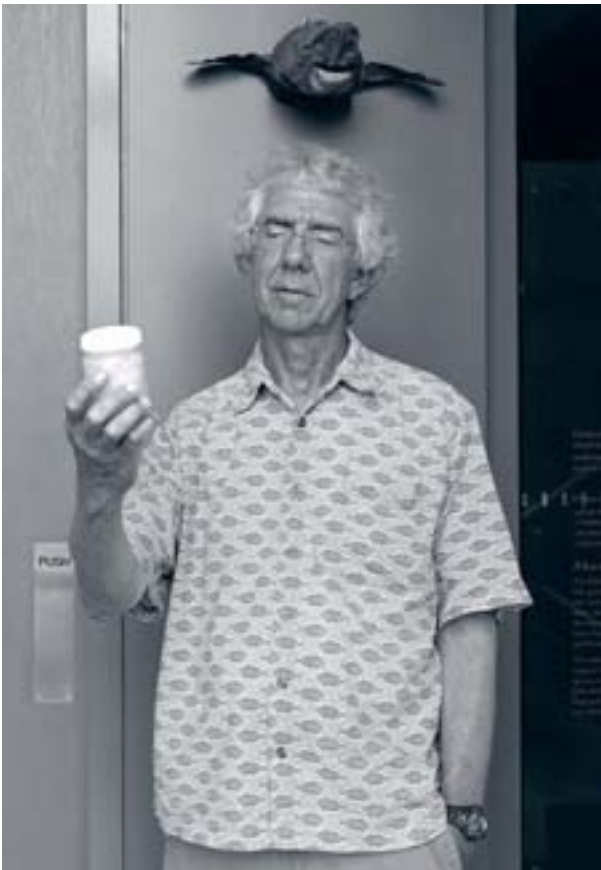
#### Below

Jeff Leis contemplates a jar of larval fish. Photo by Stuart Humphreys.

#### Right

Most of Jeff Leis's research into larval fish behaviour has focused on the reef-dwelling Blackaxil Puller, *Chromis atripectoralis*. Adults (right) reach 11 cm (photo © John E Randall). The larva (left) is just 8 mm long (photo © Colin Wen).

# fish babies AT SEA



Australia's Great Barrier Reef abounds with around 1500 species of fish, a richness matched by few other coral reefs. Understanding how tiny larval fishes manage to find a reef to settle on has kept Dr Jeff Leis, a senior principal research scientist with the Australian Museum, busy for over 40 years.

**You've spent most of your field time at the Australian Museum Lizard Island Research Station. How many times have you visited there?**

I've lost track! People ask me that all the time. My first trip up there was in 1979. Certainly it's been on average more than once each year but I haven't tried to maintain a count.

There are lots of coral reef research stations in the world, but Lizard Island is probably the best. Part of that is its location, but also we've been lucky in having Anne [Hoggett] and Lyle [Vail] running the place for the past 20 years or so. They have a great attitude and see it as their role to make sure you get your work done.

**What have you and your colleagues discovered about the abilities of larval fishes on tropical coral reefs?**

We know that they're very good swimmers and their ability increases as they develop from just-hatched larvae until they're ready to settle on the reef.

They can also control their vertical position in the water column. Ocean currents move in different directions and at different speeds at different depths. So just changing their vertical distribution affects where they end up at the end of their larval phase.

We know that these larval fishes have pretty good sensory apparatus. As my collaborator Uli Siebeck from Queensland Uni reminds me, we humans tend to think of things in terms



of our own sensory environment – we assume that what we can hear, see and smell is the same as the animals we’re studying, but in fact these tiny animals are often a lot more capable than we are.

The first thing we started working on was sound: we now know that larvae can hear sounds, natural sounds such as reef noises, and locate and swim to the source of the sounds. Jacques Cousteau used to refer to the ‘silent world’, but the underwater world is actually very noisy.

The larvae seem to see quite well too. Often the first indication we have of something going on is the change in behaviour of the baby fish that we’re following around. It may be a school of something much bigger than they are that we haven’t noticed yet, but they’re already aware of it.

A lot of fishes can see polarised light or ultraviolet light – which we don’t see very well – and they use them in their behaviour, such as using the sun to determine their orientation. They’re often responding to cues that we’re not even aware of.

Other researchers have shown that larval fishes have pretty good noses and can track down the source of dissolved material. Some species can detect the difference between lagoon water and ocean water, for example.

So they can do all these things, using their senses to help them orient in what to us seems like a very featureless environment. In fact the open ocean is not so featureless – if you’re capable of picking up the right cues.

#### **How is your research on larval fishes being used?**

A lot of the information we gather on the behaviour of the fish larvae – how fast they swim, what depths they swim at – we’re now plugging into computer models that can predict where the

larvae will end up, given a spawning time and location. You get very different results assuming the larvae are totally passive than if they’re doing the kinds of things [swimming, orienting and locating reefs] we now know they can do.

These results can be used in the design of marine park networks to say where the parks should be placed and how far apart they should be. A marine park has two roles: biodiversity conservation, pure and simple, and as a fisheries management tool – if things are designed correctly. You need to have a network of protected areas where no fishing is allowed, and these can supply new ‘babies’ to areas outside the parks to help sustain the fishery.

#### **What is the future for fish larval research?**

We’re really only just sketching the broad outlines of what the larvae are doing – determining for example that they can hear and use sound to orient their swimming – but we don’t know how that actually works, strange as that may seem. So it’s one thing to be able to say, yes they can hear and yes they can respond; it’s quite another to understand how that happens. Also we’ve only worked on a fairly small range of species and there will almost certainly be differences between species in what they can detect and how they react.

**JEFF LEIS SPOKE TO BRENDAN ATKINS**

*Jeff Leis was recently awarded the Bleeker Award for Excellence in Indo-Pacific Ichthyology. This prestigious award was announced in June at the 9th Indo-Pacific Fish conference in Okinawa, Japan, and it recognises Jeff’s outstanding career achievements, in particular his research into coral reef fish ecology.*



### NIGHT TALKS

Thanks to those Members who completed the recent Night Talks survey. Faced with rising costs, we had to choose between raising prices or not serving food or drink. The majority voted strongly against raising prices. So, much as we would have liked to maintain the pre-talk refreshments, Night Talks will now begin promptly at 6 pm and finish by 7 pm, followed by a short Q&A – leaving you plenty of time to explore the many local cafes and bars.

### SPECIAL EMAIL OFFERS

We often make special last-minute offers to Members by email. If we do not already have your email address, just give our office a call on 02 9320 6225 and we will add you to the list. You can then take full advantage of your Membership and gain access to special offers like invitations, free talks, special discounts, movie screenings, giveaways, previews and more.

However you choose to experience your Museum, we hope you enjoy your visit!

### SERENA TODD

Executive Officer,  
Australian Museum Members

Serena Todd's photo by Carl Bento.

### Chinese Dinosaur Odyssey with Dr Yong Yi Zhen

**WHEN** 15–28 October 2013

During our Chinese Dinosaur Odyssey study program, we'll visit two of the most exciting dinosaur sites in China: Zigong Dinosaur Museum, Sichuan Province; and Dinosaur Valley, Yunnan Province.

Tour leader Yong Yi Zhen, an Australian Museum palaeontologist, will take you behind the scenes to hear lectures with researchers and see field studies at dig sites where you'll gain first-hand experience of an archaeological dinosaur dig.

This tour also explores several World Heritage sites including the Leshan Grand Buddha, one of the largest stone-cut Buddhas in the world; the Jinsha Museum site; the Stone Forest near Kunming, a geological phenomenon; the Old city of Dali; the beautiful old township of Lijiang; and of course, a visit to the Panda Sanctuary.

Hurry! Places are filling fast.  
Call Odyssey Travel on 1300 888 225.



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mobile device to find  
all **Members travel**,  
or visit our website.

### The Rhythm of Cuba

**WHEN** February 2014

Discover the rhythm of Cuba through its people, music and heritage. From the historical streets of Havana to the crystal-clear waters of the Caribbean, we will explore the length of the island – riding in historic cars, smoking fragrant cigars, and with a dash of rum and rumba, this 18-day tour will take you into the heart of all things Cuban, led by travel aficionado Christopher Carter.

### Oahu, Kauai, the Big Island of Hawaii – volcanos, telescopes and tropical delights!

**WHEN** 1–20 April 2014

This 10-day tour has everything Hawaii has to offer for lovers of adventure, science and creature comforts. Get up-close and personal with volcanos, lava tubes and craters with world-renowned volcanologist Professor Nick Petford, University of Northampton, and into some of the world's leading observatories with astronomer Fred Watson in Mauna Kea. Travelling through the islands of Oahu, Kauai and the Big Island and we'll take in botany, geology and archaeology while keeping an eye out for whales, green turtles and rare tropical birds, and witnessing a total lunar eclipse.

For further information, call Marnie Ogg  
on 1300 729 183.

**Below** Kauai, Hawaii. Photo © Chanele Moss.



## ALL NIGHT TALKS

**TIME** 6–7 pm Note new earlier time!

**COST** Members \$20, non-Members \$30

**BOOKING** Phone 02 9320 6225 or  
www.australianmuseum.net.au/whatson

## Rocks from space

Dr Jonti Horner, UNSW

**WHEN** Tuesday 13 August

On 15 February 2013, a rock from space exploded over the Russian city of Chelyabinsk, injuring over 1500 people and making headline news worldwide. On the same day, a larger piece of space debris, the asteroid known as 2012 DA14, missed our planet by less than 30,000 kilometres – an incredible near miss. These events are a stark reminder of the threat posed to Earth by ‘rocks from space’. In this talk, astronomer Dr Jonti Horner explains where the different groups of threatening objects come from and traces their story back to the formation of the solar system. Dr Horner will also discuss the threat they pose to Earth and other planets in the solar system.

## Exoplanets and life elsewhere: where do we begin?

Dr Jonti Horner, UNSW

**WHEN** Tuesday 20 August

In the coming decade, it is almost certain that the first Earth-like planets will be found orbiting distant stars. At that point, the search for life beyond our solar system will begin in earnest, with scientists building costly space observatories in order to put the most promising planets under close scrutiny. But how will they choose which planets to target? What factors will make one planet more promising than another? Join astronomer Dr Jonti Horner as he explains how astronomers across the globe are searching for exoplanets before discussing the various features of a planet and its host star that researchers think might influence its habitability.



Scan this code to your mobile device to find all **Members events**, or visit our website.



## Monstrous mummies at the movies

Dr Peter Hiscock, Sydney University

**WHEN** Tuesday 27 August

Mummies have haunted cinema screens for nearly a century. They are always threatening and are typically released from their graves by meddling archaeologists to represent an ancient danger to modern humans. This talk reveals the diversity and quirkiness of mummy films. Join Dr Peter Hiscock as he explores the mummy films of Hollywood as well as British, French and Mexican cinema. From Abbott and Costello to Elvis Presley, Boris Karloff to Christopher Lee, and Karl Freund to Ridley Scott, mummies have scared and shocked audiences. But never fear! This talk promises to wrap up your worries and reanimate your interest in mummy movies.

## Past lives: convict stories through an archaeological lens

Mary Casey, heritage consultant, Casey & Lowe

**WHEN** Wednesday 11 September

The archaeology of Australia's convict past is found in Sydney and Parramatta and other parts of Greater Sydney and beyond. This talk presents the findings from various archaeological projects in Sydney and Parramatta as part of bringing together 20 years of research. Discussions will focus on the early landscape of the Sydney Domain and Parramatta; early convict potters and their products; convict infrastructure, such as the Macquarie-era dockyards and Parramatta convict hospital; as well as the lives of some Parramatta emancipated convicts and how they made good.



## On location: true stories of National Geographic photography

Jason Edwards, National Geographic

**WHEN** Wednesday 25 September.

Join us at 6 pm for a special exhibition preview followed by this special talk beginning at 7 pm.

*National Geographic Magazine* is famed for its amazing photography and engaging science stories from lands near and far. So, it's no surprise that to be a photographer for National Geographic you need technical brilliance as well as a large dash of daring. The 2012 Australian Museum Eureka Prize winner and National Geographic photographer Jason Edwards is just that man! Join us as we hear about Jason's recent Nat Geo assignments, award-winning photography and what it takes to make it into the pages of this hallowed magazine.

## Tales of the lost Spanish colonies of the Solomon Islands

Dr Martin Gibbs, University of Sydney

**WHEN** Wednesday 2 October

Few Australians realise that Spanish explorers mounted three expeditions to find the fabled Great Southern Land – in 1568, 1595 and 1606 – and along the way established colonies in the Solomon Islands. Join archaeologist Dr Martin Gibbs as he presents his recent work on the evidence of these failed settlements, including a ‘mystery’ Spanish site that may indicate the fate of Alvaro de Mendaña's lost galleon, *Santa Isabel*.

**Above left** Monstrous movies. Photo © Universal Studios.  
**Above right** On location. Photo © Anna Zhu.

**TIME** 9.30 am – 3.30 pm approximately

**COST** Members \$15, non-Members \$20

**BOOKING** Phone 02 9320 6225 or

[www.australianmuseum.net.au/Spring-2013-events](http://www.australianmuseum.net.au/Spring-2013-events)

### The John Gibbins Memorial Walk

**WHEN** Sunday 22 September

Join Ross Pearson OAM on this walk from Meadowbank Station along the Parramatta River to Olympic Park Wharf, taking in the unique surroundings of this special little pocket of Sydney. This walk is a tribute to John Gibbins who, with his wife Anne, was a foundation Member of TAMS (now Australian Museum Members), a bushwalking enthusiast and a big supporter of the Museum and its work.

### Discover the Black Swans of Dee Why

**WHEN** Wednesday 16 October

Join volunteer walk leader Keith Robinson on this lovely walk around the seaside suburb of Dee Why. Starting at the local library you will hear about the history of the area and what its future may hold. Enjoy lunch down at the rock pools before heading off towards the Stony Range Floral Reserve.

### Special offer – Members only! MEMBERS SHOPPING WEEKEND

**Get 20% discount at the Museum shop – for the entire weekend!**

**WHEN** Saturday 30 November –  
Sunday 1 December

Join fellow Members at our special holiday celebration. Take advantage of your Membership with a very special offer of 20% discount at the Australian Museum shop – just in time for some Christmas shopping! Bookings not required.



### Australian Museum Science Show and Tell Series

**WHEN** Thursday 8 August, 6–8.30 pm

**COST** Members \$35, non-Members \$45

**INCLUSIONS** Refreshments, lecture, Q&A session and exhibition viewing.

**BOOKINGS** Phone 02 9320 6225 or visit [www.polychaete.eventbrite.com.au](http://www.polychaete.eventbrite.com.au)

### Into the worm hole: a beginner's guide to practical polychaetology

A rare scientific subculture is worming its way into Sydney in August: real human beings who are passionate about polychaete worms! Wriggle into the Museum to discover why these remarkable (and remarkably overlooked) animals are so interesting, important and beautiful. And the worms are pretty interesting too ...

Here's your chance to meet some of these specialists and try out all those wormy questions you were too afraid to ask. Find out what makes a person devote their lives to these spineless, soft-bodied wonders. We'll even throw in an opportunity to see a slideshow of these worms and a chance to check out the poster exhibition in the café while enjoying a glass of wine or two.

The highlight of the evening will be a Q&A session, chaired by closet worm-fancier **Dr Richard Smith**, award-winning documentary filmmaker and host of the recent 4-part ABC TV series *Australia: The Time Traveller's Guide*.



In a past life Richard probed some beautiful worms to find out how they see our world. Now he'll turn the spotlight on the brainy bunch of humans on the panel:

**Dr Jim Gehling**, South Australian Museum. Jim is a world-renowned expert on the Ediacaran fauna, fossils of some of the oldest animals on Earth, discovered in the Flinders Ranges of South Australia. Some of these strange creatures have been interpreted as polychaetes because of their resemblance to modern-day worms. But is this really where the worm story begins?

**Professor Damhnait McHugh**, Biology Department, Colgate University, New York. As a child on the west coast of Ireland, Damhnait spent rather too long playing in tide pools and ended up turning into one of the world's pre-eminent annelid biologists! Her quest? To work out where worms come from and who is related to whom!

**Dr Pat Hutchings**, Australian Museum. Convenor of the International Polychaete Conference 2013 and the person you may hold responsible for gathering the world's worm experts together in Sydney. Pat has spent a lifetime hunting down these animals in the field and herding them into collections in the lab. In her mission to find true blue Aussie worms there is no mud too soft, reef too deep, nor stone unturned. Hear her stories from the worm front line.

**Above** Two spectacular tube-dwelling fanworms. Photos © Roger Steene.

## EXPLORE

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*Explore*, the news and events magazine of the Australian Museum and Australian Museum Members, is now published three times per year.

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Frank Howarth's photo by Carl Bento

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Dr Rebecca Johnson and her team are sequencing the Koala genome to unlock crucial information for conserving this vulnerable species. Styling by Amanda Teer. Photo by Stuart Humphreys.

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