



# Land\$cape: Gold & Water

Mandy Martin



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*Land\$cape: Gold & Water*  
Mandy Martin, 2003

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Cover photograph: **Mandy Martin** *Cadia Pipeline* 2002

Frontispiece: **Marty Huehner** *Core Samples of Deep Time* 2002.  
100x100 cm Stoneware, discarded geological core sample trays, stained with refined gold ore concentrate from the Cadia mine

Much of my current work uses found textures to build clay representations of various aspects of our world. In *Core Samples of Deep Time*, such textures were used to represent the various major stages in the development of the land in the vicinity of Cowra, NSW, which is close to the Cadia mine.

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# LAND\$CAPE: GOLD & WATER

Mandy Martin

*Land\$cape: Gold & Water* is a collaborative and interdisciplinary project combining art and text. It focuses on Cadia Hill Gold Mine, owned by Newcrest Mining Limited and located on 10 000 hectares of natural habitat and agricultural land alongside the Belubula River, in the Lachlan River catchment, part of Murray Darling Basin in New South Wales.

The research for the project derives from five intensive field trips to the Cadia region that I organised for the Environment Studio, National Institute of the Arts, Australian National University (ANU). The field trips were open to all staff and students of ANU and personnel from other research institutions, and involved local Cadia region artists, Wiradjuri mentors, environmentalists, graziers, and mine personnel.

The project seeks to engage the local community in a process whereby a broader range of landscape values are

considered in the evaluation of natural resource use. Aesthetic evaluation of landscape is an important part of ecosystem services and land use interpretation, but is little used or understood in Australia at present. Our project aims to use methodology to place a value on the 'viewshed', or in mining terms the 'visual catchment', and give it a value alongside other landscape values like indigenous, social, and environmental values.

Establishing what is of value in this Cadia region landscape is of course subjective and conditioned by many cultural factors. Working as a group of twenty people will help to establish some sort of common ground. I personally have responded to the Cadia landscape since I moved to live here in 1995. In the past two years I have developed a series of one hundred small canvases titled *Not in arCadia ego*. The canvases of the Belubula River are painted in a gold palette, using river sand and natural pigments,

while those of Cadia Hill Gold Mine are painted in a copper palette, using tailings from the dam and sulphide concentrate from the mine's sag mill.

The small canvases are juxtaposed with a 570-centimetre diptych canvas of the tailings dam with text inscribed in the foreground written by project participant and Professor of Earth Sciences, John Chappell:

*The rock is gray, without lustre; the ore is dross: only through technical stealth of sag-mill and flotation, something auriferous and smeltable is crabbed from the wretched stuff: less than a gram of gold in a tonne of rock; poorer than uranium in a coral reef.* (Field Book, 4.30 p.m., June 21, John Chappell)

Since 1931 our family pastoral company has owned a property adjacent to Cadia Hill Gold Mine, and also leases a neighbouring property from the mine. We have been involved in the respective environmental impact surveys and development proposals for both the underground and open cut mines from start-up in 1995, and have worked closely with the mine not only on the management of our leased property, but also on this project. As well, we are working with the mine and CSIRO to develop a long-term land management plan called 'Cadia Farms' for the fourteen properties acquired by the mine. This plan aims to integrate environmental and production values on the farms,

and through that protect, in posterity, the endangered superb and turquoise parrots, the yellow-bellied sheath-tail bat, and their threatened white box and yellow box communities.

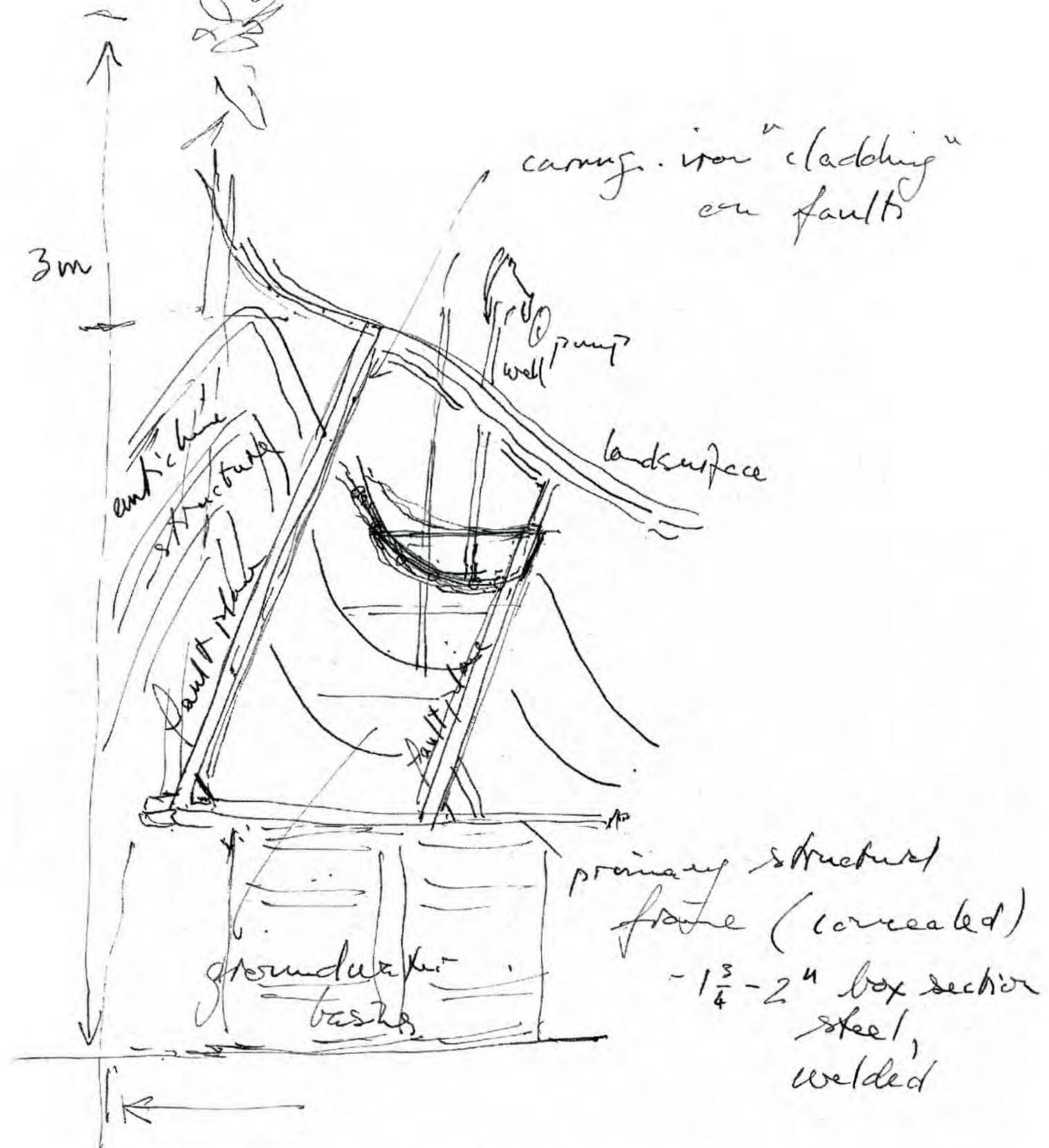
This landscape therefore is a contested landscape, one where rapid change has and is still occurring. I am keenly involved in establishing what is of value in this landscape, and how many of those values condition the aesthetics of the place. The negotiations with the mine and CSIRO, and proposed reclamation efforts, are all positive initiatives towards maintaining aesthetic amenity within the range of ecosystem services we wish to build and retain. Effort and achievement will also make this a landscape of value.

Other major themes that project artists and writers George Main, an ANU student originally from Cootamundra, and Sarah Ryan from Sustainable Ecosystems CSIRO, deal with include social displacement and the grief experienced at the loss of Wiradjuri lands, native habitat, and farming land. They consider how past environmental histories shape perceptions of this landscape for both landholders and the local community. Another theme taken up by Sarah Ryan in her essay in this publication is that of the 'gold footprint', or the hidden costs of the total energy and water consumed, and rock mined, to produce, for example, one gold ring. In other words, this landscape has global drivers accelerating the rate of

change, so an understanding of value in this landscape is also coloured by scale.

A third set of themes affecting the aesthetic reading of this landscape which project participants have tackled include other issues impacting on the health and value of this landscape, like salinisation, weed invasion, cold water pollution, the spread of European carp, and land degradation. John Chappell's ripple iron, 44-gallon drum, water, and plastic tubing sculpture eloquently visualises, in case any of us need any further evidence in this prolonged drought, the effects of excessive irrigation extraction on the water table during different wet and dry cycles.

My husband Guy Fitzhardinge and I have been working individually on these issues in the past with environmentalists and other artists, and felt the need to involve a larger local and interested group of artists and writers, not only to build our own knowledge, but to engage in this contemporary ethical debate about the value of landscape by inserting a more developed notion of aesthetic value into the discourse. This discourse often excludes people and is based around the strategic or monetary value of landscape. We would like the community to develop a wider understanding of landscape value and empower them to actively engage with large organisations like mining companies for positive environmental and community outcomes. We hope



Water Stress Sculpture Drawing. John Chappell

our attempts to define value in this landscape will be applicable to other communities where sudden and irrevocable change is proposed through different land use. It is possible in the next ten years that our property, the only privately owned one between Cadia Hill Gold Mine and the recently rehabilitated Junction Reefs mine (owned fifty-one percent by Newcrest Mining) upstream, will also be developed by the company.

The project is designed to contribute to the debate about the short-term benefits of mining against the long-term benefits of protecting bio-diversity and natural habitat, and valuing landscape for its aesthetic qualities. We will address a broad city/rural audience, including those stakeholders who have an integral attachment to the Cadia region, and identify what they value and want to keep in this landscape. It will also help to close the chapter on what

has already been lost to this community, and share with other regional communities all the above lessons, particularly that of the aesthetic value of landscape.

My mother in-law and children's writer Joan Phipson lives in the Cadia region. In her 90th year she hears the mine grinding away twenty-four hours a day. The daily blasts remind her that gold mining companies have the jurisdiction to dig right up to one's garden fence. The property and region are the location and locale for many of her prize-winning books, including *The Watcher in the Garden*<sup>1</sup>. In *Portraits of our Land*, she wrote of a particular swimming hole and a gum tree where we regularly sit and that a platypus lives under.<sup>2</sup> We have sat in the past year with Joan and her lifelong friend Rosemary Dobson, still a frequent visitor to the property, who has written several poems inspired by this place. The fact that this place has inspired these writers, and the writers and artists in this project, makes it of further value also.

Writers and artists of second settler Australian backgrounds have found the place special. As my series of paintings progressed I realised it was important to have a traditional Wiradjuri owner voice their connection with the place. The environmental impact survey for the mine had located a scarred tree and I wanted it to be photographed before we erected the obligatory fence around it. Alana Harris, a Wiradjuri born

in Cowra, completed this task and, as a water person, made a series of photographs of the river. Together we exhibited this work, titled "They Have a Faith to Move Mountains", at Bathurst Regional Gallery.<sup>3</sup> Our Wiradjuri mentors for the *Land\$cape: Gold & Water* project have been Trish and Kym Freeman. Previously they have coordinated the wonderful Cowra Bridge public art project. Trish is Alana's cousin, and she was born in Gooloogong at the confluence of the Belubula and Lachlan rivers. Kym took the men on one of our field trips to visit the trees marked with goannas which stand sentinel either side of Gooloogong. Oscar Blyth, ceramicist and grazer, responded strongly to the scar tree, receiving instructions from Kym on how to approach the site and announce his presence. Oscar takes the idea of the removed shield and creates a new skin for it. The pigmented textured surfaces representing the hewn rock face of the open pit which Oscar could have watched all day as the huge remote control earth movers were dwarfed as they worked to repair a massive slip caused by eight inches of rain back in February.

Our neighbour Meta Rothery, in her late eighties and one of the original European descendants still living on the family property first settled in the 1830s, paints a rich panoptica of images on rocks collected from the river at this spot. These are part of an installation for the exhibition—a river of

rocks flowing through the space, representing the cultural inflows. In this river of memories the Belubula, foxes, cats, flowers, the Queen, horses, dogs, Cathy Freeman, and Plugger the football player all feature.

The project artists have all approached reading the landscape individually. Matt Higgins has amassed many digital images of the region but one single poignant image of a brilliant blue butterfly plastered on the dusty ground reflects his prime concern with local communities and environments facing the effects of globalisation. Penny Stott's interest is in threatened species, and in this region she has painted the superb parrot, tracked down the turquoise parrot in captivity in Millthorpe, and hunted out the relocated yellow sheath-tail bat roosts at the Cadia Hill Gold Mine site. Nicki Dickson, previously a veterinarian and now an art student, has sketched rubble weeds at the mine, and with her scientific and artistic eye painted sublime, frightening but seductive images of other noxious weeds like Bathurst burr and Paterson's curse on grazing land. She writes that 'exotic weeds now comprise 15% of Australian flora and are the second largest cause of the loss of bio-diversity'.

Weeds carried by the wind, rivers, and animals cross the mine fence. So do endangered parrots, bats, and that indicator of environmental health the Bogong moth. The death count of



'Land\$cape: Gold / Water' *field researchers Cadia Hill Mine. 2002* Photograph: Mandy Martin

Bogong moths from huge lights burning all night must be immense. That loss of night sky amenity not only affecting fauna, but in the development phase at night the mine's huge lights cast our shadows on the inside walls of our own house, many kilometres away as the crow flies. Where there was previously dazzling clear night sky we now have a city of lights burning orange, a change of aesthetic for certain.

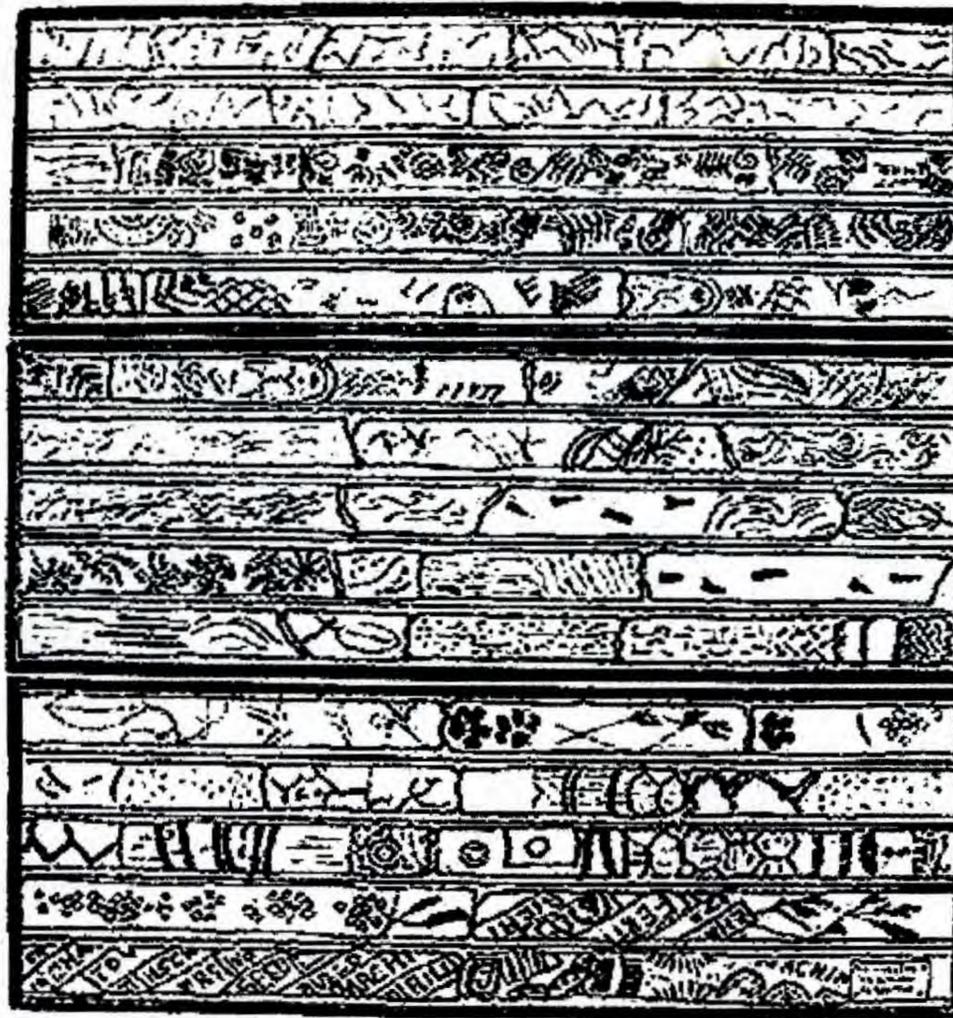
Cultural change is always difficult to effect. Because second settler Australians brought their own agricultural systems and notions of the landscape picturesque with them, it was often impossible to see the land for

what it was, or that what was being destroyed was forever lost. Polo grounds, European gardens, vineyards, and wind-farms (about to expand in the area), indeed the industrial sublime of mining which attracts me, all fit with a Eurocentric vision of an ordered landscape. Although we see all these on the other side of the fence, I do not think these things mean more to rural stakeholders than the long-term preservation of natural habitat and pastoral amenity. This is also true of the personnel we have met at the mine, many of whom would consider themselves 'green'. However, I do think they may not have thought of the long-term consequences

of the loss of ecosystem services. As George Main recounts in his essay, second settler Australians reshaped the grassy box woodlands of the central tablelands, long managed by Aboriginal fire-stick farming. Now the mine is finishing off that transformation, reworking the contours of the land into unnaturally shaped waste rock heaps and ninety-five metre high tailings dams.

The unspoiled view amenity in the Cadia region, once it was bitten into, seemed to change rapidly. A previously uninterrupted pastoral view now became a small city of activity. In the past two years, on the land we lease from the mine, a road, a power-line,

## Diagrammatic Key to Core Samples of Deep Time



Precambrian; microscopic life

Paleozoic; invertebrates and fish

Sea recedes; land plants establish

Establishment of present fauna and flora; Aboriginal arrival

European arrival

Land degradation

Introduced species

Diagram: Marty Huehner

and a pipeline taking water to the mine have been built. On the other side of that fence are the tailings dams.

Local artist Ken Hutchinson, in his series of portrait paintings of people and the landscape for the project, reminds us that the 'howling world of nature' has always been a force in human life<sup>4</sup>. And, as Paul Hawkin is quoted in *Fatal Harvest: the Tragedy of Industrial Agriculture*, 'without intending to do so, large-scale ventures seem to reduce ecological richness and human-scale endeavours to trivialities'<sup>5</sup>. The landscape settings become psycholog-

ical stage sets in Ken's paintings. His hillsides are scattered with sheep impaled on the stumps of ring-barked white box, tractors plough up the paddock right into his subject's ears, leaving trails of red dust billowing out behind. Ken has just coordinated *Sculpture on the Mount*, a reconciliation art project. An Aboriginal circle of sculptures on the western side of the Lachlan Valley is connected to a 'white dreaming site' on the eastern side by mirrors during the day, laser light at the moment of the September equinox, and later, when the lasers ran out of juice, car headlights!

Gerry Payne was one of the Aboriginal sculptors in the reconciliation art project and will contribute a life-size version of his canoe wedged in a tree for our exhibition.

The grazing industry does not have a clean slate either, of course. Massive changes to landscape have occurred as the results of bad grazing practices. In one sense the scale of environmental damage done by the mining industry in comparison with other rural industries is not as big as we feel. Peggy Spratt, a biologist and art student, uses wax encaustic and found pigment to

paint the eroded gullies and ravaged hillsides of our agricultural past. Wendy Teakel, artist and lecturer in sculpture at the National Institute of the Arts, ANU creates a large 'X' to mark the spot where environmental and social concerns meet in the landscape. Her materials—tin guttering, fencing wire, rain water and earth—are redolent of her past out at Wagga Wagga and the agricultural crisis she sees around where she now lives in country NSW. Meg Buchanan in her strongly worked triptych *Element to Elementary* uses materials found in the charred paddocks that she paints. She writes that 'although these burnt paddocks are no longer considered 'best practice', I see these paddocks as essentially beautiful, a symbol of Australian agriculture, and a starting point for the discussion of values.' Naomi Greschke, in her aerial views of agricultural patterns and burning, make us aware that industrial agriculture and the monoculture of large-scale mining have similar implications for a landscape aesthetic, including loss of landscape amenity. About her paintings titled *Mystery Plane*, Naomi explained how the series 'takes you up several thousand feet, where the eye must adjust to its new perspective. The ugly, barren or absurd can take on a new aesthetic value. The eye naturally selects harmonious elements of the larger picture. Organic shapes or lines can be found in the unnatural.' Both Naomi and Meg forge a new aesthetic out of the transformed landscape—simultaneously repelling

while attracting.

Within ecosystem management falls management of the visual amenity, seen now as an ecosystem service, which is where our project comes in and where the visual artists in this project become important interpreters and critics of commonly held and perceived aesthetic knowledge or assumptions about this landscape. 'Ecocriticism' was a term first used in the USA by William Rueckert in 1978 to denote the application of ecology and ecological concepts to the study of literature. Other terms used include ecopoetics, environmental literary criticism, and green cultural studies. I prefer ecocriticism because it covers a whole range of cultural work, including visual art. Donald Worster, in the introduction to *The Ecocriticism Reader*, writes:

*We are facing a global crisis today, not because of how ecosystems function but rather because of how our ethical systems function. Getting through the crisis requires understanding our impact on nature as precisely as possible, but even more, it requires understanding to reform them. Historians, along with literary scholars, anthropologists, and philosophers [and, my inclusion, artists], cannot do the reforming, of course, but they can help with the understanding.*<sup>6</sup>

Why worry? Pastoral landscape is already spoilt, degraded by grazing and cropping. Maybe if we had valued this

landscape more appropriately—valued it for the memories, the cultural history—then the scale of this loss would not be so big. As well as writing an essay, George Main is exhibiting a photograph that captures grief caused by a history of loss and displacement—his image of the waste rock heap through the abandoned shearing shed (and formerly schoolhouse, and makeshift dance hall) window freezing in time this transition. Sarah Ryan works with digital photographs to represent displacement. She symbolically relocates from the living room of an imaginary Cadia farm a 1940s Ray-n Ham vase, a somewhat funereal lustre ware object, onto the tailings dam, into the old shearing shed (now a storage area for mine samples), and onto the waste rock heaps.

Working in the field, artists and writers go out and engage with places, communities, and materials in innovative ways. They make site-specific installation and conceptual work. The work we have produced recognises landscape not as scenery but as the spaces and systems we inhabit and depend upon. Belinda Jessup collects leaves from white box, yellow box, casuarina, mistletoe and lichen, to dye silk cloth on the open campfire. She brews in her witches' cauldron an amazing array of landscape colours, twisting actual leaves into the fabric to make a distinct imprint. The soils and concentrate from the mine on the other side of the fence also create colour.

Marty Huehner, a freshwater biologist and artist, has made dental alginate prints of tracks on the surface of the tailings dam of a fox stalking birds, and lichen covered stone in the old 1850s Cornish engine house at Cadia Hill. Rebecca Solnit says 'landscape's most crucial condition is considered to be space, but its deepest theme is time'<sup>7</sup>. Marty, beside working with dental alginate casting of the tailings dam, has constructed clay impression timelines of the Cadia region's deep history, from the Devonian fish fossils in nearby Canowindra and Fossil Hill, through geological fault lines and natural flora, to European agriculture and, finally, the mine. These timelines are presented sequentially in core sample boxes from the mine and are fired with glazes from substances found at different sites at the mine and in the region. He is also working with the Canowindra Fish Fossil Museum on a separate project.

Lex Beardsell, a microbiologist and art student, herself with Chinese ancestry, has constructed vertical landscapes reminiscent of Chinese scroll paintings, starting with rubbings of 1880s Chinese gold diggings along the river, the sluice walls covered now in lichen. She has responded to these subtle colourings and used natural substances like soil and ochre to make the rubbings, then transferred historic photographic images into the works as a mere palimpsest. John Reid, Co-ordinator of the Environment Studio at the National Institute of the Arts, ANU also has

photographed the river and the mine, picking up on subtle issues of the touch people from the Wiradjuri, the Chinese, through to the current miners, have had on the land.

Sarah Ryan suggests in her writing that we need to recognise the monetary value we place on nature. The gilding of the land is fundamental not only to an aesthetic evaluation of that landscape but also to the dematerialisation of society. Similarly, the agricultural industry needs to look at their approach to ecosystem services, including the preservation of visual amenity. As Dana L Jackson says in *The Farm as Natural Habitat: Reconnecting Food Systems with Ecosystems*, the 'perhaps intractable problem is how to influence social evolution so that a land ethic, and not a pure utilitarianism, guides land-use decisions. We need all people to look at farming with new eyes, to see the potential of the farm as natural habitat, and to refuse to accept the inevitability of farms becoming rural factories to serve the global economy.'<sup>8</sup>

Just as Wendy Teakel uses corrugated iron, wheat, salt and tea as the significant substances in her installations dealing with paddocks and past / present farming methods, her poker-work and pigment drawings of fallow and productive paddocks are strong evocations of current agricultural practices that recall an indigenous presence. The works are aesthetic evaluations of these agricultural practices.

To see a landscape properly, different sets of data must be co-joined through an imaginative effort', said David Lowenthal. This to me is how to describe an inspirational landscape and how to make an aesthetic evaluation of it. Although I personally have responded to the many moods particularly of that one special gum tree at the swimming hole on the river, other readings make it more valid. George Seddon reminds us in his book *Landprints*, when talking about the Snowy River, that there are many different rivers. He introduces the idea of 'perceptual history', a concept that offers, he writes:

*a sequence of records of the way in which the river has been seen, by explorers, photographers, artists, natural historians, cattlemen, miners, engineers, hydrologists, bushwalkers ... There have been almost as many rivers as there have been observers, and that is in the end why the river is 'incoherent'. There can be no single view of it.'*<sup>9</sup>

The 1850s Cornish gold mine and engine house on the slopes of Cadia Hill Gold Mine is heritage listed. Within the mine's heritage area is the relocated Cadia cemetery. The old town cemetery was relocated uphill so that Cadiangullong Creek could be diverted and the new mine proceed. This major archaeological project involved exhuming 109 burials, DNA testing to identify remains, contacting relatives, and a ceremony to open the new cemetery.



**Meg Buchanan** *Element to Elementary* 2002 (Detail)  
122 x 549 cm Mixed media and found material on paper

This panel is from a triptych of drawings about the burnt stubble paddocks and undulating grazing land between where I live at Murrumbateman and the Cadia region. Although no longer considered 'best practice', I see these paddocks as essentially beautiful—a symbol of Australian agriculture.



**Mandy Martin** *Not in arCadia ego* 2002

30 x 40 cm Tailings, sulphide slurry, mica, acrylic and oil mediums on linen

This is one of a series of 100 small paintings, half painted in a gold palette of the river, the other half in a copper palette of the mine, which propose that the actual value of the Cadia region landscape is aesthetic, not material, and that the natural values of the river and native habitat if preserved, would in the long-term, outweigh the value of gold extracted from the mine

Junction Reefs mine on the other side of the fence upstream also has heritage protection over Chinese diggings and water-races, and its Cornish gold mine. The mine was rehabilitated after 1993 and has been beautifully restored with seeds collected from local travelling stock routes and the renowned Woodstock cemetery by Donna Windsor and Andrew Nolan of Greening Australia. Although the acacias, white box, kangaroo grass, and indigofera can never hide the fact that the contours are different, they will make a showcase when it is eventually reopened as a public reserve, unless Newcrest decide to develop it. The mother body of gold lies under the Belubula River, but Newcrest have demonstrated they can move mountains to change the flow of rivers, so I am sure a way will be found if the world price of gold makes it profitable.

It is our dream to see all of our property, and the 10 000 hectares of land the mine owns, rehabilitated and connected with Junction Reefs, re-establishing a whole range of ecosystem services, including the landscape aesthetic. The point of aesthetic evaluation by artists, writers, and poets is that the art itself becomes the evaluation<sup>10</sup>. In this spirit, following on from other collaborations in the past, I have, through ANU and local community contacts, brought together this diverse group of committed individuals for the current project. The exhibition and publication have deepened my understanding and

enriched my perception of not only our own property, but also of the Cadia region. For that I am humbled and grateful. I would love to prove that this Cadia landscape is so special it could be frozen in time and even restored to a healthier version of its original aesthetic. In reality, it is probably not a lot more special than those landscapes many of you have over your fences.

What I am certain of is that the unspoilt vistas and natural habitats advertised as a tourist attraction—the very amenity which the rural industry depends on and which attract people to live in the area—are being destroyed forever. We need to preserve what we have left. Agricultural and mining havoc needs to be rehabilitated. Questions need to be asked about whether we want wind farms and monocultures like vineyards as part of every vista. As I sit writing this at my desk, I can see in the distance the daily developments of North Cadia Gold Mine and the massively expanded open cut. On the ridge lying between the mine and me looms the prospect of a wind farm proposed by a Spanish energy company. The uninterrupted vista of rural Arcadia with white box, kangaroos, echidna and superb parrots in the foreground can be retained and re-established on our properties. Retaining and restoring the middle distance and the far distance is infinitely harder because it requires far-sighted cultural changes to reduce our material consumption, and the vision that in the long-term the natural values of this landscape will benefit society forever.

## Notes

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# NOT IN ARCADIA EGO

## *Reflections following a visit to Cadia mine*

John Chappell

### **Prologue:** *the lure of gold*

*The city lieth foursquare, and the length is as large as the breadth: and he measured the city with the reed, twelve thousand furlongs ... And the city was of pure gold, like unto clear glass ... and the street of the city was of pure gold. (Rev. 21)*

Each year at the approach of Easter, the House of Faberge delivered to the Tsar of All Russia an egg; not an egg from the canal of a bird but an egg bejewelled and worked from gold, bedewed with minerals, wrought with watchmaker genius; an annual gift from Tsar to Tsarina. Each year the egg was different: one year (Alexander III to Maria Fyodorovna, 1891) an egg of heliotrope, chased with gold rocaille and diamonds, contained a battle cruiser of platinum with rose-cut diamond portholes and golden guns, floating in aquamarine. Another year (Nicholas II to Alexandra Fyodorovna, 1900), a

silver egg with green enamel and gold guilloche held a golden train; its tiny locomotive with minute clockwork key pulled five coaches, the last being consecrated to religious devotions.

In this manner, the royal Romanovs celebrated a tradition extending back through time and nations—a tradition whereby monarchs commissioned golden works from craftsmen renowned throughout the civilised world for their works exquisite. But while words trickled down from palaces to the peasantry and became legends that leavened the sameness of their common day peasant lives, very little substance from the royal riches was sprinkled upon them. It was other crafts and other minerals that made the peasants' lot at once more secure and more anxious: clay, coal and bricks withstood winter and iron ploughs turned the sod, but swords of steel tore the flesh and left bodies for dead, half a family at a sitting. From pit to forge, mining and smithing became as much a part of the social cloth as



**John Chappell**

*Water Stress* 2002

Corrugated iron, water tank,  
perspex sheet and pipe,  
rigging wire, electric pump,  
2.4 x 2.2 x 0.9 m

This kinetic sculpture is a visualisation of our escalating water use, from early sustainable flows, to depletion, to catastrophic zero. A cycle takes about ten minutes but can vary depending on the rain or wind, symbolising the sensitivity of our over-stressed earth. Water is connected throughout the Cadia region; rivers, ground water, irrigation, evaporation, and rain—ultimately derived from the oceans. The price of overuse in one region may be degradation in another.

farming and building, baking, warring and worshipping—a threnody ringing across centuries of time and amongst nations until steam and machinery burst upon us with a boom that has repeated like a cannon, ever since.

Boom! dark satanic mills. Boom! locomotives and steamships. Boom! blast furnace and Bessemer converter; boom, boom, boom! electricity, flight, Silicon Valley—each crashing in like thunder and falling away in its own echoes: Kondratieff cycles to economists and addictions for humanity at large—each at base resting on base-metals quarried and mined in ever-increasing quantities: the old metals of iron, copper, tin, zinc and lead now mingling with alloys of the new: aluminium, titanium, magnesium, lithium and uranium. Throughout, the premiership of the yellow metal persisted: the dream of Everyman is to own a goldmine, and fortunes rose and fell like heavy seas, as much with each new goldmine as with new metals from which a new Rome might rise. New mines gave iron for battleships of empires and copper for the cables that linked them. ‘The Iron Blow at Mount Lyell, the world’s richest copper mine, smelted by the most advanced methods....’ And, despite bust ups of failed ventures and vanishing flights of cash, the boom of dynamite and clash of ore trucks sounded out a symphony entitled prosperity, whose first movement was progress; whose most obtrusive theme was gold.

## **Cadia**

As one approached the open-cut pit, larger than a hole in the ocean that would swallow a ship like Titanic, images flickered in the mind: doughty gold-seekers in their deep underworlds — gold-winning ring-smiths whose yellow jewels flowed to baronial hordes. But this pit at Cadia Hill Gold Mine was not at all like that. Hemmed by grassy slopes and Australian woodland beneath a winter sky, dump-trucks the size of houses crawled downwards on a curving ramp until they vanished, only to reappear like matchboxes at the bottom of the vast pit—to be filled with stone and begin their upward crawl. The ground heaved momentarily as explosives were fired; dust settled. But the pit has size only, without mystery; the rock is grey, without lustre; the ore is dross: only through technical stealth of sag-mill and flotation, something auriferous and smeltable is crabbed from the wretched stuff: less than a gram of gold in a tonne of rock; poorer than uranium in sea salt.

Gold, the bright yellow basement of jewels for which kings once killed, founded towns in our Austral domains; raided for gain, it came to stay. Ballarat, Bendigo, the Clutha rushes, Kalgoorlie and the Golden Mile: these were names to conjure with, and communities, clubs, churches and eventually cities were conjured into being by gold. Some endure though their gold is exhausted; the best favoured lived on

through symbiosis between city, farm and industry. Kalgoorlie lives on, sustained by giant pits resembling Cadia: from their kilometres-long Super pit, so deep that Titanic if stood on end wouldn’t reach to ground level, Kalgoorlie’s machines haul out eighty-five million tonnes of rock a year to be crushed to a slurry. This is more sediment than all Australia’s rivers carry to the sea.

But more daunting than the sheer size of Cadia, Kalgoorlie Super pit and mines of their ilk is the leaden balance sheet: so little, from so much. What with dirt-poor ore and massive rock overburden, near one hundred tonnes must be moved to win an ounce: it comes down to quarrying a ton of rock for a lousy six Ozzie dollars. And then there are the bills: bills to Caterpillar, Komatsu, Goodyear.... A million and a half dollars for a haul pack, a hundred thousand for its tyres. The list goes on and on, and the creditors are not Australian.

## **Depletion**

Through trackless wetlands and deep forest swamps, a river winds from mountains to the sea. If this were in China, the riverbank would be birthplace of tens of teeming millions and close-packed with factories, but here in the Fly River in Papua New Guinea, a passing eagle may spy only a fisherman’s dugout, or a village dog between crocodiles and palms at the water’s

edge. For eight hundred kilometres the river flows downstream from the port of Kiunga, through a water-world of forest, swamps and hidden lakes, to its delta. A handful of wide-flung villages barely interrupts the river-land.

An early intimation that there is a greater world beyond was crashingly announced by Luigi D'Albertis in 1876 when, with explosions of guns and rockets he and his polyglot house crew steamed their tin-can Neva upriver. A later and overwhelmingly greater shock in this never-world came a hundred and ten years later, when Ok Tedi Mining Limited opened operations on an auriferous gossan mountain, deep in rain-forest at the head of the Ok Tedi River. With faith only in itself, the mine is removing the mountain. Ships ply upriver, nourishing the mine and removing copper to the world. And, every year, five thousand millimetres of rain falls on the mine and seventy million tonnes of crushed rock washes into the river, to creep downstream into forest and back-water wetland alike. The riverbed silts up, fish decline, sulphides accumulate in the delta, without halt or remediation.

This sorry sort of thing is nothing new. Mines have ever been thus; their wreckage stands testimony to human endeavour, labour, guts and invention. With surging sentiment, tour-guides spruik and tourists snap their cameras at mine heads and tailing-heaps, black above Broken Hill, or on the sulphur-blasted hills at Mt Lyell.

### **Time's arrow and life's cycles**

Mining towns can outgrow their origins. The abrupt hills and dark Gondwanic forest around Port Chalmers gave way before axes and wagons until handfuls of Scottish settlers began to taste security—although their lot was modest enough. Then gold almost in bucketfuls was discovered by Gabriel Read at Tuapeka Stream—and the rest is history. Thirty years later, Dunedin, built on gold, stood as New Zealand's largest city; its first university town and first medical school, with civic buildings and cathedrals of stone. And having become established with rich farmlands to the south, the gold ran out—but Dunedin had now arrived at its civilised destination and has carried on ever since, a former gold-city that has superseded its parent.

Not all mining towns, though they be based on great lodes, lie amidst rich farmlands, and social realities depend on their mine's stage of life. Broken Hill, its ores nearing exhaustion, lives uneasily pensioned in middle age. In contrast, China's newest mining boom-city of Panzhihua on new-found ferric and vanadic ores, roars with youth and exuberance in wild gorge-lands of the upper Yangtse River: for Panzhihua, the future seems to stretch forth as a swelling river of smelters, factories and municipal prosperity. But for humans to realise themselves in societies that take anchor through generations, it is the distance of the arrow's flight that

matters, more than being close to the bowstring. Ten-year mines such as Cadia come and go before there is time to build a school, football club or repertory theatre. Generations have lived and loved, and live yet, around those aging, monumental Australian mining cities in waterless desert such as Kalgoorlie or Broken Hill, but there is little to sing about at these ten-year holes whose workers barely have time to scratch before they depart—and the list of ten-year holes is long.

As with all that enriches the tides of human affairs, mining—together with the passions, ambitions, deceits and rewards that flow from mining—add up to a complex matter. Aggressive mining will remain with us for as long as humans are shackled to the creed of growth economics; for as long as we consume coal in large quantities; for as long as it takes to unlearn the word 'disposable' and absorb the word 'sustainable' in its proper meaning. Gold mining both gives and takes away; it nourishes for a while, but how marginal is the balance sheet when margins are too short to restore the quarried rock to the holes from which was quarried? Where today are the thrilling treasures crafted from gold; who does the crafting, who owns the treasure and for what end? It is time to reconsider these things.



*Scar Tree. Belubula River, NSW. 2002* Photograph: John Reid

# THE BELUBULA

## *Thoughts around a common stream*

Guy Fitzhardinge

As a young boy, full of a sense of adventure and excitement, one of my favourite adventures was to go up to the dog kennels, let the dogs off, and then after reaching the river, to walk some four or five miles upstream to the old mine, Junction Reefs, and to explore the workings. The track to the Belubula River led down a long and bare ridge, and joined the river just upstream from where my grandfather had established the Lister pump in 1931 to water my grandmother's garden. "It was the middle of summer", my father said, "and the ground was so hard that the horse team could only just get the trench in deep enough to cover the pipes". The result being that by now the whole pipeline is now largely exposed.

Turning upstream, I followed the river past the old Chinese workings, plainly visible on almost every bend in the river, and past the entrance to the tunnel (the mouth now fallen in, and its location probably known only to me).

The dogs could never be persuaded to enter, but often, and against my father's explicit orders, I would enter and fantasise I was one of the Chinese miners. I could hear the picks and shovels as they struck rock, and smell the fresh earth. I imagined that I helped wash the gold laden soil, and finally packed the precious metal into the bones of the dead Chinese to be sent back to their homeland, which was the way, my father assured me, that they got the gold back to China!

Further up the river lay 'the Junction' as it was fondly called. Junction Reefs was a mine of a later era. While the Chinese concentrated on the alluvial gold, moving down the river working out all the likely spots for its deposition, the Junction was mined for reef gold. Where the Chinese left only piles of stones and humps and hollows, mining at the Junction left far more than that. There were old steam engines, rail tracks for the skip carts, the cyanide plant, and the smelting plant. There

were numerous shafts, mullock heaps, bits and pieces of scrap metal, the remainder of sheds and other paraphernalia. The remains of the mine manager's house and the assayer's office were still plainly visible, the latter being clearly distinguishable by the rows of crucibles marking the garden beds.

The Chinese came through from around the 1860s to about the 1890s and many of them subsequently left the river around then and took up work in 'ring-barking' teams clearing the landscape. The mine opened in the mid-1880s and shut in the mid-1930s. My father could remember being taken around the mine, where the pit supports were mostly fragile columns of earth, crumbling and unstable. Land tenure maps still clearly show the many small blocks where the mineworkers once lived. Some of the laneways are still visible, and the 'Hazelwood' community hall still stands. The school has gone, but crumbling bricks and occasional shards still mark its location. The cricket pitch can still be seen, though few today would know where it is. The remains of the schoolteacher's house can still be seen, though its pise walls have all but disappeared. Long gone also is the pony and trap that my father said he used to get to school.

Many of the miner's or mineworker's names are still around. Wells and Sheans are two. The Stubbs and Butts are another two, my father being greatly

amused when a Stubb married a Butt! The names live not only in people, but in lanes, locations and the oral history. Mining in those days was about people; it was labour intensive and slow. Picks and shovels gored out the ore, trolleys and carts transported it to the mine head, and slow steam driven batteries crushed the ore. For fifty years the mine was inextricably interwoven with the local community.

My father employed one of the old miners. He 'knew' where all the good places to prospect for gold were—the diggings that still contained gold rich ore, the places missed by previous prospectors (though not the Chinese, *they never missed an ounce!* Hector said), and the cracks and crevices that worked as a natural sluice box. As a boy I made my own sluice box, a cradle, and together with picks and shovels and a copy of Ion Idriess's book *Prospecting for Gold* set out many times to make my fortune on the river. In the depression, my father had said, prospectors made their living on the river. 'Old Ticehurst' lived just downstream from where the track meets the river, and on the rise on the flat there was once a shop. Scant signs of their existence remain, but there is still a small mound where the chimney of Ticehurst's house once stood.

The mine of course had long closed when I stumbled up there with the dogs. There was talk of it opening again, and we had a succession of

geologists tramping and chipping over the property for most of my adolescent years. However, such talk was met with scepticism, disproved when finally one day the lease was taken up again, and over a short number of years mined out again. New extraction methods and machinery had made economic to mine what was once uneconomic.

So when Cadia was proposed for development it came as no surprise. Cadia's history stretched about as far back as the Junction, and historical gold extraction methods used the same methods and techniques as the Junction. Through new technologies and processes, ore that was previously unobtainable had now become available. So in a sense the Cadia and Ridgeway developments were just a continuation of an old activity. However, where the landscape once rang to the sound of the pick and shovel, it now resounded to the relentless noises of massive trucks, pumps and machinery that continued day and night. Changes, like the building of a dam or the removal of overburden that once took many years to take place, now took place in months. Nothing seemed impossible; water is piped in from distant locations or lifted hundreds of metres, hillsides are removed, streams diverted.

Having a neighbour as a goldmine in what once was a once purely farming community gives rise to a range of thoughts. For example, while we are



**John Reid** *Heavy Hand. Belubula River, NSW* 2002

37.5 x 115 cm Digital print from 8 x 10 inch negative

'Heavy Hand. Belubula River', together with its companion piece 'Heavy Industry. Cadia Hill', indicates a scale of human touch in relation to gold mining near Cowra, NSW. Physical impacts on the sites depicted are separated by several decades in time but little more than a stone's throw in place. Both operations share the diversion of the Belubula River.

both part of the same ecological community, the notion of sustainability has different connotations. The term 'sustainable mining' would at first appear to be an oxymoron, but the harsh reality is that many would say the same thing about 'sustainable farming'. While mining has a huge impact in a small area, agriculture has a small impact in a large area. The black and the white in the case of sustainability gets a bit grey around the edges. It is obvious that the notion of sustainability has to lead to some higher goal, for example, the community's future well-being, if we are to rationalise the apparent disparity in the notion of sustainability between grazing and mining.

The second thought is that I now have a neighbour who I do not know and probably will never know. Certainly, I

know a lot of the employees, and they could well be part owners, but who is the real owner? The truth is the real owner is an amorphous body of entities or people listed on the share register. There is no rubbing of shoulders at the end of the day while having a few beers, sharing the same dust and talking about common problems. Ownership is by a group of shareholders who probably have never been to the locality and have no wish or intention of doing so. Satisfaction to them is the appropriated value of the mineral: the return on the dollar invested, cleansed and pure, untainted by the context in which it was won.

As a public company, there are peculiarities. Make too much money and you are taken over, don't make enough and the same fate happens.

For us, as private landholders, if we make money, we reinvest. We invest in our future. If we lose money, we reduce spending in an attempt to ride over the hard times. The quality of our lives is inextricable linked to our knowledge of the vagaries of the climate, soils, landscape, and markets. This linkage is broken with the mine. Its sustainability is based on technology; the value of the Australian dollar, the performance of other sectors, and a range of factors that have essentially nothing to do with this locality. Once again, not only are the appropriators of the wealth isolated from the context in which it was won, but the process that generates such wealth is likewise influenced by factors that lie far outside this ecosystem or community.

A third and obvious point is that the

mine is significantly bigger, stronger, better resourced and capitalised than I will ever be. Any entity that can purchase seventeen properties, invest more than \$5 million in set up costs, shift more than 300 000 tons of rock a day and so on, obviously deserves respect. I know that my shrill voice of protest is likely to be lost amidst the passion for 'development'. This very fact however, is a clear signal that special attention needs to be directed in an attempt to hear people like me and other locals. Unlike some other countries (the USA for example), landholders in this country do not own what lies below the surface. We have no legal claim to it, and can at best expect only compensation for what lies above the surface. However, the effects of the development reach far further than this throughout the social fabric. A community has disappeared with the mine's appearance. Friends that grew up with one another for 40 years no longer speak as a result of differing opinions regarding the mine. Panuara tennis courts, funded and used by the local community for almost 100 years, now lie unused. There is no longer a community there to use it.

The way forward lies in recognising not only the environmental disturbances but also the social disturbances. We all operate within a legal structure that provides guidelines and parameters for behaviour. If, for various reasons, we do not like mining or cotton farming or grazing, our thoughts should be direct-

ed toward the system that permits it, rather than the individuals who practice it. In our case, both mining and grazing have strong historical precedents. Grapes, for example do not, and yet I do not see the vitriolic complaints against that industry even though it involves significant ecological disturbance. Whether I agree with the mine or not isn't the issue. The reality is that it is there, and the way forward is not to identify and debate what we do not have in common, but to explore and enlarge what we have in common. Sure, there are some negative sides, but the mine also offers a huge potential that we never had. The mine is capable of doing things that no small community ever could. What I need to do is to convince the mine, and thus their owners, that to be a good neighbour, not just to me, but to the community as a whole, is in all our best interests. Similarly, I need to show them that being a responsible, sympathetic, and caring occupant of this landscape in terms of its environmental and natural heritage will deliver rewards that even gold could not buy.

We cannot separate the community from nature and the landscape, in exactly the same way as we cannot separate the future from the present. One of the features that the mine and I have in common is whatever each of us do now impacts on the future, the future not just of people and communities, but of the total environment in which they live. For that reason alone we are compelled to seek common ground.



# PATHWAYS

## George Main

We drove down rough tracks through stony paddocks to camp beside washpan bend. Here, steep hillsides woven with sheep tracks meet narrow river flats undulating with 'Chinese diggings'—turned earth amid mysterious, tumbled constructions of stone. 'I never saw a country better adapted for the grazing of all kinds of stock than that we passed over this day', explorer John Oxley wrote in his journal when he stopped for the night, uphill from this place, in April 1817. Oxley described a park-like vista of widely spaced trees

**George Main** *The view from 'Bexley' woolshed* 2002

100 x 75 cm Black and white photograph

Stories shape the way we see the world, and act in it. This old timber window of an abandoned Cadia woolshed is a metaphor for the different frameworks of perception that shape action towards land and people. Perhaps the stories told here through art and writing will foster fresh worldviews and alternative actions.

rising from swathes of tussocky grassland. When the sun rose above wash-pan bend in April 2002, I walked up the frosted slope and described in my notebook the same land encountered generations ago by the explorer.

*Closely cropped grasses, spreading mat of juvenile Paterson's curse. Grey worn timber, fallen across gullies of loose earth and stone. Some trees dead recently, others much longer. White box overwhelmed by rust-green drapery of mistletoe. Guy at a loss to know how to begin restoring this river country (hills, battered, along river). 'Where do I start?' he asked Sarah.*

To colonise and transform the central-west tablelands and slopes of the Great Dividing Range, settlers found and secured pathways that became wide roads and railway routes. From the coast came explorers, soldiers, convicts, cattle and sheep, steel ploughs, axes. To the coast and beyond went wool, meat, gold, timber and grain. At Blayney I picked up a tourist guide with glossy photographs of grazing flocks and trellised grapes, bright paddocks of flowering canola, a steam engine and the rubble of gold mines. When explorers Blaxland, Wentworth and Lawson 'forged their way', said the guide, through the scrubby Blue Mountains, 'they opened up the heart of Australia.'

Men of capital and their convict workers fought for this country after John Oxley marvelled at its fertile grassy wood-

lands. In the 1820s British markets called loudly for wool. Settlements, mining sites, and homesteads appeared on the land as settlers bound the central-west to a worldwide network of Empire and trade. When a mine opened, the nearest small towns swelled with people before subsiding as horses or trucks hauled the last gold and copper away.

Global forces continue to shape land and lives on the western slopes. Black Angus cattle dot the hillsides. Japanese consumers pay well for their fine beef, marbled with fat. Globally mobile capital has established the new giant gold and copper mines at Cadia Hill. Farmers carefully consider present trends in international prices before deciding what crops to sow. In the international marketplace for agricultural commodities, ruthless competition erodes the prices received by farmers and elevates the costs of imported inputs and machinery. A few years ago, one farmer told me, when prices were particularly lousy and the season poor, the carpark outside the pet food factory at Blayney filled each night with white four wheel drive utes. Inside the factory, farmers had taken second jobs to keep family and land together.

Pathways join distant places and people. They also divide and intersect, fragmenting land and lives. Steel ploughs, superphosphate, and the hungry mouths of domestic stock rearranged ecological patterns and flows as set-

tlers farmed and grazed the central-west slopes. Ecologists Suzanne Prober and Kevin Thiele say that on the western slopes of the Great Dividing Range, less than 0.01 percent of the original grassy woodland community remains today in a healthy, diverse condition.

A rare fragment of woodland trees, grasses and herbs cloaks six gently sloping hectares inside the boundary fence of Woodstock cemetery. The small town of Woodstock, north-east of Cowra, failed to meet the expansive visions of its early surveyors. Since townspeople erected a fence to exclude stock from the burial ground, much of the land and its diversity of plants remained undisturbed. In spring-time, beneath the grey-green crowns of white box trees, lustrous chocolate lilies and bright yam daisies rise amid tussocks of kangaroo and snow grass. At the cemetery fence this complex texture of open woodland ceases abruptly. The endless patchwork of crops and pasture begins.

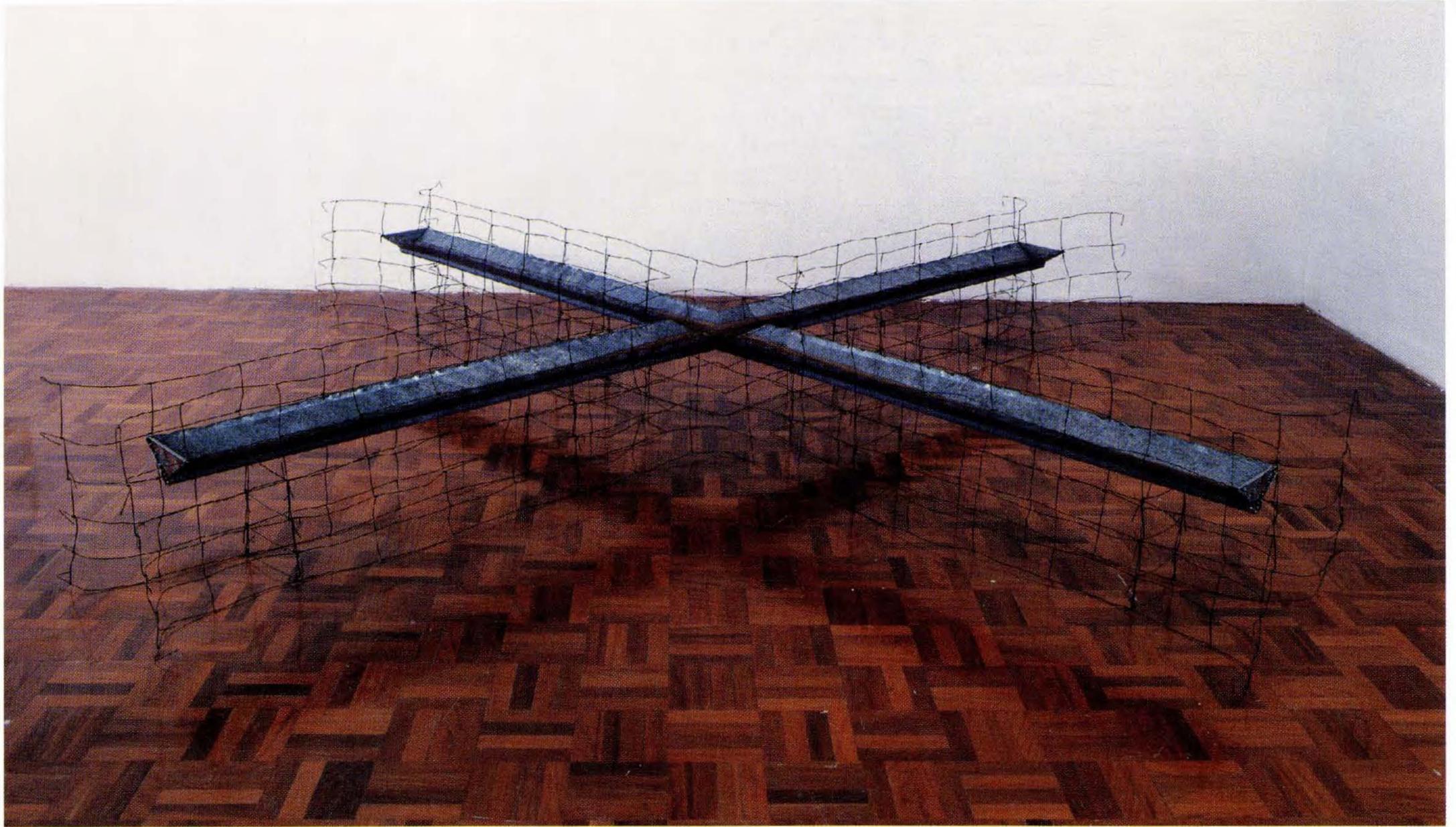
I visited the cemetery in winter and walked tenderly through the understorey profusion of herbs and grasses bleached grey by frost and sun. My feet sank into ground made soft by layers of decaying organic matter and the tunnelling of ants. Here locals and ecologists had recently burned neat rectangles in the intertwined thatch of kangaroo grass tussocks and fallen white box leaves and branches. A



**Peggy Spratt** *Once there were white box* 2002

18.5 x 32.3 cm Wax encaustic, pigments, wax medium on canvas/board.

Mining has had a dramatic effect on small areas of the Cadia region but the long-term effects of clearing and unsustainable agricultural practices are seriously degrading large areas of this currently sunburnt country. The chronic problem becomes acute during drought but drought is a normal part of Australia's weather pattern which we need to manage for.



**Wendy Teakel** *Cross Trough—paddocks and watercourse* 2002

70 x 510 x 510 cm Galvanised iron, fencing wire and dam water

The cross is an intersection, a point where human and landscape intervene. The fence protects but further it usually separates mine from yours. Our sense of ownership of landscapes overrides our sense of belonging to, and being part of them. We constantly contain and control water in landscapes. Water dammed without flow dies, and any water usage or management has implications well beyond its immediate vicinity. Essential to life, water is more precious than gold. When will we realise this?

droughty winter, no rain had yet washed the soft ash away. The round leaves of juvenile white box trees perched twisted and scorched above blackened tussocks of kangaroo grass. A nearby sign says that burning the dense stands of snow and kangaroo grass allows native buttercups, chocolate lilies, yam daisies, and other bush food plants to flourish in the spaces opened by flame. I walked to the wire fence. On the other side, winter sunshine and artificial fertilisers brightened a wide crop of oats. Hundreds of metres away an old white box tree stood alone.

The burning trials at Woodstock cemetery are part of a wider movement of learning led by scientists, indigenous people, farmers, and other members of the community to comprehend the nature and dynamics of pre-colonisation vegetation communities on the western slopes. With listening and observation, time and thought, a sense emerges of how this fertile landscape functioned before European settlement. A growing intimacy with land and its lively web of connections will help land managers to stem the processes of ecological disruption that came with colonisation. The evidence emerging at Woodstock cemetery is that Wiradjuri 'fire-stick farming' nourished a wide range of plant species and bolstered the resilience of land against drought and other extreme events. Humans have shaped the patterns of this land for millennia, and continue to do so.

The careful relationships the Wiradjuri held with their ancestral country on the central-west slopes and tablelands weakened and fractured as settlers strove to establish their network of pathways across the region. One afternoon we crossed the Belubula River at a ford of rounded stones and drove up a steep track to see a tall scar on an old box tree. Flaky bark rolled inward like thick pastry over the weathered, exposed oval of heartwood. Kym Freeman, a local Aboriginal artist, said he thought a Wiradjuri warrior had cut and removed the bark to make a fighting shield. Back at the camp on wash-pan bend we flicked through Mary Coe's book on Windradyne, a famous leader of Wiradjuri resistance against colonisation of the central-west in the 1820s. Kym paused on a drawing. *Dance of Defiance*, read the caption. Four rows of muscled warriors, each with a fighting boomerang in their belts, clubs and shields raised.

In the early decades of European settlement some survivors of disease and conflict managed to remain close to their country by working for the newcomers. Meta Rothery spoke of hundreds of Wiradjuri living on the flat above her homestead in the early 1830s, when her grandfather first established his grazing property 'Cliefden'. Far to the west, on the open plains, Aboriginal men and women commonly lived and worked on wide pastoral stations. But closer east, on the relatively densely settled western

slopes and tablelands, historian Peter Read observed that there was less demand by settlers for Wiradjuri labour. In the late nineteenth century closer settlement and Aboriginal 'protection' policies pushed most Wiradjuri people onto church missions and government reservations.

Wiradjuri families camped on John Grant's Merriganowry run, a vast grazing establishment on the Lachlan River below Cowra. Stan Grant, a Wiradjuri elder, has traced his Aboriginal and European ancestry back to this riverside property. Like the Lachlan River floods that once carried silt and red gum branches across the plains, a tide of disruption and loss took Stan's family far from their land. Stan spent the early years of his life on a reserve down the Lachlan at Condobolin. To maintain what bonds they could in this transformed world, his people knew they had to change. On the Condobolin mission the old people made sure their kids did not pick up the tribal language. "It was a real threat", Stan told me. "The fear was real, that had we gone to school and started speaking Wiradjuri, that the governments may've come and removed us and took us away from there. Because the threat was there, all the time: 'if you speak this language to your kids we'll come and remove your kids', you know. So the language was never spoken around us".

Stan now runs the Wiradjuri Language Development Program with anthropologist

John Rudder and teaches his language to groups of children and adults. "If you don't have your language, you don't have a culture", said Stan. To revive the vibrant language once spoken across Wiradjuri country, John and Stan consulted elders who remembered odd phrases. They combed through word lists compiled by missionaries in the nineteenth century and discussed grammar and structure with linguists. As they drive across the western slopes to meet classes in distant towns, land and culture reconnect and the Wiradjuri language comes alive. "When I drive around I see names on signposts ... We were driving between Orange and Parkes and there's a creek there, Bindogundra Creek. This is a mussel, you know, the mussel we used to eat, the freshwater mussel. And 'bindugayn-dhuray' just says 'mussel-having', mussel-having creek."

\* \* \*

Joan Phipson passed busy rapids and quiet pools during long walks in the solid shade of river oaks. Ribbons of green algae swayed in the steady flow of the Belubula River. When dry summers descended on her property 'Wongalong' and the grassy hills turned to gold, falling river water retreated to deep holes where water rats made burrows beneath red gums. Joan listened and thought as she walked along the uneven, stony riverbanks. Story lines, characters and titles rose in her mind. Joan thought the truth must sound odd,

that the ideas for her many children's books so often came from the river. 'I would like to thank it if I knew how', wrote Joan, 'for being such a friend to me for so many years.' The Belubula lost its distinct seasonal variability in flow when the dam went in above Carcoar to ensure summer supplies for downstream irrigators. European carp took advantage of the new conditions, and the algae streams and water rats vanished.

A few sharp twists downstream from wash-pan bend two wide black pipes descend through a mesh platform into a waterhole to draw away some of the Belubula River's regular flow. At night an electric light at the pumping station casts an industrial orange hue across broken water and into the dark spaces of river oaks. A humming pump lifts water from the valley into a pipe that finds a path along steep ridges to the great mines at Cadia Hill Gold Mine. At Cadia a towering, dusty industrial complex pounds, concentrates, and wets gold and copper ore into a sloppy mix. Powerful pumps push the wet concentrate along a thirty-five-kilometre pipeline to the railway at Blayney where it is dried and loaded into shipping containers for smelting in Japan.

From a viewing station on the side of a tall hill I gazed down the steep grassy paddock peppered with stringybarks and white box trees into the deep spaces of the open pit. Magpies swept over tussocks of phalaris and the yellow

flowers of dandelions. A roof of rusted corrugated iron supported by wide stone pillars offered shade and shelter. This recent construction of recycled materials is part of the official heritage precinct of the Cadia Hill mining development. Further up the slope brass plaques are fixed to rows of basalt boulders. Each round stone marks a burial site. To make way for the open pit, archaeologists relocated over a hundred graves to this hillside from the old Cadia town cemetery that lay beside Cadiangullong Creek. When the excavation began early one spring daffodils and jonquils rose from the graves and sheep grazed the green paddock next door. Most graves held the remains of children. An archaeologist's fine brush unearthed a glass feeding bottle placed with gentle care on the breast of a baby. Down a sharp slope from the relocated rows of graves stand the stone and brick engine house and chimney built when mining began at Cadia in the 1860s. From the viewing station visitors look back to see the graves, the old buildings, the past. They look forward into the open gaping pit and the bright future they are told the mining development will bring.

An alternative sense of time is conveyed inside the old 'Bexley' woolshed that sits near the mine tailings dam below the ore-processing complex of steel buildings, pipes and machines. Here fine slurry, waste material from the mills, is dispersed across wide paddocks. Bill Gunther used to own

'Bexley', a grazing property that included part of the land now thickly blanketed in wet clay and other waste. He told me the old Boxlands schoolhouse made up part of his woolshed. A local historian wrote of the regular dances held in the single-room timber building beside Cadiangullong Creek. Tom Harris senior played the piano accordion. Someone had shifted the schoolhouse a short distance to 'Bexley' before Bill bought the property in 1964. He added to the schoolhouse to make his woolshed. Today, its slatted timber floor still smells of sheep. Unlike at the mine's contained historic precinct, where a neat fence-line severs the past from the future, history at this woolshed feels layered and interlaced, all present at once. Industrial dust from passing mine trucks coats wool fibres left behind at the last shearing. A sash window of the old wooden schoolhouse frames a solid stony bank, the tailings dam wall outside.

Bill spoke of the first time that he saw this place, when 'Bexley' was for sale. The road wound through scrubby hills. Steep stony country of stringybarks and eagles nests. Not the productive farming and grazing country he sought. Then the road emerged from the scrub as the land opened out into a broad valley, picturesque and fertile. A plateau of chocolate and red basalt soil nourished yellow box trees, leafy and wide. River oaks lined Cadiangullong Creek. Bill and Fay Gunther brought up two daughters on their farm. Ann-Margaret



**Ken Hutchinson** *Laura Rothery* 2002

Acrylic on canvas, 56 x 64 cm

I was born in the Lachlan Valley and I have chosen to come back to live and raise a family. I have a strong sense of place here. This series of paintings, *Face the Landscape, From the Mine and Beyond*, is of people, mining, farming or just going about their daily lives in this landscape and the effect they have on the land and conversely how the land affects them.



**Meta Rothery** *Daewoo Dog* 2002

14 x17 cm approximately. Oil on river stone

This series of dozens of hand painted rocks titled, *Belubula; River of Memories*, depicts the important things on the farm in the eight decades that I have worked and lived here. I paint the bushrangers and the Royal and colonial history—all part of our property, an original Kings Grant from the 1830s. I also paint our pets, birds, horses, cattle, sheep, and feral pests. Sometimes I paint famous people like Cathy Freeman and Plugger.

and Julie went to the local Errowanbang school, and on holidays their schoolmates would stay. *Everyone used to fall in love with 'Bexley' when they came*, Bill said.

An old-timer told Bill that in the early days during the cold months, people at Forest Reefs led draught horses down to these grassy, creek-side paddocks where winters were mild. On 'Bexley' Bill and Fay grew crops of wheat, oats and barley, and grazed their sheep on lucerne pastures. The view from the homestead's front verandah passed over open paddocks and blue hills to Mount Canobolas. Bill told me of the sweet water that cleaned itself across the gravel beds of Cadiangullong Creek as spring sunshine melted winter snow on the mountain. He relished the taste, *better than bloody rainwater*.

A few years after Bill and Fay sold their farm the old mine reopened at Cadia Hill. At the pub in Blayney contract workers from Sydney and Newcastle told Bill they were troubled by the changes their bulldozers wrought. Sometimes Bill pulls his car off the new road above the tailings dam to gaze across the transformed place that used to be 'Bexley'. On the upper reaches of Cadiangullong Creek fresh spring flows no longer filter through beds of gravel. Giant trucks rumble by as creek water silently enters a steel tunnel fixed to the bare western wall of the open pit. The river oaks are gone too. And the wind that falls from the hills has no dark

sprays of thin leaves to ease through and sigh.

\* \* \*

In the carpark the air smells of petrol, fried food, and roses. Hungry travellers park station wagons beside bright gardens at the tourist information centre. Busy highways meet at the bridge that takes traffic across the Lachlan River into the main street of Cowra. Across the wide concrete bridge townspeople and their dogs walk to a green park of mown kikuyu, where a few old red gums totter on the edge of the steep riverbank.

From the bustling carpark, the rumble of a truck above the Lachlan might take the eye of a visitor along the sweeping arc of the bridge to a monumental redbrick building on the opposite riverbank. The bold tower of St Raphael's Roman Catholic Church rises tall above the bridge and the river flats, its pointed turrets and lofty crucifix drawing attention to the heavens, away from this place. Alternatively, the bark of a dog as it splashes into muddy river water might cause a traveller to look down the sloping riverbank, where afternoon sunshine illuminates an unexpected sight beneath hectic bridge traffic. Down here, wide concrete pylons marked by geometric shadows are alive with vibrant designs. In differing shades of ochre, white and black are handprints, giant totemic animals—platypus, echidna, koala—and a

stylised map of Wiradjuri country, its ancient travelling routes and meeting places.

Kym Freeman, singer-songwriter and visual artist, coordinated the project. On one bridge column Kym painted a great eagle perched majestically on a massive granite rock. Beneath the eagle the word 'MINIMBAH' is painted in stark white capitals, a Wiradjuri word for a place of learning, Kym told our group of eager listeners. Kids from each local school came down to the river to work on these paintings. Names are painted in a flowing script beside small handprints: *Ali, Cameron, Donna, Karl*. Above an image of a snake-necked turtle embellished with cross-hatching, Kym painted an old man with long hair and a white flowing beard, an imposing and watchful custodian for this site, gazing in silence from the cold cement pillar.

'I sing my songs with feelings, as I always do, I'm singing to reach out to you', Kym sings in one of his songs. These animated paintings reach out to travellers paused high on the riverbank by their parked cars. The bright images draw some of them across the busy road and down the cement pathway to the shady spaces beneath the bridge, down close to the flowing river and damp dark earth, to encounter a way of seeing and knowing embedded in the lively patterns of places.

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*Gold Footprint. Belubula River, NSW 2002* Photograph: Sarah Ryan

# GOLD FOOTPRINTS

Sarah Ryan

Everything is big at the Cadia Hill Gold Mine—the hole in the ground, the trucks, the power lines, the plant, the noise from blasting, the wall of the tailings dam, the lights at night, the piles of waste rock visible from twenty kilometres away. Equally audacious is the newer underground mine nearby, Ridgeway. As the gold bearing ore is mined from deep underground, the excavated areas are allowed to collapse, eventually leading to a sunken cavity at the surface about three quarters of a kilometre across and one hundred metres deep.

The mines are big, not only in size, but ‘big’ in time. The changes to the landscape happen quickly. If no new deposits are found nearby, both mines will have come and gone within twenty years leaving a vastly altered landscape behind them.

Clearly the mining company, Newcrest, has obtained the requisite approvals and permits to build and operate these mines. The board and shareholders

have approved of the investment for the projected financial benefit it will bring them. The legally-required environmental concerns have been satisfactorily addressed, local council approvals given and political blessing bestowed by the Premier, Bob Carr, in a gala opening of the Ridgeway mine in early 2002. But is this the full story?

I don’t think it is. I want to tell the story another way, one in which society might look at the pluses and minuses of making such intense alterations to our land. The currency of this story is a gold wedding ring.

There are about five grams of gold in a typical Australian wedding ring. Choosing a gold ring to represent the products from a gold mine is a reasonable thing to do. About eighty percent of the gold currently produced around the world every year is used for jewellery or for storing personal wealth in the form of bullion. Of the remaining twenty percent, a small amount is used for dental

work and the rest is used in tiny quantities in items like mobile phones and computers. Gold has been one of the most highly desired materials for satisfying human vanity and cultural needs because it is scarce, it doesn't tarnish or corrode and is easy to shape into decorative items. It is people's willingness to pay for gold that is the ultimate reason for the gold mines at Cadia.

The two mines between them will produce enough gold over their lifetimes to make fifty million wedding rings. At today's market prices, each ring contains about \$90 worth of gold so the total returns look pretty attractive. Production costs at these two mines average \$57 per ring, allowing plenty of room for other company costs like the final processing in Japan and exploring for new deposits as well as a reasonable return to investors.

On top of that, most of Australia's gold production is exported so those hypothetical gold rings reap foreign income that helps pay for our appetite for imported consumer goods. These two mines account for about seven percent of Australia's total gold production, which in turn produces about \$5 billion annually in export earnings. Thus each ring earns about \$85 in export earnings, enough to perhaps cover the import of a pair of gym shoes.

Another way of looking at the economic value is to use an economist's measure—net present value. At \$19 per

Ridgeway ring, this is the net additional value that the ring brings to the economy; the economic value that wouldn't have existed without the mining project. Included in this economic plus is some small additional value from minerals other than gold that are recovered from the same ore. For example, along with each wedding ring and its impact comes 13 kilograms of copper. Strictly speaking, the gold footprint I write about is a 'gold and copper and other mineral' footprint, but it is only the gold that makes the mine possible.

It is also commonly regarded as a plus that mines provide jobs for people in regional Australia. At these mines, one gold ring provides employment for one person for about forty minutes. Some of the 950 people working at the mines have families who live and shop locally and therefore contribute financially and socially to the local economy. So there are sound economic reasons for the gold mines.

The symbolic value of a wedding ring should also enter the ledger. While profligate use of gold jewellery could be classified a human vanity, for some a wedding ring is a treasured symbol of a strong social relationship. The symbolism has deep roots in our cultural history and for those people who treasure their wedding ring, it has meaning far beyond its value in dollars.

What might be other legacies of our appetite for gold? What silent footprints

will forever be padding along behind the travels of our representative gold wedding ring? To begin with, consider the weight of rock that has to be moved around. Before the open cut mine produced an ounce of gold, fourteen million tonnes of 'waste' rock had to be moved before the gold bearing ore was exposed. Even after that, 'waste' rock that contains no gold, or only minute quantities of gold, continues to be generated and is simply carted out of the mine and dumped in new hills called 'waste rock dumps'.

The ore that contains economic levels of gold is then crushed and milled and the valuable minerals concentrated by a series of physical separation processes in large vats of turbulent water. The valuable concentrate is pumped as a slurry through a pipeline to Blayney, thirty kilometres away, while the watery and finely ground waste rock is pumped to a 'tailings dam'. A gold ring from the open-cut mine involves the moving of twenty one tonnes of rock with a mere nine tonnes per ring entering the treatment plant.

By the same measure, the underground mine at Ridgeway is much more efficient. Because the ore body contains a higher concentration of gold, and only the ore body itself is mined, less than two tonnes of rock have to be moved to gain enough gold for one ring. Taking both mines



**Belinda Jessup** *Ecological Disapperation* 2002 (Detail)

100 x175 cm. Found mining pigments, white box, casuarina, yellow box, vegetable dye, silk organza, silk habute

The pigment from the mine and the dye derived from native flora are used to explore the relationship between the natural and imposed second settler environment. The distortion and manipulation of the silk cloth relays memories and feelings for the Cadia region, the river, and the landscape.



**Lex Beardsell** *The Golden Mountain* 2002 (Detail)  
93 x 60 cm. Watercolour, graphite on calico

Landscape is a metaphor for my own life and as a reflection of my interest in my second settler British and Chinese forebears who arrived in Australia in 1850.

together and their projected lifetime production, the average weight of rock moved for one ring is ten tonnes, about the weight of ten family cars. Another way of looking at it is that the weight of rock moved is two million times the weight of gold in the ring.

What are the consequences of moving and processing such large quantities of rock? It takes a lot of energy. It takes precious water. It changes the shape of the landscape.

There are two major sources of energy used in the mines: diesel fuel and electricity. Diesel powers the front-end loader, the two huge shovels, and the eighteen haul trucks that pick up and cart the ore from the open pit mine. Diesel also powers the equipment in the underground mine and assorted service vehicles above ground. This thirst for fossil fuel consumes over 100 000 litres of diesel per day, equivalent to about ten litres of diesel per ring, about a bucketful or the amount a four wheel drive needs to travel one hundred kilometres.

This energy only gets the ore to the processing plants. Energy inside the plants (one for Cadia Hill ore and one for the richer Ridgeway ore) is supplied by electricity taken from the NSW state grid. The rocks are first ground in a SAG mill (Semi Autogenous Grinding Mill), a horizontal coffee-grinder of giant proportions. At twelve metres in diameter, the SAG mill in the Cadia Hill Gold Mine

plant is the largest such mill in the world. It takes a twenty-megawatt electric motor to turn this grinder alone, about the same power as 150 medium sized car engines. The crushed ore from the SAG mill passes through two smaller ball mills and then through a long chain of large tanks in which the gold and copper minerals are separated out and concentrated. The electrical energy needed for this processing, as well as the pumping of water and tailings around the mine site, amounts to about nine hundred megajoules per ring. This is about two percent of the energy that the average Australian uses every year in household power, heating and transport—a significant proportion of an energy consumption that is amongst the highest in the world.

The impact of burning fuel to make electricity is not felt at this mine site. The coal, gas or oil used to fire the power stations is mined elsewhere; each has its own localised mine site impacts and footprints. Ninety percent of the electricity produced in NSW comes from burning coal, a particularly inefficient (although convenient) way of delivering energy since two-thirds of the energy content is lost in the conversion process. On top of that, the carbon dioxide that is released when the fuel is burnt is adding to growing amounts of carbon dioxide in the atmosphere. This in turn is believed to act like a blanket and trap heat, leading to a greenhouse effect and so to global warming. The diesel and electricity used to produce

the gold for our one ring sends 270 kilograms of carbon dioxide into the atmosphere. This is the amount that would fill a large living room or about four percent of the greenhouse emissions produced in making food for the average Australian every year. Not much perhaps, but every other manufactured item brought into the house has its own greenhouse footprint and they are quietly adding up.

The impact of global warming is difficult to predict, but rising temperatures will certainly alter climate and rainfall patterns. Besides affecting industries like agriculture and tourism, native plants and animals will be affected. In regions like this one, where the original plants and animals persist mostly in highly separated fragments, the opportunity for species to move across the landscape as climate changes is highly restricted.

These energy footprints of the ring do not include the earlier footprints laid down during construction and others associated with mine operations. For example, all the buildings and machinery of the mine contain 'embodied' energy, that is the energy it took to manufacture them. Additional fuel and embodied energy is also involved in transporting mine staff to and from work, and delivering the diesel (more than two tanker loads daily) and other inputs like tyres (more than 430 giant tyres annually), chemicals and the steel balls that are added to the ball mills to

help break up the rock. Three semitrailer loads of steel balls are delivered daily to feed these hungry mills. The energy involved in making these balls amounts to about two hundred megajoules per ring, about a quarter as much again as the direct energy used at the mine site.

Further energy is used to filter the slurry of concentrate after it arrives in a pipeline at Blayney, to transport the 160 shipping containers a week by train from Blayney to Newcastle, then ship it to Japan for final processing. After that the refined gold still has to be sold and the gold ring manufactured and retailed. None of these additional energy costs appear in our calculated energy footprints.

Once the rock has been crushed to a fine powder, it passes through a long series of tanks where the precious minerals attach themselves to very fine air bubbles in the stirring water and rise to the surface for collection and further concentration. While this method has some obvious environmental benefits over the cyanide or mercury previously used to process gold elsewhere, it uses large quantities of water. Each gold ring needs about 8 600 litres, although seventy five percent of that comes from recycled processing water and a further ten percent from treated sewage effluent brought in a pipeline from Orange. So only 1 200 litres is freshwater taken from local watercourses. Only 1 200 litres! This is 120 household buckets of water for one gold ring.

The freshwater comes mostly by pipeline from the Belubula River, twelve kilometres away. Smaller local amounts come from dams on the Cadiangullong Creek, and on one of its tributaries in the valley, Rodds Creek. Every day, fourteen Olympic-sized swimming pools of water are taken from these sources.

Water levels in the Belubula River are regulated, like most in the Murray-Darling Basin. In this case the control is exercised by a dam upstream at Carcoar. This dam provides water for a number of local towns and villages, for licensed irrigation use downstream around Canowindra, and now for the two gold mines. Sitting by the banks of the Belubula one evening, I asked a local land-holder about the changes he'd seen around the river since his childhood. Faster than I could write, he recited a list of the living things that have disappeared or become very rare since he was a child: platypus, water rats, echidnas, red-brow finches, firetail finches, quail, black-faced cuckoo shrikes, big grey thrushes, treecreepers, diamond sparrows, shrimp, red wasps and frog blanket (a water plant). In their place are foxes, cats and carp—three pernicious and persistent pests.

Much of this change in and around the river is due to the local impacts of agriculture (clearing, stock, pests, pesticides, herbicides, fertiliser), but some is due to changes in the annual pattern of water flow caused by controlling the

amount of water released from the Carcoar dam. Before irrigators wanted water in the warmer months of the year, before industries and households wanted reliable daily supplies of water, and before we built the 12 000 dams and weirs across the creeks and rivers of the Murray Darling Basin, rivers in southern Australia used to run cold and high in winter and low and warm in summer. Now that we can control their flow and harvest their waters, they run low and cold for much of the year. They're often cold in summer and low in oxygen as the water released comes from the poorly oxygenated layers of water near the bottom of dams. All this control means floods are far less frequent. The plants and animals that used to live in and around the river had life cycles in tune with the cycles in the river, and it is no surprise that in eliminating the one we've eliminated the other.

As rivers go, those in the Lachlan catchment, which includes the Belubula as a major tributary, could be worse. Various measures used to rate the health of Australian rivers place the catchment in a moderate category: it is moderately modified from its pre-white settlement condition, it carries moderate levels of nutrients and sediment and shows moderate levels of habitat destruction in and around the river. As we ask for more and more from our rivers, the challenge will be how to keep this catchment in its current condition and not let it slide into a lower category.



**Naomi Greschke** *Cereal Star* 2002

92 x 136 cm Oil on wood panel

From the air, the Cadia region reveals a new aesthetic value. The eye absorbs developed and industrialised areas in their entirety, allowing an insight into a thought pattern. These decisions sit in the landscape, ploughed and paved over. Yet the eye naturally selects harmonious elements of the larger picture. Despite a surface of relentless industry, underlying patterns of the sublime endure.



**Sarah Ryan** *Remember the Future* 2002 (Detail)  
30 x 21 cm Digital print

In wringing gold from the rocks beneath Cadia valley, memories of the valley are in upheaval. This installation of Australian pottery vases from the 1950s and 1960s and digital photographs depicts urn-like vases containing the memories of lost landscapes around the mine site and at the nearby Belubula River.

The water taken from the Belubula for the Cadia Hill Gold Mine is water legitimately purchased and it would be unfair to blame our gold ring for the state of rivers in the Lachlan catchment. Irrigation uses still outstrip the demand from the mine and the fourteen Olympic swimming pools a day represent only three percent of the total water that flows annually from the Belubula into the Lachlan, seventy kilometres further downstream. The point is that every new demand for water is added to an already big ask of our rivers. Water licences issued across the Murray-Darling Basin already ask the rivers for twenty five percent more than they can sustainably provide.

The third major consequence of gold mining activity in the Cadia valley is the large physical reshaping of the landscape. About 1 200 hectares will have or have already had their ground cover destroyed—cleared, buried or drowned—in the subsidence zone of the Ridgeway underground mine, the open pit of Cadia Hill, the waste rock dumps, the two tailings dams as well as two dams on local creeks for water storage, and the roads, mills and service areas. Each wedding ring accounts for an area of about a quarter of a square metre, an area roughly the size of a broadsheet newspaper. A small footprint.

What is the impact of this small footprint on local biodiversity? The company is required to have revegetated this land

when it leaves the area and is already planting local tree, grass and understorey species in areas where they are finished using topsoil stockpiled at the beginning of operations. More trees will be replanted than were present when the mining operations began because most of the area had previously been open grazing land. Something like 2000 mature trees have been destroyed, but something like 20 000 will be reappearing, albeit small to begin with. On the other hand are concerns that many small animals, unnoticed species of insects, soil creatures and micro-organisms are not being replaced and might take many years to arrive by natural processes, if at all.

The Cadia valley is in a biogeographical region called the South Eastern Highlands, a region that stretches along the steeper ranges of southern NSW and extends across southern and eastern Victoria. In the part of the region that lies within NSW, the landscapes are considered to be highly stressed. About three-quarters of the original eucalypt forests and woodlands have been cleared, mostly for grazing. Less than ten percent of the area is in conservation reserves and the remaining native vegetation is classified as fragmented, that is the remnants are largely disconnected and risk not being able to regenerate themselves in the long run. More than fifty plant and twenty animal species are threatened in this sub-region. ('Threatened' means that if current trends continue and nothing is

done to protect these species, they are expected to disappear from Australia forever.) Considering that twenty-seven Australia mammal species are already extinct, and there is only 329 Australian mammal species altogether, the loss of a further twenty through accumulated demands, including agriculture, will be significant.

At the Cadia Hill Gold Mine sites thirteen rare or threatened plant species were identified as possibly occurring in the region before the mine operations began. A survey identified just one of these on the site: *Eucalyptus canobolensis*. Six trees of this species were found but judged not to be in a place that will be affected by the mine. Twenty-two threatened species of frogs, snakes, bats, birds, mammals and one butterfly were identified as possibly occurring in the same area. Two bat species and two bird species found on the site are classified as 'vulnerable' but judged unlikely to be affected by the mining. One colony of bats was relocated as a precaution. The paucity of occurrence of threatened species is no surprise, given the high regional levels of fragmentation over the last hundred years.

To visit the cemetery at Woodstock and glimpse what the landscapes in this region might have looked like before white settlers came with their sheep, cattle and mines, is a startling and recommended experience. Within the cemetery grounds is a rare six-hectare

remnant of the white box grassy woodland that was once widespread in this region. While the trees are ones we are still familiar with, it is the diversity and luxuriousness of the groundcover grasses and herbs, that is startling.

The reshaping of the Cadia landscape affects not only the biodiversity that lives there, but the people who have lived in the valley and those who still live in the surrounding areas. Before the current mines were established, the Cadia valley was inhabited by a handful of farming families, the ghosts and relicts of small scale mining activities dating back to the 1850s, and tiny fragments from an Aboriginal past. Much of the area had been cleared for grazing by the early 1900s, leaving just scattered remnants of the original vegetation.

So for the past hundred years, with Mount Canobolas in the background, steeply rolling hillsides, creeks trickling down gullies, wooded ridges and scattered eucalypts in the paddocks, this valley has predominantly been an attractive but unchanging agricultural landscape. Although we can't measure it, the footprint of the ring has to include the destruction of the visual value of this landscape, and the shock to the memories of those who lived and grew up there.

For our one gold ring then, the full story, the one that takes into account impacts inside and outside the mine site, reads: ten tonnes of rock moved,

five tonnes of rock ground to a fine powder, 120 buckets of freshwater used, nine hundred megajoules of energy burnt, enough greenhouse gases produced to fill a large living room, and destruction of the vegetation, living organisms and visual landscape of a newspaper sized piece of land. I emphasise that these impacts are approved by society; the mine operates under some five hundred specific legal conditions. On the plus side we have \$18 of economic benefit, forty minutes of employment and some pleasure and satisfaction in owning and wearing the ring.

But to make decisions as a society about the relative benefits and costs of a gold ring, we should also look at how its footprint compares to other uses of the same land and water and energy. It would take another essay to develop the full footprint story of the steak that could otherwise be quietly grazing in the Cadia valley. But here's a snapshot.

Taking a twenty year view—a thirteen year life for each mine plus time for recovery—the same area of land disturbed to mine the ring (0.25 square metre) could have provided five steaks. The freshwater (1 200 litres) could have irrigated grapes downstream and produced nearly two bottles of wine. Or the water could have been given back to the river system to help bring back those birds that have disappeared. Although cattle are notorious belchers, the area of land per ring is small and

the greenhouse gas emissions to produce the five steaks would be reduced from about 270 kilograms to about one kilogram. It takes relatively little energy to run a pastoral property, so the energy bill would also be vastly reduced. This would allow a little less coal to be mined or oil to be imported, with temporary environmental benefits at their sources.

In terms of the visual landscape, the footprint of the alternative—an agricultural landscape—is one that most rural Australians feel comfortable with. Our culture has mostly lauded agricultural pursuits and the landscapes that accompany them have come to look just like we think they should. As we are learning, this idealisation of agricultural landscapes has hidden footprints, just like the footprints of the gold ring.

There is no clear-cut way to judge the relative value of these alternative uses of our land, as individuals will place very different relative values on the final products: a gold ring or steak and a bottle of wine. Some people find mine-scapes attractive and the old engine house and chimney dating from mining in the valley in the 1860s is heritage listed for its historical value to the community. Essentially the mine has large impact over a small area; agriculture is smaller in immediate impact but is spread relentlessly across the landscape, accumulating many small impacts and greater loss of species over long periods of time.

'You are what you eat' is a common expression. I would like to say 'We are what we take from our landscapes'. In some intrinsic way, people have a dynamic relationship with the land; as we change the land, it changes us. We diminish ourselves if we carelessly diminish our land, whether for gold, steaks or wine.

We can say no.

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### Author's note

The calculations that underpin this essay are based on publicly available data in the references below or from data supplied by Newcrest Mining. Some approximations and roundings up and down have been done for simplicity. The aim is to be roughly correct, but not absolutely precise. The conclusions reached and the views expressed in this essay are mine alone.

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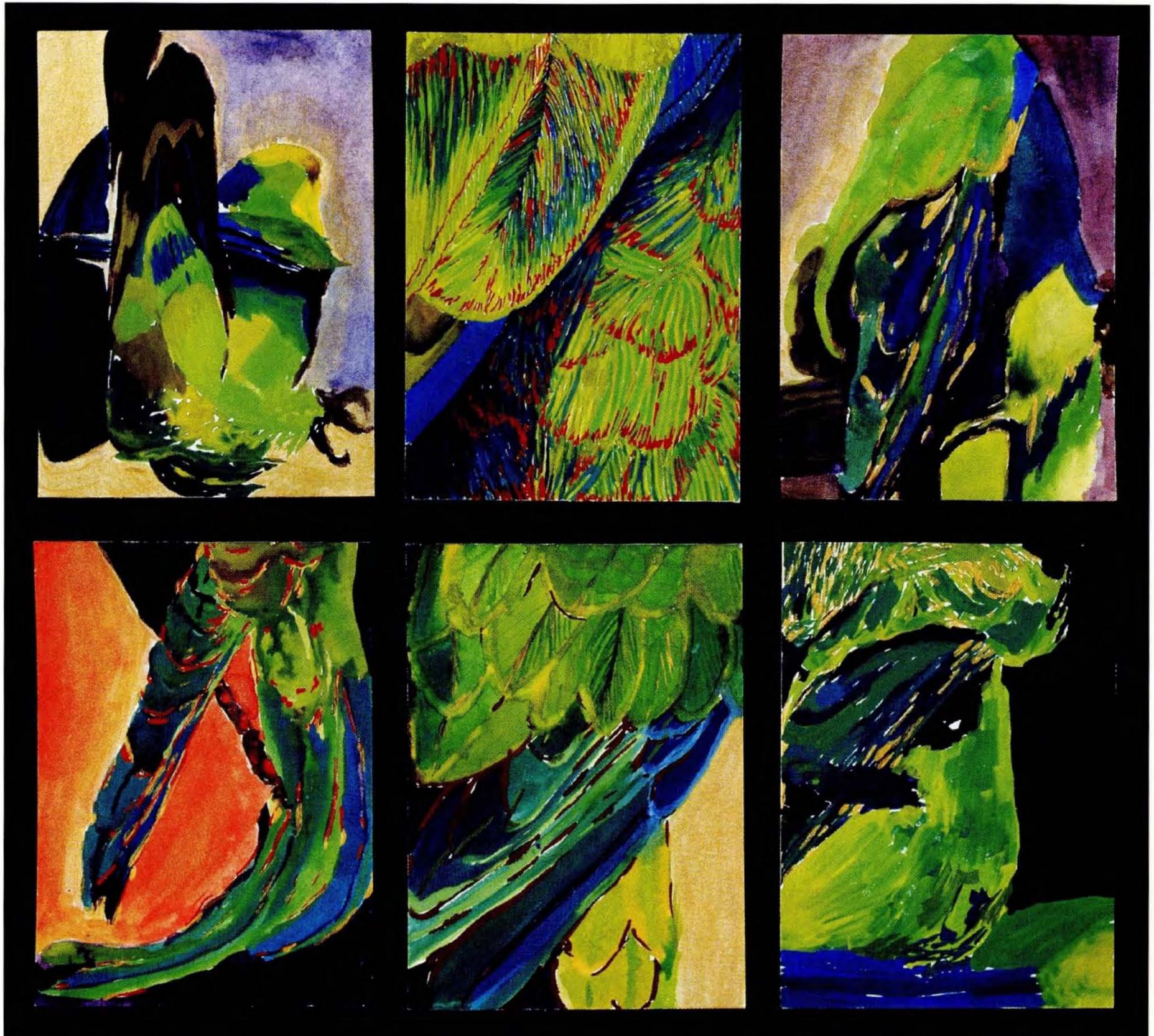
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**Nicola Dickson** *Garden Memory* 2002

65 x 75 cm Oil and canvas

Weeds now comprise 15% of Australian Flora and are the second largest cause of the loss of bio-diversity. This painting is of Paterson's curse, introduced initially into Australia as a decorative garden plant and I use the lace patterning to represent that domestic history. The large size and sublime colour question the commonly held assumption that a 'weed is merely a plant out of place'.



**Penny Stott**

*Fractured Space; Superb Parrots* 2002

30 x 126 cm Gouache on 300gsm Arches paper

My concern is with the increasing numbers of native flora and fauna becoming extinct in Australia including the endangered Superb Parrot, emblematic in the Cadia region. The loss of another precious form of life, whether through agriculture, mining, road-kill or colonisation of roosting sites by bees, would be a sad indictment of the values held by our society



**Matt Higgins**

*Digital Shadows 2002*  
(Detail 100 x 75 cm x 27)  
Type C digital prints

The complete work, 300 x 675 cm, encompasses a political, cultural and spiritual view of Cadia region overlaid with the escalating economic demands of the commercial sector and the industrial reality of the land. Read together the images speak of the change I hope for in our conditioned existence.



**Gerry Payne** *Canoe Tree* 2002 (Maquette)

This canoe wedged in a white-box tree symbolises aboriginal presence in the Lachlan Valley where the river, canoes and fishing were part of traditional culture.



**Oscar Blyth** *Scar Trees* 2002

100 x 200cm Stoneware, porcelain, oxides, sand, granite, approximately

As a grazier I am very aware of the impact of management on the environment. Small ill-advised decisions can lead to permanently scarred country. My work explores and compares environmental scarring left by Aborigines, farmers, and mining operations that all use the country to survive.

# Biographies

**Lex Beardsell** holds a PhD granted by ANU for her research on sheep parasites. She is currently enrolled in the honours program of a bachelor of visual art at the National Institute of the Arts, ANU.

**Oscar Blyth** is a grazier from the Snowy Mountains. In 2001 he graduated as a ceramicist from the National Institute of the Arts, ANU. He held his first solo show at the Potter's Society, Canberra, in November 2002.

**Meg Buchanan** is a visiting fellow at the National Institute of the Arts, ANU. She has held lecturing positions at tertiary institutions in Australia, Kenya, Singapore and Thailand. Meg's work is represented in many collections here and overseas, including the National Gallery of Australia.

**John Chappell** is Professor of Environmental Earth Science at the Research School of Earth Sciences, ANU. His research embraces landscape evolution and past changes of sea level and climate, to guide sustainable human use of natural resources.

**Nicola Dickson** has degrees in science and veterinary science. She has worked in small animal practices in Sydney, Melbourne and Muswellbrook. Nicola is completing an honours degree in visual art at the National Institute of the Arts, ANU.

**Guy Fitzhardinge** is local to the Cadia region. He is director of Thring Pastoral Company and Meat & Livestock Australia. Guy participates on boards and committees of several national conservation bodies and is a PhD candidate at the University of Western Sydney.

**Naomi Greschke** studied visual arts at the National Institute of the Arts, ANU. She has been involved with cross media collaborations and solo and group exhibitions in Canberra, Sydney and Europe. Menzies Library ANU, Art Bank Australia, and private collectors hold her work.

**Matthew Higgins** is an honours graduate in photo media at the National Institute

of the Arts, ANU. He has participated in several environmental field studies projects. Matt's work has been exhibited in Australia and New Zealand and reproduced in several publications.

**Martin K. Huehner** originally trained as an ecologist. Marty recently completed a master of visual arts degree at the National Institute of the Arts, ANU. He is co-director of the environmental studies program at Hiram College, USA.

**Ken Hutchinson**, sculptor, painter, father, and feral species hunter, is passionate about human interactions with Australia's inland. He has studied social ecology and creative art, and worked extensively in remote Aboriginal communities coordinating the production of bilingual language resources.

**Belinda Jessup** is undertaking a bachelor of visual arts (textiles) at the National Institute of the Arts, ANU. Growing up in western NSW gave Belinda a love of landscape, which recurs in her textile work. She is working with the landscape to create her own abstract landscape.

**George Main** is an environmental historian and PhD student at the Centre for Resource and Environmental Studies, ANU. His work employs creative writing techniques to explore how worldviews of individuals and groups shape patterns of relations between land and people.

**Mandy Martin** is an artist. Her work is in state galleries and the National Gallery of Australia. She has exhibited widely here and overseas. Mandy lives in the Cadia region and lectures at the National Institute of the Arts, ANU. She won the 2002 Cowra Art Prize.

**Gerry Payne** is a Ngiyampaa artist from western NSW. Gerry now lives in Lake Cargellico.

**John Reid** is a visual artist and lecturer at the National Institute of the Arts, ANU. His research is concerned with visual art as an agent for social change, for the advancement of human rights, and in community debates about sustainable futures.

**Meta Rothery** is a celebrated identity of the Cadia region. She lives with her two sisters on a King's grant made to her family in the 1830s. Meta's work will soon feature in an exhibition at the National Gallery of Australia.

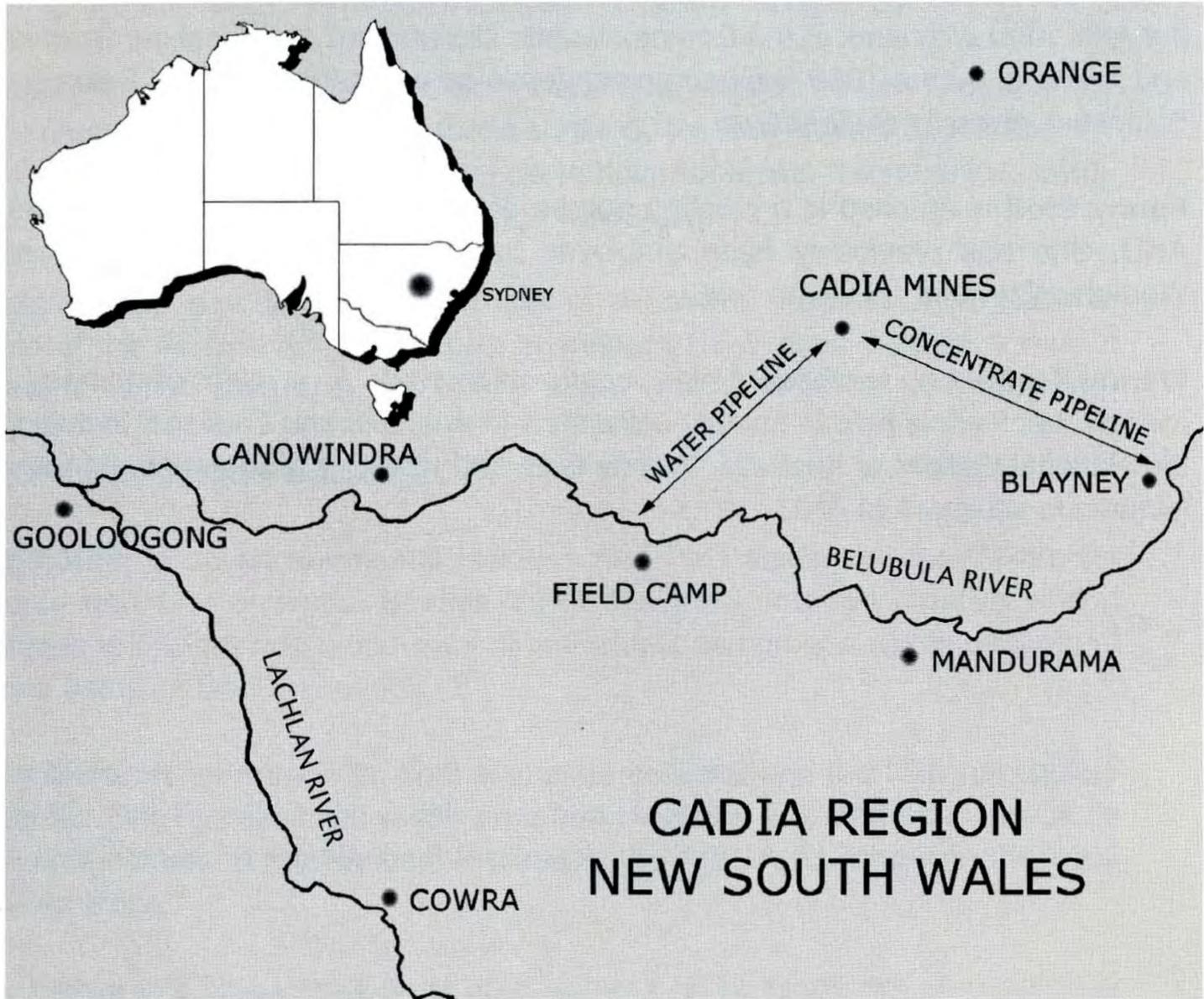
**Sarah Ryan** has a professional background in agriculture, science, and ecology, and has worked in CSIRO for twenty years. Currently with CSIRO Sustainable Ecosystems, she has a new interest in developing compelling written and visual communication about sustainability issues.

**Peggy Spratt** combines study in the painting workshop at the National Institute of the Arts, ANU with work in the Commonwealth Department of Education, Science and Training. Before 1986 she had an academic career in the School of Resource Science, University of Canberra.

**Penny Stott** is enrolled in a painting degree at the National Institute of the Arts, ANU. She has previously been employed in the Child Support Agency and Women's Services.

**Wendy Teakel** has exhibited professionally since 1980. A recipient of numerous awards, her work is held in notable collections in Australia and Thailand, including the National Gallery of Australia. Wendy lives and works at Murrumbateman and lectures in sculpture at ANU.

# Map



Alexander Boynes