

Emu Dreaming

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Draft of 18 February 2008

Introduction

Many Sydneysiders who pay fortunes to visit the magnificent rock-art of Europe are unaware that thousands of wonderful sacred rock engravings lie within a few kilometres of their home, showing animals, people, creator spirits, and strange symbols whose meaning is unknown. These beautiful works of art were created by the Aboriginal people who lived there until the British arrived in 1788.

Twenty years ago, my wife and I used to take our kids walking in Ku-ring-gai Chase National Park, just north of Sydney, and became fascinated by the kangaroos and strange figures on the Basin Track. Someone had told me that the group of kangaroos represented the Pleiades, and I wondered idly how much evidence supported that story. Over the years, I began to hear more about these astronomical connections, and even came across the statement that the Australian Aboriginal people were the world's first astronomers.

As an astrophysicist with an interest in the history of astronomy, my curiosity was piqued, but it was not until three years ago that I finally had the opportunity to put these rumours to the test. My mild curiosity quickly became an absorbing research project.

Only recently has it been recognised that there is a deep vein of astronomy threading through many Aboriginal cultures. With hindsight, we shouldn't be surprised. If you live in the outback of Australia, each night gazing up at the magnificent river of the Milky Way threading through the coal-black sky, then of course the night sky becomes important to you. It becomes an integral part of your understanding of the world. Most of the 400-odd Aboriginal cultures in Australia share the belief that the world was created in the "Dreaming" by ancestral spirits who have left symbols all around us to guide us in our lives. If you can understand these symbols, then you have a complete understanding of the world and of the meaning of life. It should come as no surprise that the night sky contains many of these symbols.

For example, the appearance of a star or constellation can tell people when it's time to move to a new food source. When the Mallee-fowl constellation (Lyra) appears in March, the Boorong people in Victoria know that the Mallee-fowl are about to build their nests, and when she disappears in October, the eggs are laid and are ready to be collected. The Yolngu people in Arnhem Land know that when the star Spica sets just after the Sun, the raika nuts are ready for harvesting, and the appearance of Scorpius once signalled the imminent arrival of the Macassan (Indonesian) fisherman.

Sometimes these astronomical themes are marked in stone. At the Ngaut Ngaut site in South Australia, tally-marks carved into a rock face, along with images of the Sun and Moon, are said to record Moon cycles. The Wurdi Youang Aboriginal stone ring in Victoria seems to point to the position on the horizon where the Sun sets at midsummer and midwinter day and the equinoxes.

But what about the Sydney engravings? Is there any astronomy there? Shortly after the First Fleet arrived in Sydney in 1788, Governor Phillip explored the region and noted the friendliness of the Guringai people. Within two years, most had been killed by smallpox. Within a few decades, the remaining Guringai had been driven out by white settlers, and nobody thought to ask them about the engravings. Now, only the engravings themselves can tell their story.

The Emu in the Sky

On a warm autumn evening, find a remote spot away from streetlights, and admire the spectacular band of the Milky Way stretching across the sky from horizon to horizon. Yolngu people tell us that it is a mighty river, and either side of it can be seen the campfires – nebulae – of their ancestors, next to the river. Now look at the Southern Cross (a possum in a tree, according to the Boorong people) and look at the dark cloud to the left of it. That cloud is called the Coalsack by astronomers, and is the birthplace of new stars, but to many Aboriginal groups, it's one of the best known constellations – the Emu in the Sky. The Coalsack is the head of the emu. Stretching away to its left you should be able to see its long dark neck, round body, and finally the legs. It's a spectacular sight – far better than the contrived European constellations that most of us grew up with. Once you've seen it, the Milky Way will never look the same again.

In Ku-ring-gai Chase National Park, close to the Elvina Track, is a rock engraving of an emu. Its legs are trailing back, in a position that would be unnatural for a real emu, but, as Sydney academic Hugh Cairns pointed out a few years ago, in just the same pose as the Emu in the Sky. This might sound like wild speculation until you notice that, astonishingly, the Emu in the Sky stands above her portrait, in the correct orientation, at just the time when the real-life emus are laying their eggs. I wondered if it would be possible to take a photograph to illustrate this, so consulted my son, award-winning photographer Barnaby Norris.

Photographing these engravings is tricky. The grooves are shallow and frequently obscured by natural undulations in the rock. Received wisdom is to photograph them at sunrise or sunset, when the low angle of the Sun outlines the grooves with shadows. But at sunset the resulting photo is likely to be marred by shadows of nearby trees.

Instead, we replaced the Sun by a high-powered studio flash, together with a portable power supply. Three telescopic pool poles were used to construct a tripod five metres high, from which we suspend a remotely-operated digital SLR camera vertically above the engraving. Further image processing, sometimes including spatial filtering, then clearly shows up the engravings.

A further challenge is that the emu stretches half-way across the sky, so doesn't fit in the field of view of a normal lens. A fish-eye lens on an equatorial mount would do the trick, but would distort the image, preventing a realistic comparison with the

engraving. So instead we made a mosaic of smaller images that could be pieced together in software.

Having taken the photos, Barnaby spent two months stitching the hundreds of images together, working out how to correct for the distortions and sky rotation while keeping the shape true to the projection seen by the human eye. The result was magnificent and in August 2007 won Barnaby a prize in the New Scientist Eureka science prizes.

Next to the emu is an engraving of a strange half-man with a club foot who is believed to be Daramulan, a creator-hero from the Dreaming of the Guringai people, and related to Baiame, a creator-hero found in many Aboriginal cultures across the South-East of Australia. Only fragments of information have survived about Baiame and Daramulan, but perhaps we can learn about them from the rock art.

The Sun, Moon, and eclipses

In most Aboriginal cultures, the Moon is male and the Sun is female. For example, the Yolngu people of Arnhem Land, in the far north of Australia, tell how the Sun-woman, Walu, travels steadily across the sky from east to west each day carrying her blazing torch, creating daylight. As she descends to the western horizon, she puts out her torch, and starts the long journey underground back to the morning camp in the east.

The Moon-man, Ngalindi, was originally a fat lazy man (corresponding to the full Moon) who expected others to feed him. His wives attacked him with their axes, making the waning Moon. He managed to escape by climbing a tall tree, but was mortally wounded, and died, causing the new Moon. After three days, he rose from the dead, and gradually regained his health, giving us the waxing Moon. After two weeks, when he was round and fat again, his wives attacked him, and so the cycle continues to repeat every month. Until Ngalindi first died, everyone on Earth was immortal, but Ngalindi cursed humans and animals so that only he could return to life. For everyone else, death would thenceforth be final. These Yolngu stories also explain the connection between the tides and the Moon. The Moon fills and empties as it rises through the horizon, raising the tides when it is full, and lowering them when it is half-full.

Solar eclipses are explained by the Warlpiri people as the covering of the sun-woman by the moon-man as he makes love to her. On the other hand, a lunar eclipse occurs when the Sun-woman successfully forces her unwelcome attentions on to the Moon-man, who constantly tries to evade her by following a zigzag path through the sky. From these stories, we know that traditional Aboriginal people had long ago noticed the complex path of the Moon compared to that of the Sun, and had worked out that eclipses happened when their paths cross.

A recurring motif in the Ku-ring-gai engravings is a crescent, which has been interpreted by archaeologists as a boomerang. But a closer look suggests a different explanation. The figure [below] shows a man and woman reaching up to a boomerang in the sky. But why would a giant boomerang be sailing over their heads? And boomerangs generally don't have pointed ends, and generally have two straight lengths rather than a single curved crescent. It seems to me that much more likely that

the shape represents the crescent moon. But the only time you see a crescent moon with its horns pointing downwards is at an eclipse. If this picture represents an eclipse, then it might explain why the man is standing in front of the woman, partly obscuring her.

Bulgandry

Near Woy-Woy on the central coast of New South Wales is a rock engraving of a figure named Bulgandry, who may be related to Baiame. In one hand is a disc, and in the other is a crescent shape. Nowadays, the crescent is badly eroded and barely visible, but fortunately we have a drawing made by W.D.Campbell in the 1890's which shows it clearly.

Archaeologists label these objects as a shield and a boomerang, but the shield is the wrong shape and has none of the markings that are usually shown on an engraving of a shield, and the crescent is Moon-shaped rather than boomerang-shaped. It is tempting to speculate that this engraving may refer to a Dreaming story about the creation of the Sun and Moon. But my science background forces me to acknowledge that this is no more than speculation. To make sense of these engravings will take years of detective work, amassing clues and piecing them together. But we now know that astronomy is an important part of the culture for Aboriginal groups elsewhere in Australia, and so my hunch is that astronomy will turn out to be an important component of the Sydney rock engravings.

Conclusion and Motivation

Why should we be interested? I have to admit that one factor is personal curiosity. But it goes much deeper than that. First, if we succeed in understanding these engravings, perhaps we can give back to the Aboriginal people some of that culture which we destroyed when we invaded their land two hundred years ago.

Second, there still exists a gulf of misunderstanding between Indigenous and non-Indigenous Australians. Over a beer at a barbecue, one of my mates, Dave, sniggered some insensitive and plain stupid comments about "secret women's business", not understanding that this is something real, and sacred, and important to many of his fellow-Australians. Dave isn't evil, but he doesn't have much understanding of the cultures of Aboriginal Australians, and the complex issues now facing them. His attitudes, frankly, aren't that much different from the early British settlers who shot Indigenous Australians for sport.

How can we help poor Dave to understand Indigenous Australian people? Many of the esoteric Indigenous stories and tales, let alone complex kinship systems, are just too different, and therefore difficult, for Dave to understand. On the other hand, Dave loves the bark paintings that he sees in the tourist shops, or the Didgeridoo music he hears on Circular Quay, and is spellbound by the intricate traditional dances and songs. All these art forms have successfully forged a bridge of understanding, because they are understandable, and accessible, even by Dave.

I hope that, like music and art, astronomy can build an important bridge of understanding between Indigenous and non-indigenous Australians, because we all share the same sky, and even Dave is entranced by the sight of the majestic Milky

Way stretching across the unknowable black heavens in outback Australia. We can't help being intrigued by the beauty and mystery of the sky, and we all love to swap stories about it. By doing so, this project aims to promote a greater appreciation of the depth and richness of Indigenous Australian cultures.

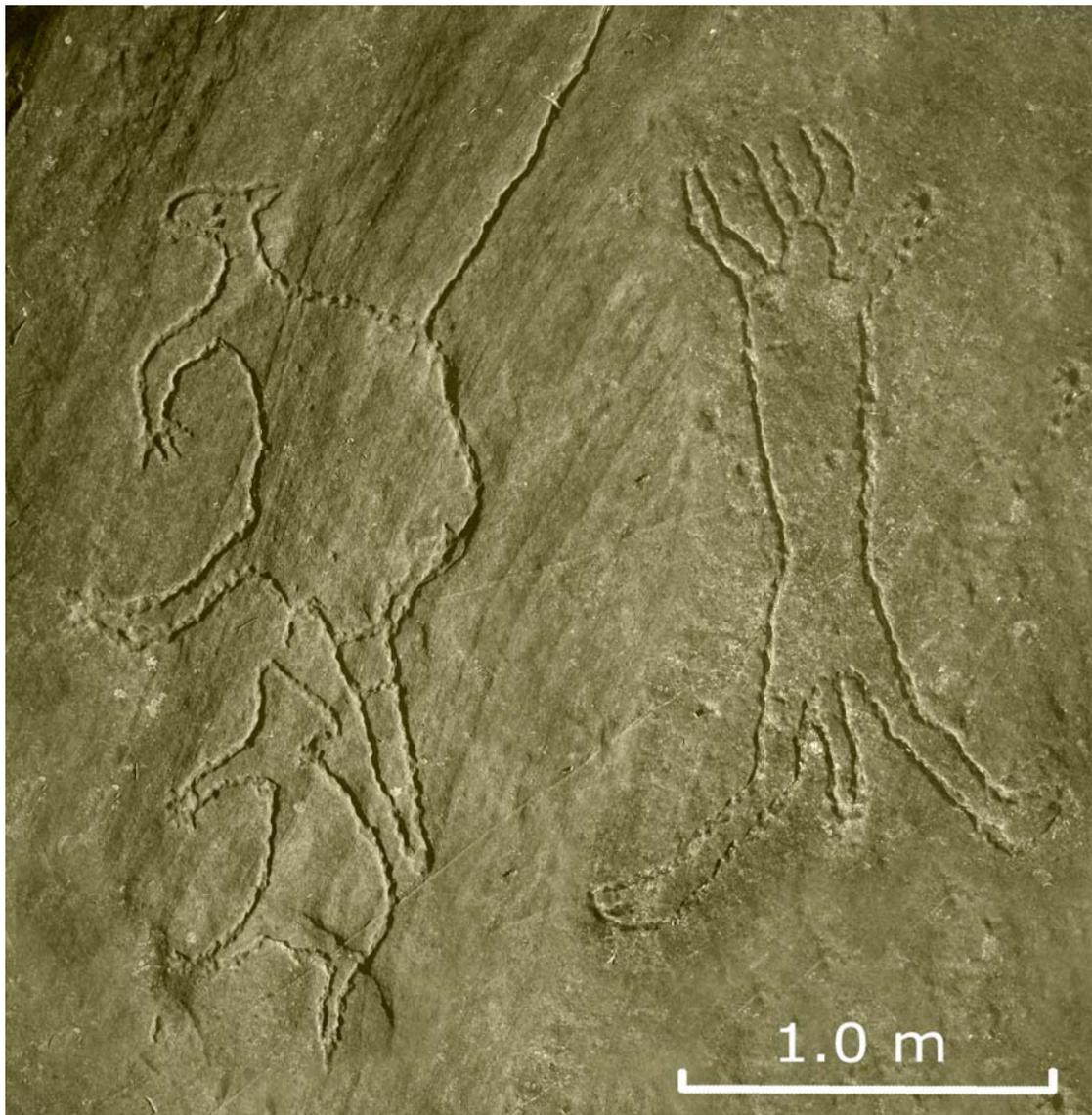


Fig 1: An Aboriginal rock engraving of a man and two wallabies at Terrey Hills, north of Sydney.

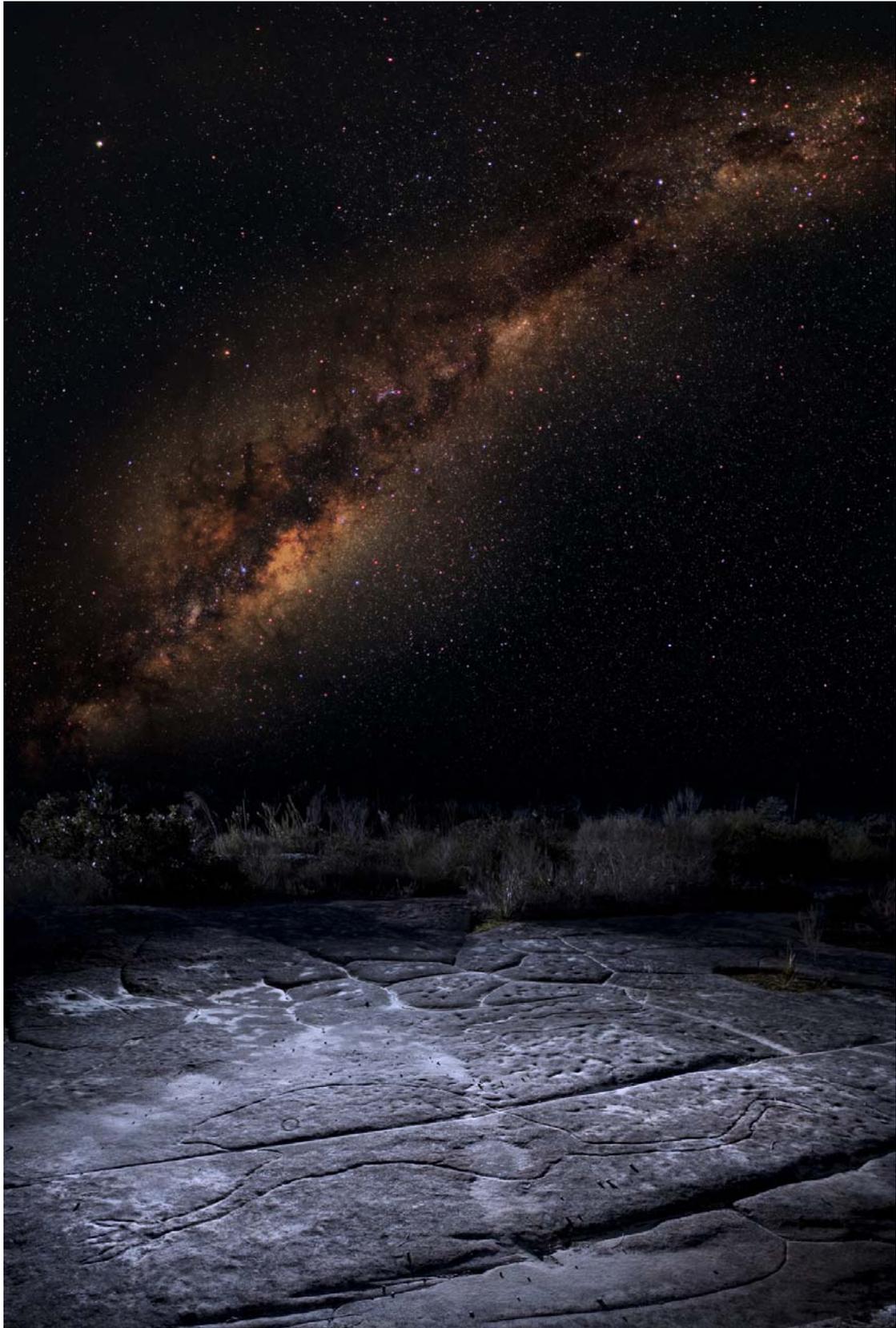


Fig 2: The Emu in the Sky, seen as dark clouds in the Milky Way, stands above her engraving in Ku-ring-gai Chase National Park. She is in this position only when real-life emus are laying their eggs.



Fig 3: An ancient rock painting of Baiame, a creator-spirit, by the Wanaruuah people, near Singleton, NSW.



Fig 4: Do crescent-shaped engravings represent the Moon or a boomerang?

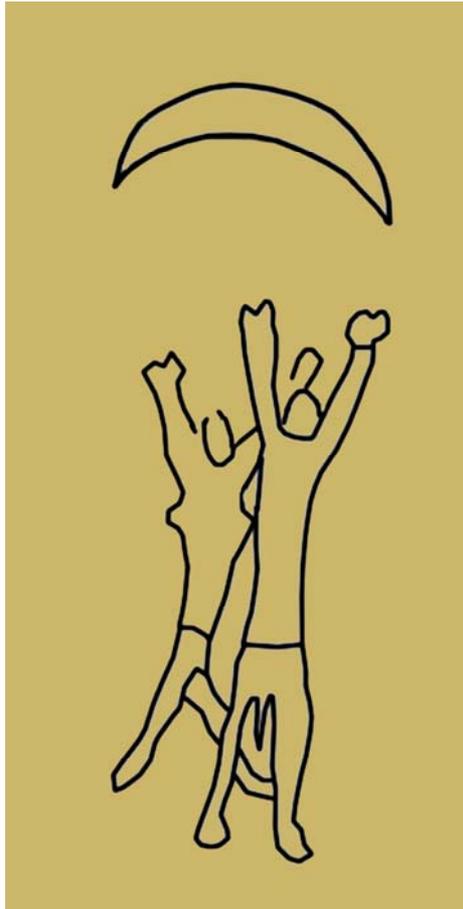


Fig 5: A rock engraving from the Basin Track, Ku-ring-gai Chase, national park, showing a man and a woman with a crescent above their heads.

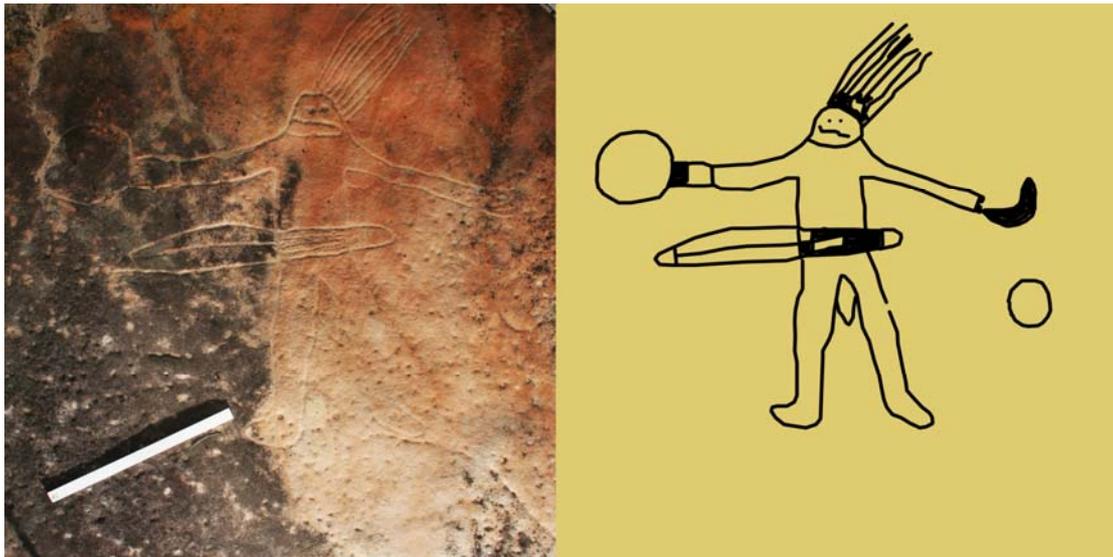


Fig 6: The Bulgandry rock engraving near Woy-Woy, NSW, and the drawing by W.D. Cambell in 1893.