
INTRODUCTION

LEARNING TO UNDERSTAND WESTERN AND INDIGENOUS SCIENCES



This issue of *Humanities Research* offers four papers exploring relations between Western and Indigenous sciences. They derive from the 'Science and Other Indigenous Knowledge Traditions' conference, held at the Cairns campus of James Cook University in August 1996. The conference was an ambitious venture, sponsored by the Humanities Research Centre, in collaboration with Bukal Indigenous Consulting, the Centre for Aboriginal and Torres Strait Islander Participation in Research and Development of James Cook University. It brought together Indigenous Elders and knowledge custodians, Indigenous and non-Indigenous researchers from Australia and overseas for five days on the ancestral country of the Djabugay people, on which James Cook's recently established Cairns campus is located.

The decision to devote a major Humanities Research Centre conference to exploring the relations between European and Indigenous sciences grew out of conversations through 1994 between myself, Henrietta Fourmile, a Yidinji historian and policy analyst, well known for her research on protection of

Indigenous knowledge and cultural heritage, and Iain McCalman, Director of the Humanities Research Centre. By early 1995, these discussions included David Turnbull, a cultural historian internationally known for his work on the relations between Indigenous and Western ways of mapping time and space.

Since assuming the Directorship, McCalman had sought to encourage Indigenous participation in the Centre. Given that in 1996 the Centre's activities would cohere around the theme of 'Science and Culture', it seemed to us logical and timely for a major conference exploring the relations between European and Indigenous sciences. Also, we felt it should be held at the Cairns campus of James Cook University. This would maximize opportunities for participation by Elders and knowledge custodians from across Northern Australia. However, we were also keen to recognize and draw upon the expertise in issues relating to Indigenous Australian knowledge developing within James Cook's Centre for Aboriginal and Torres Strait Islander Participation in Research and Development. Indeed, it was while Henrietta

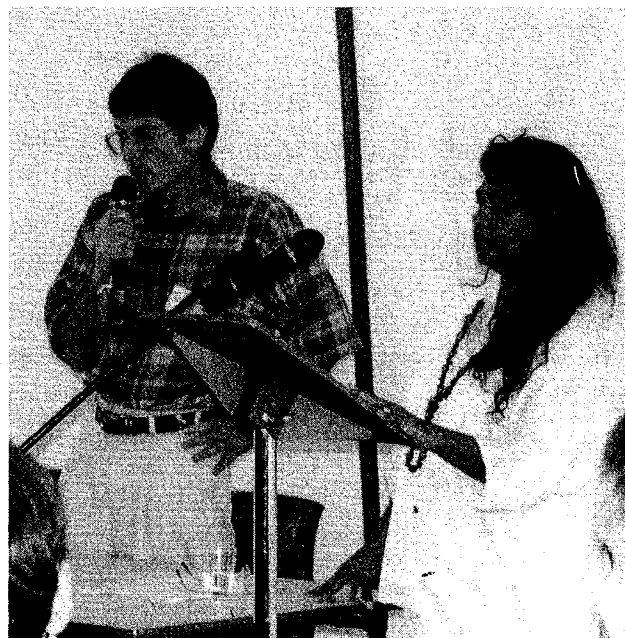
Fourmile was employed at the Centre that she won international recognition for her research into the theft of Indigenous cultural property in Australia.

In Queensland, with the gradual dismantling from the mid-1960s of the protectionist regime under which they had lived since the turn of the twentieth century, Aboriginal and Torres Strait peoples gained legal rights to ownership and enjoyment of cultural property. Yet, as research by Henrietta Fourmile had shown, restoration and community protection of cultural property hinged on demonstrating the property in question was used in accordance with 'tribal custom or law'. State bureaucrats and non-Indigenous experts effectively reserved the right to determine just what constituted 'tribal custom and law'; and as was evidenced by cultural property being defined as 'relics' in the relevant legislation, the presumption on the part of non-Indigenous authorities was that little if anything remained by way of Indigenous culture and customary law.

Moreover, as Fourmile argues in her contribution to this volume, the continuing persuasiveness of these colonialist assumptions places

Indigenous biological resources and other less tangible forms of cultural property in grave risk of appropriation and use without permission or compensation.

For several years, I had likewise been interested, as a non-Indigenous researcher, in documenting the fate of Indigenous cultural property and knowledge in nineteenth and early twentieth century Australia. In particular, I had been exploring the history of scientific procurement and uses of Indigenous bodily remains. As is well known, the 1980s witnessed at times fierce controversy over the continued preservation of Indigenous skeletal material within museums and medical schools. Demands by community Elders and Indigenous spokespersons provoked debate as to whether scientific criteria or obligations prescribed by Indigenous ancestral belief should ultimately determine their fate. I was particularly



Iain McCalman, Director of the Humanities Research Centre, and Henrietta Fourmile, conference co-convenor.

Photo: Leena Messina

struck by the perplexity of personnel working in institutions housing collections of remains. Why, as it seemed to them, did research focused on human remains now cause Indigenous Australians such anguish and outrage when it had never done so before? Several confessed to me that they could only make sense of the controversy in which they had become embroiled by assuming that it was orchestrated by younger Indigenous activists, whose motivation was purely political: quite likely they had been inspired by similar campaigns for the reburial of remains undertaken since the mid 1970s by radical North American Indian organizations.

There was no reason to doubt that these sentiments were genuine, but what they raised in my mind was whether the controversy over scientific use of Indigenous bodily remains had more complex historical origins that needed to be considered. This question seemed especially pertinent as during the course of the controversy both scientific researchers and their Indigenous critics justified their stance by recourse to claims about how and why Indigenous bones and soft tissue had come to rest in medical schools and natural history museums.

Working in the collections of the National Library over the summer of 1994-5, I came across numerous accounts written during the course of the nineteenth century documenting how different Indigenous communities sought to prevent the desecration of burial places by explorers,

natural history collectors or ordinary settlers keen to aid contemporary scientific research into the origins and nature of Indigenous society. Many of these sources also proved remarkable for illuminating the ways in which the scientific practices and ideas that rendered the Indigenous dead objects of curiosity in European eyes also determined how the living and their knowledge systems were understood.

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What emerged in the process were also glimpses of how explorers, surveyors and squatters routinely availed themselves of Indigenous knowledge. They used the expertise of Indigenous people to navigate unknown country and to assess its worth for pastoralism. Explorers often found that the Indigenous men they employed to help them travel, and often live off the land, were anxious to gain the permission of traditional owners to do so. The diplomacy of Indigenous guides was often critical to expeditions gaining safe passage. Interestingly, guides were at times as unfamiliar as the white men with the culture of the people whose country they passed through. When they met with what from their own experience seemed sacred places, Indigenous guides readily

sought to persuade their European companions to leave quickly without disturbing anything. Typical in this regard were the expeditions undertaken by George Grey in northwest Australia during the late 1830s. In his account of his second expedition in early 1839, Grey wrote of the wariness of Kaiber, the party's principal guide, when travelling through unknown country, and his 'concern and unease' on the party's encountering a newly made grave on the upper reaches of the Harvey river.¹ After the loss of their stores and boats, Grey's party was forced to make a gruelling journey of some six hundred kilometres back to Perth, which they survived only through Kaiber's diplomacy, his ability to discover water and persuading the people they encountered to share frogs and other seasonally plentiful foodstuffs.

Pastoral, and later mining, frontiers were typical of colonial situations in that the colonizers assumed they were inherently superior to the colonized. While as has been extensively documented by historians, sexual relations between Indigenous women and European men were widespread, other relationships, grounded in senses of affinity or equality, were much rarer, with the result that Indigenous knowledge was used by settlers only when it made pragmatic sense in terms of western understandings of nature.

For many early squatters the choice of homestead and out-stations was

determined by Indigenous knowledge of weather patterns and the reliability of local water courses. Indigenous pharmacopoeia and ways of healing were assessed and used when they paralleled contemporary western medical practice. Settlers in outlying districts similarly used the ashes of woods favoured by Indigenous healers to cauterize wounds, and employed steam baths using herbs and species of fern which Indigenous people had discovered to be effective in treating rheumatic pains and bronchial congestion.² Stiff black and white joints were treated with goanna fat.³ The resin of the red gum (*Eucalyptus resinifera*) was used to prevent wounds turning septic, and taken in pill form to check dysentery.⁴ As one settler in Western Australia recorded in his journal in the early 1840s, 'it is a very strong astringent and has been taken medicinally very generally in the colony, and certainly I found immediate relief from it.'⁵

Throughout the nineteenth century, colonial naturalists drew heavily on Indigenous knowledge. They invariably relied on Indigenous people to locate specimens of flora and fauna, as is well exemplified by the activities of the early nineteenth century botanist, George Caley. Through the patronage of Joseph Banks, Caley collected extensively in the ancestral country of the Eora, Dharug and Tharawal peoples of what is now the greater Sydney region between 1800 and 1808. Caley was quick to appreciate the value of employing Indigenous help. As he wrote to Banks in

August 1801, 'I mean to keep a bush native constant soon, as they can trace anything so well in the woods, and can climb trees with such ease, whereby they will be very useful to me...' ⁶ Yet, he soon realized that Indigenous people were able to provide him with crucial information about the animals and plants he encountered. In 1802, for example, he sent Banks specimens of various kangaroo and wallaby species, together with detailed descriptions of their usual habitat and behaviour which had been gathered from Dharug men. At the turn of the twentieth century, some fifty type specimens of *Eucalyptus* collected by Caley were discovered in the Imperial Herbarium at Vienna. They reveal how extensively Caley relied upon Indigenous people not only to find specimens, but to provide him with detailed information as to their reproductive cycle, growth and uses within Indigenous society. Of a specimen of the Turpentine Tree (*Syncarpia glomulifera*), Caley wrote, 'When the tree is wounded it discharges a turpentine like substance of a peculiar taste and smell which bees are remarkably fond of and if I do not mistake the natives at some particular times [they] make incisions into the bark to attract the bees in order to trace them to their hives or nest for robbing them of the honey.' ⁷ Caley also regularly recorded the flora and geographical features he encountered by their Indigenous names.

Caley came to form a close relationship with an Eora youth named Moowat'tin,

whom he relied heavily upon when collecting well beyond the boundaries of European settlement. He was, Caley wrote, '...the best interpreter of the more inland native's language of any that I have met with. I can place that confidence in him which I cannot in any other - all except him are afraid to go beyond the limits of the space which they inhabit with me (or indeed any other)...'. Moowat'tin accompanied Caley to Norfolk Island and Tasmania in 1805. From what survives of Caley's letters and journals it would seem that this expedition proved a fascinating cross-cultural engagement in which two individuals schooled in radically different knowledge traditions worked closely together to make sense of the ecology of places to which both were equally strangers. Moowat'tin eagerly questioned Caley about the relations between climate, landform and the forms of vegetation they encountered. On the basis of their discussions, Moowat'tin sought to locate plant specimens typical of particular environments.

While he admired the intelligence of his Eora friend, Caley remained conscious that Moowat'tin lived between two worlds. That other world intrigued and disturbed Caley. Exploring the upper reaches of the Nepean river in 1807. Caley and his party were introduced by one Tharawal clan to a party of Gundungurra men who had supposedly come to share in a hunt for kangaroo. Among the party was Carnambaygal, a warrior who was to figure prominently in the campaign of

resistance that Tharawal, Dharug and Gundungurra clans fought through the autumn of 1816. Caley recalled being struck by how subdued and respectful the Tharawal were in the presence of Carnambaygal, until seeing his startled reaction to Caley's using his gun to bring down a bird. The Tharawal were delighted, Caley wrote, to see Carnambaygal's unease, as they believed him to be 'invincible and more than mortal'.⁸

Caley's interpretation of the encounter is a minor but telling illustration of how by the early nineteenth century Europeans' belief in their scientific superiority—tangibly proven in their minds by technologies such as the gun and the time-piece—shaped their interaction with Indigenous societies.⁹ This theme is further explored by David Turnbull in his contribution to this volume, which explores the cultural entanglement of European and Polynesian knowledge traditions in the 1760s. Turnbull retells the well-known story of James Cook and Tupaia, the Raiatean priest and navigator, but does so in ways that tease out the cultural presumptions implicit in European navigational expertise.

Western scientific communities have interacted so as to form complex webs of interconnections in which shared assumptions and theories about the workings of the natural world have evolved. Even so, as Turnbull shows, scientific knowledge has invariably been

forged from cultural resources peculiar to the historical context of its creation. For all its seeming discursive unity, European science has been in many respects as intellectually diverse as the knowledge systems of Indigenous societies.

Where European science has differed is in the persuasiveness of its claims to universalism. From the mid-seventeenth-century British scientific communities gave varying degrees of credence to sceptical modes of reasoning. No one way of knowing was believed certain to confirm the true and essential nature of things. Scepticism found much favour with intellectuals from the 1650s, as a way of ensuring social stability through neutralising the truth claims of both radical Puritans and Catholic apologists. Another strand of thinking that gained widespread assent, especially in British intellectual circles during the course of the eighteenth century, was the idea that the methodological aims and procedures adopted by Newton in determining the existence of regularities in the physical universe could be extended to all domains of human knowledge. Especially amongst theologians and moral philosophers these two strands, scepticism and what we might justifiably call positivism, lay in uneasy contradiction. But gradually they came to be seen as capable of resolution by accepting that while no way of knowing could lead to certainty, human nature was stubbornly disposed to accept various propositions as proven beyond doubt. What was thus required was close

investigation of human nature and specifically how beliefs came to be formed.

In essence this was the rationale informing the Enlightenment project of analysing the origins and natural history of belief. As the philosophers of the Enlightenment maintained, the human mind was acutely susceptible to the power of the emotions as they were stimulated or subdued by the engagement of the senses with the body and the external world. In unfavourable existential circumstances, humanity easily fell to irrational thinking and behaviour. As David Hume, the highly influential Scots philosopher, argued, 'the mind of man is subject to certain unaccountable terrors and apprehensions, proceeding from the unhappy situation of private or public affairs, from ill health, from a gloomy and melancholy disposition, or from the concurrence of these circumstances'. Worse, in such a state of mind the presence of 'infinite unknown evils' of unknown causation were actively and fearfully assumed to be at work in the affairs of men.

The Enlightenment conceptualized religious devotion and belief in magical or occult powers as arising directly out of the mind's natural propensity to generate irrational hopes and fears. The weight of historical evidence was overwhelmingly seen to support the conclusion that the first forms of religion were the most irrational, because life in the earliest human societies was lived at the mercy of

natural forces. As these societies survived through hunting and gathering, there was little or no opportunity for experiences which might allow the formation of the kinds of complex ideas necessary to grasp the actual relations between objects and entities in the world. Human understanding was a captive to the irrational play of the mind. Indeed, when eighteenth-century European intellectuals spoke of non-European societies as 'savage', they did so presuming savagery to be a distinct condition, characterized by the 'life of the chase' circumscribing what its practitioners could believe and know.

Could the savage escape savagery? This question was to be the focal point of metropolitan and colonial debates about the fate of Indigenous communities until well into the 1840s. The stress that Enlightenment philosophy placed on the progressive development of human understanding through experience was interpreted by Christian humanitarians as proving that Indigenous people could be civilized, at least to the same level as the labouring classes in settler society, provided they were removed from their country and life-ways at an early age. Humanitarians also aligned themselves with those philosophers who had argued that, though ideas were derived solely from sensation, there was nonetheless overwhelming scientific evidence that humanity possessed an innate sense of moral judgement. When freely exercised this moral sense ineluctably led the mind to embrace the essential truths of

Christianity. Indeed, it was the teachings of Christianity which had refined human sensibilities so as to seek social and moral improvement. Conversion to Christianity was integral to the task of raising the Indigene from savagery.

However, as is evident from the writings of early colonial naturalists such as George Caley, belief in the supremacy of experience in shaping human intellect could equally result in ambivalence and often fatalism about those perceived as living in the condition of savagery. This

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may also help explain why colonial intellectuals proved so receptive to theories which posited that the minds of non-Europeans were physiologically less equipped to process sensory data.

Extending 'the experimental mode of reasoning into moral subjects', Enlightenment thinkers drew upon a culturally engrained repertoire of assumptions—notably the distinctiveness of mind and body, and culture as opposed to nature. They saw reality in terms of physical causality. They explained the

objects and entities they perceived almost exclusively by the patterns of cause and effect they associated with them. As Joseph Banks famously remarked of the astronomical observations in which he participated on Tahiti during Cook's first Pacific voyage of 1768-71, they were inspired by the goal of measuring the frame of the world.¹⁰

By way of contrast, Indigenous Australian societies have been equally concerned to observe and account for relations between objects and entities, but have understood the order of things from the perspective that they themselves either share the same qualities, or are distinguished by not possessing them. Sylvia Kleinert takes up this point in her paper on Indigenous artistry and craft in southeastern Australia, showing how everyday life and artistic practice is informed by complex webs of meaning drawn between self, community, the ancestral realm of being and other phenomena in the world.

What seems, to the western eye, knowledge of phenomena that has been acquired through the same inductive processes that characterize post-seventeenth-century European science only makes sense—only becomes science—through its connections with other beings or things that Europeans implicitly see as external to the self. As the late David Mowaljarlai, a senior Elder of the Ngarinyin and Worora peoples of the Kimberley region, explained by availing himself of the conceptual vocabulary he

encountered amongst anthropologists with whom he worked over many years:

We Aborigines of Australia see our land as a grid system, within which every man has his symbol in nature. One man will have a mountain as his symbol, another the river, another a plain; still others represent the stringy bark tree, or the track of a spirit, a fish such as the rock cod, or a tree blossom.

At our camping place on the grid, we do not sow seed and plant food, as our spirit ancestors put out all our foods for us. There are increasing-places where a stone could symbolize a yam or a barramundi fish. When we hunt we touch these stones and obtain that food.

There are women—images and man—images in the earth itself. These images relate to our stories and the cave-painting, and without them we could not live. They give us energy and power, they give us much wisdom, they are controlling our lives

When the really hot weather comes, and the water supply is reduced to one pool, we know that Wandjina the creator puts that pool there for us. Everybody drinks there together, including the kangaroo, the goanna, the lizard and the snake. The children who drink at that waterhole are the image of the Wandjina, who goes on creating our families, our young people."

Since the mid-decades of the nineteenth century, western science has come to regard the question of what ultimately causes the regularities discerned in nature as beyond its concern. Indigenous science is underwritten by the presumption that all sentient beings are not just created by

ancestral spirits, but are the living embodiment of those creative entities. Each being, moreover, is conscious of its place and purpose within the schema of ancestral creation, and may communicate that knowledge to other beings. Hence the investigation and appraisal of phenomena is a process of learning what things say about themselves and other beings. As Deborah Bird Rose writes of the Yarralin people of the Victoria River district of the Northern Territory, they see their country as 'alive with information for those who have learned to understand':

Crocodiles (*Crocodylus johnstoni*), for instance, only lay their eggs at one time of the year. Yarralin people know that it is time to hunt for crocodile eggs when the black march flies start biting. These annoying flies carry a message: 'the march flies are telling you the eggs are ready.' This sort of knowledge is accurate. If we know that crocodiles lay their eggs toward the end of the dry season, the calendar can tell us that they will probably start sometime in September or October. March flies tell us exactly.

However, as Bird stresses, Yarralin do not understand this relationship, as western observers would, in terms of cause and effect.

No one tells the march flies to bite because the crocodiles are laying eggs. Rather, the big river country where Yarralin is located, march flies know when it is time to hatch and forage. Their time is also crocodile time. Neither causes the other, nor is caused by an external other. In following

their own Laws they communicate themselves; those who know the interconnections find information in their actions.¹²

To the outsider, the attributes of fellow beings discernible to Yarralin clearly reflect a specific cultural geography. So too does the knowledge they acquire from studying the relations between beings. This is not to suggest that western science evades precipitating the wider cultural forces in which it is located into its practices and intellectual products. As much recent historical research has demonstrated, western science equally has a social history: the play of wider cultural forces has similarly determined how facts about the world have become evident.¹³ As suggested above, where western science differs from Indigenous knowledge is in how it has come to talk about our primary relations to objects. What has been distinctive is its use of narrative techniques to strengthen cognitively its claims to interpret literally the world—to be a way of knowing that accurately and transparently mirrors the unconditioned external world, no matter where and how it may be encountered.

Western scientific discourse relies heavily on metaphors that not only underwrite its claims to interpret literally the grain and substance of physical existence, but occlude perceptions of its employment of metaphor. Notably in colonial contexts other knowledge systems have consequently been seen as so suffused with metaphor as to warrant their

classification as primordial, pre-scientific modes of thought. Hence, as David Okpako explains in his paper comparing Western and African modes of medical diagnosis and treatment, there has been a long engrained tendency with the Western academy to relegate Indigenous knowledge to the analytical categories of myth. If we are usefully to re-evaluate the relations between indigenous and western sciences, we would do well to accept that no knowledge system can make sense of the world without recourse to deeply enculturated narrative traditions and techniques. All knowledge systems might be considered myth or lore in this respect, and analyzed as giving voice to those things which matter most in particular knowledge traditions.

In Australia today most researchers in the physical or biological sciences appreciate and respect Aboriginal and Torres Strait Islander cultures. However, those who choose to interact with Indigenous communities remain anchored within professional communities still greatly inspired by narratives which represent the researcher as discoverer of radically new and universally applicable insights into the workings of nature. Over the past decade, notably within Australian universities which have supported the development of Aboriginal and Torres Strait Islander Research Centres, there have been numerous programs undertaken on the basis of Indigenous participation and control, notably in the area of environmental science. But the outcomes



The Yarrabah Dance Company perform as part of the welcome ceremonies for the conference.

Photo: Leena Messina.

have not yet greatly influenced mainstream scientific practice. When findings have been reported in scientific journals, research data has generally been re-conceptualized in terms of conventional disciplinary aims and practices.

Since the mid-1990s, the refashioning of Indigenous knowledge in the light of western scientific aspirations has been critically appraised by Henrietta Fourmile, Errol West, and other researchers at James Cook University's Centre for Aboriginal and Torres Strait Islander Participation in Research and Development. What they have found on consulting North Queensland community Elders and knowledge custodians is that information shared with non-Indigenous researchers is often still regarded as if the communities have no real moral or legal claims to dictate how it will be represented or used within the wider world. As Gladys Tybingoompa, a senior Elder of the Wik people, observed at the Cairns conference, Indigenous knowledge has only recently

come to be seen as more than 'untucker'—i.e. raw information about natural phenomena that is free to be digested by western science with little or no consciousness of its being Indigenous intellectual property, and no guarantees that its owners will benefit from its use in the commercial development of processes and products. This presumption, incidentally, still seems implicit in Australian science policy. What is noticeable about the Federal Government's 1999 White Paper on Higher education, *New Knowledges, New Opportunities* is that it has much to say about invigorating Australian science through encouraging stronger linkages between university-based researchers and industry, but says nothing about Indigenous science, nor indeed anything about the contribution of Indigenous peoples to our understanding of the world.

The Cairns conference aimed to open a dialogue amongst scientists working within western and Indigenous traditions, so that they, philosophers, anthropologists

and historians could come together to discuss how western and Indigenous sciences might interact in more intellectually and morally profitable ways. Critical to our thinking about how this might best be done was the Indigenous Research Ethics Conference organized by Errol West that took place in Townsville in September 1995. Discussions with various community leaders during the conference resulted in the decision to hold the conference in Cairns, with a view to maximizing opportunities for participation by Indigenous Elders and knowledge custodians across Northern Australia, where there had been most interaction with western scientific researchers. In view of concern that the conference not replicate the inequalities widely felt to characterize those interactions, and thus treat Indigenous participation as another source of 'uni-tucker', it was agreed that the conference would take the form of a mix of prepared papers, workshops and presentations which the presenter considered best suited to what they wished to achieve.

In view of rising concern that Indigenous intellectual property gain stronger and more culturally appropriate forms of legal protection, it was also decided that the conference would include workshops aiming to provide advice to peak Indigenous organisations. Indeed, as it turned out, the conference coincided with the Aboriginal and Torres Strait Islander Commission's seeking community advice in the framing of its submission to the

Federal Government in respect of Australia's response to the United Nation's Convention on Bio-Diversity. The workshops resulted in the Commission being strongly advised to demand of government that it endorse provisions within the draft convention safeguarding Indigenous ownership and rights over the uses of traditional knowledge.

Clearly, such a conference could not take the routine academic form of papers read and subsequently offered for publication. We discussed filming the proceedings, but found key participants had doubts that we should. Rightly, they were concerned at what would subsequently be made of the footage. While happy to share their thoughts and expertise with those participating at the conference, several Elders were troubled by the prospect of having no control over its future interpretation, especially being in the process of framing claims under native title legislation. As one Elder pointedly asked, what guarantee was there that what he and others might say would not forewarn hostile parties of what would be argued before Queensland's Native Title Tribunal.

We could hardly ignore these concerns, especially given the aims of the conference. By the same token, even if it had been possible to ensure that participants enjoyed control over how footage was edited and subsequently presented, we would have then been obliged to negotiate appropriate copyright

agreements and royalty payments. And while we had no hesitation about doing so, the total funding we had secured left just enough after meeting the travel and accommodation costs of invited participants to recognize their contribution through payment as distinguished guest lecturers. We had no option but to drop the idea of creating a film record of the proceedings.

This of course meant that we were left with a small selection of formal papers, which stood as fragments surviving the ebb and flow of conversation in which Indigenous voices were heard strong and clear. Since 1996, several of these papers have been revised in the light of things we talked about in Cairns, and published in other journals or within monographs. The four which appear in this issue of *Humanities Research* address major themes that were explored and often vigorously debated well into each night of the conference. Each secured a place in this volume by virtue of being nominated by participants on our last day together as having provoked us to think in fresh and more rewarding ways about the relations between Indigenous and western sciences.

Finally, special thanks are due to Iain McCalman, who, besides offering the resources of the Humanities Research Centre, helped secure the conference additional funding from various sources to support Indigenous participation. Also, the success of the conference owed much to Leena Messina, the Centre's conference

administrator, and her ability to manage the logistics of an event which up to the last moment seemed ever to change its form. ~

PAUL TURNBULL

Paul Turnbull is a Fellow at the Centre for Cross-Cultural Research, Australian National University, where he is the Director of the South Seas Digital Project. Amongst his most recent publications are 'The Network and the Nation: the National Library and the History of Bibliographical Information Infrastructure in Twentieth Century Australia', in Peter Cochrane (ed.), 'Conversing with a Nation: the Centennial History of the National Library (2000), and 'Rare Work for the Professors': The Entanglement of Aboriginal Remains in Phrenological Knowledge in Early Colonial Australia, in Jeanette Hoorn and Barbara Creed (eds.), The Body Trade: Cannibalism, Captivity and Colonialism in the Pacific (Pluto Press: Melb, 2001).

NOTES

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- 5 John Ramsden Wollaston, *Wollaston's Picton Journal*, ed. Alfred Burton (Parth: Pitman, 1940), p. 79.
- 6 Caley to Banks, August 1801, cited by Joan Webb, *George Caley, Nineteenth-Century Naturalist* (Sydney: Beatty and Sons, 1995), p. 51.
- 7 Caley, 'Notes on Plants', Sydney: Mitchell Library, FM4/2468; also cited Webb, *George Caley*, p. 125.
- 8 Caley, *Reflections on the Colony of New South Wales*, ed. J.E.B. Currey (Melbourne: Landsdowne, 1996), p. 103.
- 9 See Michael Adas, *Machines as the Measure of Men: Science, Technology and Ideologies of Western Dominance* (Ithaca: Cornell University Press, 1989).
- 10 Roy Macleod, 'On Visiting the Moving Metropolis: Reflections on the Architecture of Imperial Science', *Historical Records of Imperial Science*, 5 (1982), 1-16.
- 11 David Mowaljarlai, 'Life, Death and Burial', Address given at the Ceremony before the Repatriation to Indigenous Control of Ancestral Remains from the Anatomy Department, Edinburgh University, 29 September 1991. Copy in Possession of the Author.
- 12 Deborah Bird Rose, *Dingo. Makes Us Human: Life and Land in an Australian Aboriginal Culture* (Cambridge: Cambridge University Press, 1992), p. 225.
- 13 On this point, see Steven Shapin, *A Social History of Truth* (Chicago: Chicago University Press, 1994), especially chapter one.
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