The BONE READERS

Atoms, genes and the politics of Australia's deep past

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For Maude, Patrizia
and the late Diana

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Junette

Junette Mitchell did not hesitate when asked why she had given a DNA sample to a geneticist studying the evolutionary history of Australian Aborigines. 'I wanted to see how close we were to Mungo Lady,' said the quietly spoken elder of the riverine Paakantji people from south-western New South Wales.

Her motives when she gave the sample were strong enough to overcome the suspicion many Aborigines have of genetics research. They were also a match for opposition to 'colonial science'.

Mitchell's people, who have a history of frontier conflict and dispossession stretching back more than 150 years to the time when Europeans were encroaching on their territory around the mighty Murray, Darling and Lachlan rivers, are among traditional owners of the Willandra Lakes Region World Heritage Area, about 800 kilometres west of Sydney. Her country takes in the relics of a 1,000-kilometre-square system of five huge lakes, dry for 18,000 years and now covered with saltbush and mallee scrub. The Paakantji now lead tour groups to the Walls of China, a 30-kilometre-long lunette, or crescent-shaped sand dune, which rises up to 40 metres from the eastern and southern shores of Lake Mungo, the centre of the system. They also work as land and heritage managers at Mungo National Park, which attracts 50,000 tourists a year.

Dotted with strange forms beaten by the westerlies into white quartz sand, the vast lunettes around the lakes have delivered up the skeletons of more than 100 ancients. Mungo Lady illuminates an ancient culture and its interaction with a new land. She was strolling around Lake Mungo when the first modern humans were venturing

into Europe. Her bones, along with those of her contemporary, Mungo Man—claimed in 2001 to have yielded DNA—are the oldest on the continent. She is the world's oldest known cremation, and she lies at the heart of arguments about the date of the first colonisation of Australia. She is also at the centre of the wider debate on human evolution—whether our species evolved recently from an 'African Eve' or had a more ancient and complex origin. According to the ascendant 'out of Africa' model, our species evolved in Africa up to 200,000 years ago and spread out across the globe, replacing the descendants of even earlier African migrants. The rival 'multiregionalist' model has *Homo sapiens* evolving at several points on the globe, with interbreeding pushing our species down the same evolutionary pathway. Just how the first Australians, Europe's Neanderthals and Indonesia's 'hobbits' fit into the global human evolutionary scheme is critical to the argument. Australia's multiregionalists engage in heated debate with its Africanists, and sometimes the arguments take on ideological aspects. According to archaeologist Hilary du Cros, 'Indigenous communities in Australia will probably be barracking for the multi-regional model as their creation myths tell them that they have been always here.'

The burials, hearths, shell middens and unique geomorphic features that won the Willandra UNESCO World Heritage status in 1981 have, at times, been a battleground for scientists and the region's Aboriginal communities—the Paakantji, Mutthi Mutthi and Ngyiampaa—which once formed an alliance called the 3TTGs (Three Traditional Tribal Groups). Some local Aborigines have vehemently opposed research, and some had rejected the geneticist's request for DNA samples. 'There's a lot knocked her back,' says Mitchell. Asked to comment on opposition to genetics research, she said: 'It's only up to you—if you want to find out how close you are to those remains. That's what we wanted to do.'

Mitchell works tirelessly to pass Paakantji 'lingo' down to her people's children. One method is a game called 'Paakantji whispers'—the children sit in a circle with Mitchell and pass on new words. She is scandalised by some of the older children who have picked up naughty words in lingo and are repeating them at school, all too often when

giving cheek to uncomprehending teachers. She also wants to record a Paakantji story in an illustrated book for the kids, but she would not give much away when asked about her creation beliefs. Her views on her people's origins differ markedly from those of the geologists, dating experts, geneticists, biologists and archaeologists who have been making pilgrimages to the Willandra since 1968, when geologist Jim Bowler discovered Mungo Lady's remains eroding from dunes on the Joulni sheep station on the southern shores of Lake Mungo. At Mungo, the scientific world view stands alongside the traditional one. It's an arrangement that sometimes works, but often the politics of the past intervenes.

Where did the Aborigines come from? 'Well, they never floated over,' Mitchell says firmly. 'A lot of people always say they floated over. But, eh! I always think their heart was little people. Monkeys and apes and gorillas and that—we never came from them—but we come from these other little people.'

Here? 'In Australia. I believe it from my mother, from her grandmother—handed down, you know? We couldn't float over here, because the sea was too rough. But we was here all the time … That's as far as I'll go.'

Still, Mitchell was curious to see what the genetics said of her kinship with the mysterious Ice Age lady who harvested mussels and fish from the lake tens of thousands of years ago. Already, scientific research on Mungo Lady had confirmed her belief that Aborigines had been in Australia 'a long, long time'.

'It's a big breakthrough now to prove that Aboriginal people was in Australia before anyone had 'em here,' she says. 'That's what Mungo Lady showed … They said she was Paakantji but it's hard to tell. So I was thinking I'd like to find out properly.'

Mitchell made the comments in an interview in the yarns tent at the Mungo Festival, held in 2006 to celebrate the twenty-fifth anniversary of the Willandra Lakes Region World Heritage listing. In a later interview, when asked about another prehistory political hotspot—what drove the Australian megafauna, like the bird *Genyornis*, and the two-tonne marsupial, *Diprotodon*, to extinction—she said: 'I don't think [it was] the Aboriginal people. You know, they used to kill. They

would have a big feast. That was mostly on the smaller animals—fish, turtles, yabbies, mussels. When we go up the river, we go for the smaller animals; we don't go and kill out the big buck kangaroo. We only go for the young stuff.' And the Aboriginal practice of burning the landscape was not responsible for extinctions either; rather, it was critical to the regeneration of the bush.

I
LANDFALL

1 Timelords and god-scientists

Tourists skated as much as drove along 100 kilometres of wet, red clay from Mildura to the national park to attend the 2006 Mungo Festival after a rare night of heavy rain in a place that averages just 250 millimetres a year. The bitumen roads around the Riverina end abruptly with the irrigation channels that sap the ailing Murray, its murky waters choked with weed and feral fish, to coax out of the semi-arid zone crops from another hemisphere. Fields of bright yellow canola flowers clash with dull green remnant eucalypts. Then the incongruous landscape of vineyards, citrus orchards, cotton fields and pampered dairy cows gives way to impossibly flat, sparse woodlands of bonsaied trees and native tussocks. Eventually, the road dips to the surface of Lake Outer Arumpo, the southernmost larger lake of the network, before rising over that lake's lunette and on to Mungo.

In the drizzle outside the Mungo Visitors' Information Centre, a local Aborigine gave a drum of eucalyptus leaves a liberal dose of kero, to enhance their natural flammability, before setting them alight for the smoking ceremony. Bathing yourself in the smoke would keep you safe, the crowd was told. Local didgeridoo maestros, their instruments' natural tones ratcheted up by powerful amps, were felt as much as heard. Traditional dancers wearing only loincloths froze as they performed in the howling wind before busloads of tourists.

'It all comes about because of that Mungo Lady—our ancestor, our mother, who came up out of the ground, who was accidentally found, who was taken away … went around the world, mind you, so that

white man could study her,' Mutthi Mutthi elder Mary Pappin said in her welcoming address. 'That continuation of our culture defies all kinds of beliefs throughout the world. The Australian Aborigine was very clever to survive in a harsh environment and continues on. We know that our ancestors today are standing with us all and encouraging us to make sure that we will continue our cultural heritage.'

Some of those white men were in the crowd. They had been at the 'Legacy of an Ice Age' conference, held in the national park in the lead-up to the festival. (Scientists don't always see eye to eye with Pappin but like to tell anecdotes about the feisty, diminutive lady who once drove would-be sand miners out of town, accusing them of wanting to rape Mother Earth.)

'An important feature of this meeting is engagement between scientists and the three Traditional Tribal Groups,' the conference pre-publicity had said. 'Group forums will seek the views of the traditional custodians, explore the interaction of indigenous people and science, and discuss the management of this heritage.' Scientists and archaeologists, some of them veterans of the early days of research at the site, answered the call. They shivered alongside representatives of the 3TTGs in a marquee as presenters, competing with the coughs and splutters of the generator outside, gave papers, many of them recounting or synthesising earlier research, with new studies limited in the political climate of the past two decades.

The Mungo burials were swept up in the wave of protest over Aboriginal remains collected in the nineteenth and early twentieth centuries and still held in museums and universities around the world. Indigenous people, who had had bad experiences with the amateur pseudo-scientists of the first century of colonisation, were, from the 1970s, undergoing a 'decolonisation of the mind'. They were demanding ownership of the past—control over what research was done and a greater say in how it was interpreted. They were working to preserve or resurrect traditional customs and beliefs, some of which conflicted with the scientific view. The battle to get indigenous remains and artefacts repatriated to Aboriginal communities began, with the most hardline stance in Tasmania, where first contact with Europeans had been bloody. Indigenous world views today

vary widely, ranging from traditional through Christian and New Age to scientific, or a combination of them all. Many Aborigines agree to disagree with the scientists, and their stance on research, at least in the communities, ranges from opposition to ambivalence and support. The 3TTGs have blocked research on Mungo Child, probably a contemporary of Mungo Man and Mungo Lady, and discovered at Joulni in the late 1980s. The find coincided with protest ignited by celebrations in 1988 marking the bicentenary of the British colonisation of Australia. The bones have remained in the dune, first covered with a sheet of corrugated iron and later protected with shade cloth and sand. There was talk of a salvage excavation, but it came to nothing.

Still, there were signs of a thawing in relations in 2006.

Delegates heard reports on newly discovered fossil footprints left 21,000 years ago. And the masculinity of Mungo Man, or Willandra Lakes Hominid 3—WLH3—or LM3, as he is variously known in the scientific literature, was restored, according to one researcher, following a review of his vital statistics. Palaeoanthropologist Alan Thorne recounted how almost 40 years before he had spent six months gluing the fragments of Mungo Lady's skull together. And the megafauna extinction debate was rekindled. Did overhunting, firing of the landscape or climate change drive the big animals into oblivion?

Outside, an Aboriginal elder, a joey at his feet, basking in the sun, glanced at the marquee and observed dryly: 'They're better off in there than making bombs.'

Researchers and elders were loaded into mini-buses and taken to key sites around the lakes on an excursion setting the scene for yet another cultural clash—between science and art. Inevitable art installations had been deployed along the Mungo tourist drive for the festival. The works, exploring themes ranging from time to the 'spirit of place', left many scientists scratching their heads. One work, which had blown over and broken, was blocking the path to the Walls of China. Perhaps the destruction was intentional, symbolising the problem of 'preservation' of bones and archaeological material in the ever-changing environment of Willandra. Perhaps it was a statement that, in life, there's always something in the way.

A visit to the Joulni sites took on aspects of Anzac Day. Conference delegates gathered on the lunette overlooking the site of a blowout, a place where wind and rain had exposed older strata more than 30 years before. A star picket in front of a 'residual'—a sculpted remnant dune—marked the site of the Mungo Lady burial. Another 450 metres to the east designated the resting place of Mungo Man, found by Bowler in 1974. This was Aboriginal land. The 3TTGs held the lease over the old sheep station, and the public was banned from the area. It had significance, too, for the researchers who, in the early days, dug the sites in an area described as 'Australia's Rift Valley', a zone which to Aborigines is the centre of creation, and which to scientists holds the key to understanding the evolution of our species.

There was one, a former cattle musterer from the Snowy Mountains, who is now one of the giants of geology. Jim Bowler translated the story written in the sediments, a story he says changed his life. It is encoded in coarse gravel dumped by big waves whipped up by the westerlies, in fine quartz beach sand hurled onto the lunette by the wind, in tiny grey clay pellets dislodged from the lake floor in dry times, in wüstenquartz—red desert dust—swept onto the dunes as the arid Centre expanded, and in soils that form when dune building ceases. In the early days, the radiocarbon dating method revealed that the burials were very old. A second dating revolution, based on the liberation of energy from grains of sand, later pushed back the age. The synthesis of the data told a familiar story. It was about Australians struggling with aridity.

Archaeology students arrived on the lunette. Only a few were Aboriginal, but enough to swell the ranks of indigenous archaeologists, at the time of the Legacy of an Ice Age conference numbering only about 10. Then the father of Australian archaeology said his piece.

John Mulvaney founded an Australian prehistory department at the Australian National University in the 1960s and wrote the first textbook on the subject. An outspoken conservationist who fought hard battles to protect Aboriginal heritage in Tasmania and Kakadu National Park, he had campaigned to get the Willandra Lakes region its World Heritage status. In 1965, he populated the Pleistocene with people, with the discovery of the first site dating from that epoch—Kenniff Cave on Mount Moffatt Station in Queensland, where a dated

sequence of stone tools extended nearly 3 metres deep to about 22,000 years ago. Later, along with Wilfred Shawcross, he dug at Mungo. It was to be his last archaeological excavation.

On his return to Mungo in 2006, by then in his eighties, he could not resist a gentle dig at the three generations of dating experts assembled—radiocarbon specialist Richard Gillespie, and Rainer Grün, John Prescott and Matt Cupper who use newer methods. Many archaeologists worry about losing prehistory completely to these practitioners of the arcane sciences—the 'timelords'.

'I do want to say, particularly to the scientists who think only in dating, what is the significance of this Mungo site,' he said. 'It dates early occupation, but it does far more. These burials here—reliably dated now—we have a cremation, we have an inhumation [burial] in which the corpse has been sprinkled with considerable quantities of ochre. The ochre, as far as we know, had to come [from] at least a couple of hundred kilometres from here. Forty-two thousand years ago, already people knew enough about the country, knew enough about geology … to know about this ochre. The point about the burials is that they are human actions. That is to me the real significance of Mungo. In the nineteenth century, indigenous people were thought to be just savages—they were incapable of counting, incapable of drawing—they were sub-human. Here we have, at 42,000 years ago, people who were burying the dead. We don't know for what reason but they seem to be human values—respect and love of the dead, fear of the dead and a particular process—you burn the body and you smash them up and bury them in a hole. What's the significance of that? Why do that? Or why cover the corpse with ochre? People obviously have thoughts about the afterlife.'

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When Mulvaney began his work, the study of the human past was still based in humanities faculties of universities world wide. Then a 'new archaeology' or 'processual archaeology' swept academia. New archaeology propelled the field towards the natural and social sciences and viewed humans as part of the ecology. Archaeologists were adopting Enlightenment philosophy—positivism, empiricism,

rationalism and reductionism—the epistemology that grounds science. They were coming up with theories to explain change in the artefacts and bones in the archaeological record, and had a quiet confidence that the scientific method was the most reliable path to knowledge—a way to test their hypotheses. Mulvaney was ambivalent about the new philosophy influencing the second generation of Australian prehistorians. 'I remain a humanist,' he said in 2008. 'No matter how many scientific tests you do on bones, they won't reveal anything about human creativity. You can't treat humans as animals.'[1]

The shift to new archaeology came in the early stages of the radiocarbon revolution, at a time when the dating experts—the timelords—were just beginning to illuminate the past more brilliantly. Other quantitative methods were being developed, too.

Then another philosophy, the ideology behind it rooted not in the Australian desert or in laboratories but in Paris, would influence the field. A new group of prehistorians, some of them qualified in science, drew on ideas taking shape in the politicised, postmodern air of university arts faculties. Borrowing from French literary theory and supporting the 'post-processual' theory pioneered by the British archaeologist Ian Hodder, postmodernists deem truth to be a myth, research to be irredeemably biased, science to be 'just another text'—a Western construct—the past to be unknowable, and politics to be more important than knowledge. Many deride, or 'deconstruct' as 'racist' or 'sexist', the scientists or archaeologists with whom they disagree.

It is impossible to gauge the impact of postmodernism on prehistory, and many scholars and university departments have let the wave wash over them. However, there have been accents of the philosophy in cultural heritage management and some academic debates.

Tim Flannery, a scientist accustomed to calling a spade a spade and well known for his claim that a single hunting blitzkrieg wiped out the Australian megafauna, has been viciously attacked because of the supposed risk that his views could be used by anti-Green forces. Mulvaney, meanwhile, has been attacked for opposing the reburial of ancient remains. And an entire Honours project was devoted to 'deconstructing' the three editions of his textbook, *Prehistory of Australia*, the last co-authored with archaeologist Johan Kamminga.

In her 2005 thesis, 'Specimens and Stone Tools: Aboriginalism and depictions of Indigenous Australians in archaeological textbooks', Flinders University's Belinda Liebelt claimed to have unmasked meanings in the texts that 'subjugate and oppress Indigenous people's knowledges of themselves and their pasts, as inadequate and unscientific'.

Most researchers with a scientific world view agree that their discipline is on some level influenced by social and cultural factors. 'That is not the same as saying the knowledge which is being generated is the same as that in the horoscope in the back of the *Women's Weekly*,' says La Trobe University's Tim Murray.

Complicating the issue are rivalries between research teams, universities and museums as they compete for glory, jobs and dwindling funds. Claims for sites to which researchers have devoted years of work are guarded jealously against counterclaims from rival research teams presenting new data. One of us, Jones, has written elsewhere that 'archaeology without science is so much poetry'. Prehistory relies on science for dates, and for reading the complex histories written in sediments, fossils and DNA. Big research teams typically include scientists as well as archaeologists. But when a scientific paper is published, some players adopt the tactics of the political activist, flouting the self-correcting protocol of science involving peer review and replication of results. They line up on factional grounds. Debate rages in the media and public fora, in preference to learned journals. University and museum public relations machines are cranked up. Factionalism and lack of rigour have led to some internationally renowned blunders.

The big debates in Australia are echoed in the United States, Canada and the Pacific islands. The North American continent shares Australia's curious ecological history, with its larger animals becoming extinct soon after people arrived in force. In the United States and Australia, despite what science has to say about these extinctions, sometimes politics and ideology obscure the scientific evidence. And the repatriation debate reverberates through countries where first peoples have a history of dispossession and disadvantage. In the US, it centres on the bitter dispute over the 9,000-year-old Kennewick Man

remains. Discovered along the banks of the Columbia River in Washington State in 1996, Kennewick Man is said to resemble populations such as the Ainu, the indigenous people of Japan, more closely than modern Native Americans. The high-profile dispute has played out in courts, parliaments, academic journals and the media.

This book is not a treatise on formal epistemology, and we spare the reader the obscurantism of Foucault and Derrida. We will, however, recount the collision between researchers and politics in the quest for answers to four big questions that have reverberated through Australian prehistory studies: Where did the Aborigines come from? When and how did they get here? Who were they? How did they interact with the environment?

Some of the results and hypotheses reported here will be refined—perhaps even abandoned—as more evidence comes to light. Our focus will be on Australian prehistory but we will show how Australia is critical to global questions about our species' deep past, including the evolution and dispersal of our genus during the Quaternary, the most recent geological period. The book involved years of research, visits to sites and laboratories around the world, attendance at conferences and interviews with some of the world's leading experts.

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By the end of 2006, hopes were high for a resurgence of research in the Willandra. Scientists, led by ANU dating expert Rainer Grün, and the 3TTGs had won $735,000 in government grants for a grand three-dimensional survey of the region aimed at improving conservation of the skeletons, hearths and middens eroding from the dunes. The surveyors would deploy satellites, lasers, aircraft, deep physics, geomorphology and traditional knowledge. The push for the project followed the destruction by wind and rain of a skeleton that had been exposed in the sand. The scene of destruction had upset elders, but research on human remains was still off the agenda. And apart from salvage excavations in urgent cases to be performed in a separate project led by the 3TTGs, only in situ conservation was sanctioned by traditional owners. Still, there had been hopes that a 'keeping place' to house remains at the Willandra would smooth the path to research.

However, there have been alarming signs that politics is weakening one of the foundations of science—peer review, a system of checks and balances central to the scientific method. The British journal *Nature* and the American journal *Science*, which compete for top ranking in the scientific food chain, along with hundreds of other refereed journals, subject manuscripts to peer review before publishing the research. In theory, independent scientists eminent in the relevant field vet the research on the basis of its scientific merit. The journals accept or reject papers on the advice of referees and the response of the scientists, from whom a referee's identity is usually kept secret. Science funding agencies put research grant applications through the same gruelling process when deciding whether to back them.

One referee described a grant proposal made by a team of elite researchers as 'the fly-by-night neo-colonialism of god-scientists' putting samples through 'their expensive machines'. Another grant proposal—for a project critically dependent on the interpretation of the subtleties of deep physics—was attacked by a reviewer because no humanities-trained archaeologists were included on the research team. '… [T]his is a very arrogant application,' the reviewer wrote. '… [T]his is an application by scientists treating archaeologists with contempt,' continued the review, which implied that the applicants—another team of elites—were mere technicians.

The disadvantage of indigenous people, their rights and the solutions to their problems are political matters. What happened in the deep past, however, is a scientific question. The idea that modern ideology determines reality 50,000 years ago is a hypothesis unworthy of refutation. Like their compatriots, Australian scientists and archaeologists agonise over the nation's race relations. Some have been attacked for 'playing into the hands' of racists by releasing results seen as politically sensitive, but they know that there is nothing repugnant in the prehistory emerging through their work.

This is the story of physicists, chemists, geologists, dating experts, palaeontologists, palaeoanthropologists, geneticists, biologists, palaeoecologists and archaeologists illuminating the deep past. They use the scientific method. It is a way of looking at the world through experimentation and observation in an approach pioneered by the

likes of Galileo Galilei and Francis Bacon 400 years ago. They subject their data, analysis and interpretation to the rigorous scrutiny of their peers, and often end up in heated debates among themselves. Some of them use isotopes generated from the radiation from exploding stars to date the arrival of Australia's first people. Others use the eggshell of extinct birds and ancient pollen in deep sediments to assess the Aborigines' environmental impact. Still others read the record of human migration from the blood pulsing in our veins. They are the 'timelords' and 'neo-colonial god-scientists', and this book is about what they can tell us.