

Vom Bergbau und Mentalität: Die künstlerische und geologische Darstellung der australischen Landschaft im 19. Jahrhundert

Of Mines and Mentalities: Artistic and Geological Representations of the Australian Landscape in the 19th Century

Горная промышленность и склад: художественное и геологическое изображение ландшафта Австралии в 19 веке

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Abstract

The history of mining takes place within a cultural, as well as a geological landscape. From European settlement at the end of the 18th century, artists in Australia have struggled to find a sensibility that

will capture and make sense of unfamiliar land-forms. Their attempts to draw and later to photograph the bush, with its aboriginal inhabitants and its evanescent moods were commonly seen as attempts to create and impose a moral sense of civilization and order, whereby an unruly continent would be transformed into an orderly pastoral vision, comprehensible to European eyes. By the end of the 19th century, artists, geologists and of course miners themselves become participants in transforming the physiography of Australia from a haunting landscape, into a useful physical environment valued by Europeans less for its spiritual beauty than for its material benefits. In so doing artistic models drawn from European culture become agencies of European political economy.

This paper will consider the role of art, and the work of selected artists and naturalists in the European construction of beauty and utility in the Australian historical landscape. It will pay particular attention to the interest of art and geology in representing the continent equally as an early paradise and as a vast treasure of mineral wealth in either case, an inimitable site for Europeans, to borrow Geoffrey BLAINY's phrase to begin a "rush that never ended".

Introduction ¹¹¹

Australia is a huge continent with a vast compass. From the tropical north, through the arid 'dead heart' land, to the temperate south, a diverse landscape as large as continental Europe defies any definition of geographical homogeneity. Nor does its landscape imply a unity among its indigenous peoples who, in their diverse languages and customs, not only reflect a mythic past, but also ways of knowing that remain deeply foreign to Europeans ¹¹². In the early years of colonial settlement, the alien strangeness attaching to this 'land of contrarities,' in the fashionable phrase ¹¹³, both inspired and confounded explorers who came looking for inland seas and river systems comparable to those known in Europe, Asia, the

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¹¹² David LOWENTHAL, *The Past is a Foreign Country* (Cambridge: Cambridge University Press, 1985) opens a vista upon this past, which is now settled increasingly by practitioners of literary theory, postcolonial discourse, environmental history, geography, anthropology and the history of science. For a valuable introduction to the crosscultural synthesis of science, cartography, and language, and cross-references to art, see Helen WATSON-VERAN and David TURNBULL, 'Science and Other Indigenous Knowledge Systems', in Sheila JASANOFF et al. (eds), *Handbook of Science and Technology Studies* (London: Sage, 1995), 115-139. I am grateful for many insights to David TURNBULL, and especially to his *Maps are Territories* (Chicago: University of Chicago Press, 1993)

¹¹³ F.G. CLARKE, *The Land of Contrarities. British Attitudes to the Australian Colonies, 1828 - 1855* (Melbourne: Melbourne University Press, 1977)

Americas, and Africa-- and who left, or died, in the attempt to understand their differences¹¹⁴. The same sense of wonder equally touched artists, writers, and naturalists who, arriving with the baggage of European methods and models, sought to make sense of and settle the Australian continent¹¹⁵.

It is difficult to see past landscape in the present. At best, we can attempt to preserve some of the present for the future. But from the late 17th century, we have written memories of Europeans who first saw the land; and from the 18th, of men who surveyed and studied it, and left visual memories of their discoveries. Australia was a land of travellers and visitors and, once a British colony had been assured, Matthew FLINDERS advised Sir Joseph BANKS in 1800 that 'the interests of geography and natural history in general, and to the British nation in particular, seem to require, that this only remaining considerable part of the globe should be thoroughly explored...' ¹¹⁶ and, we may add, drawn and quartered. Just as the early artist-naturalists aboard His Majesty's ships showed how Europeans, in Bernard SMITH's phrase, found art useful as information so the study of landforms assumed a place in both literary and artistic narratives, with explorers symbolizing sites, giving them names, and describing their recognizable features¹¹⁷. Art, like science, is an act of appropriation¹¹⁸. Eventually, art gives way to science, landscape to mapping, and theories of the earth to systematic stratigraphy, in a trajectory that traces European perspectives from the aesthetic to the economic¹¹⁹.

Along the way, these discourses are redefined. Cartography, Brian HARLEY reminds us, is 'primarily a form of political discourse, concerned with the acquisition and maintenance of power'¹²⁰. Understanding the earth

becomes, to an imperial power, vital to the expansion of European influence overseas¹²¹. So landscape art, commissioned by government or private enterprise, becomes economic and cultural intelligence. From the middle of the nineteenth century, survey art and systematic description begin to document new 'knowledge spaces' -- heterotopias, in the language of FOUCAULT that Europeans define unfamiliar, geopolitical terms¹²². Sites of symbolic significance to aborigines are renamed and given new meanings. Physiographers and geomorphologists gradually occupy and describe a land that remains 'half known'¹²³. Nature retreats, as geologists, minerologists, and practical men -- including lucky miners and their companies -- begin to transform the landscape into industrial environments of modern mining, aided by satellite precision and massive technology. Eventually, it becomes a challenge to recover the ways in which European artists and naturalists set out to understand their 'historical' landscape and who, in the process, inscribed themselves upon it.

Historical geographers have argued that, by peeling away successive layers of human residues, it is possible to reconstruct histories that underlie them. Undoubtedly, as D.N. JEANS has argued, landscapes must be viewed as the products of identifiable historical agencies¹²⁴. Among such agencies, artists (including photographers) and naturalists were highly significant. I should like to indicate some of the more important -- first, those who tried to reconcile the Australian 'other', the unfamiliar, with what was familiar at 'home'; second, those who grasped and promoted a particular identity for the Australian environment; and third, those who created new 'spaces' endowed with political and economic significance. Their maps, paintings, and sketches -- today, found among collections, museums, libraries and galleries -- helped to

¹¹⁴ George SEDDON, 'Eurocentrism and Australian Science: Some Examples,' *Search*, 12, (1981-2), 446-450, and Robert STAFFORD, 'Roderick MURCHISON and the Structure of Africa: A Geological Prediction and its Consequences for British Expansion', *Annals of Science*, 45, (1988), 1-40

¹¹⁵ Barbara Maria STAFFORD, *Voyage into Substance. Art, Science, Nature, and the illustrated Travel Account, 1760-1840* (Cambridge, Mass.: MIT Press, 1984).

¹¹⁶ Stephen MARTIN, *A New Land: European Perceptions of Australia, 1788-1850* (Sydney: Allen and Unwin, 1993), 35

¹¹⁷ See Bernard SMITH, 'Art as Information: Reflections on the Art from Captain COOK's Voyages', *Proceedings of the Australian Academy of the Humanities*, 10 (1979), 81-128

¹¹⁸ Anne-Marie WILLIS, *Picturing Australia: A History of Photography* (Sydney: Angus and Robertson, 1988), 31 et passim.

¹¹⁹ See Paul CARTER, *The Road to Botany Bay: An Exploration of Landscape and History* (New York: Knopf, 1988).

¹²⁰ J. Brian HARLEY, 'Silences and Secrecy: The Hidden Agenda of Cartography in Early Modern Europe', *Imago Mundi*, 40 (1988), 57.

¹²¹ See Anne GODLEWSKA and Neil SMITH (eds), *Geography and Empire* (Oxford: Blackwell, 1994); Robert STAFFORD, 'Geological Surveys, Mineral Discoveries, and British Expansion, 1835-71', *Journal of Imperial and Commonwealth History*, 12 (3), (1984), 5-32.

¹²² Michel FOUCAULT, 'Of Other Spaces', *Diacritics* 16 (1), (1986), 22-27

¹²³ See E. Sherbon HILLS, *The Physiography of Victoria: An Introduction to Geomorphology* (Melbourne: Whitcombe and Tombs, 1940)

¹²⁴ D.N. JEANS (ed.), *Australian Historical Landscapes* (Sydney: George ALLEN and UNWIN, 1984), 14

fashion, in Benedict ANDERSON's phrase, the 'imagined community' of Europeans in Australia¹²⁵.

Two centuries after European settlement, cross-cultural conversations between aboriginal and Western systems of knowledge and art remain neglected and incomplete. In this short paper, it is possible only to introduce the rich potential this implies, for readings of Australia as both text and time-machine, and our understanding of its historical environment, as a continuous act of representation and display. Our 'readers' are a small selection of the artists, surveyors and naturalists who saw, wrote and drew, and who have since become arbiters of the ways in which their texts have been read. Their story tells of human capital drawn from a world bank of art and science, and invested in the representation of a land of great difficulty, danger and delight. It has its resolution in a new respect for aboriginal representations of that land, that form a feature of our time.

Australia the Text

Since the earliest speculations of cartographers, seeking in ptolemaic tradition a southern landmass to balance the continents of the northern hemisphere, *Terra Australis* was conceived as being necessary, and relative to Europe. Even as the shape of Australia emerged from the mists of misconception, so a new continent acquired the character of a vast, empty page, awaiting the inscription of European names and places. From the first European sightings by Cook in 1769, through settlement under the British in 1788, the Australian landscape haunted its early settlers, whether convict, soldier or free migrant who found its soil harsh and unyielding, its forests brutally burned by bush fires, its fauna cut short by toxic flora, its peoples elusive, evasive, and difficult to place. It seemed a perfect application of *terra nullius* in fact, as well as in name. Those who loved the landscape of Europe, and especially that of England, hated the 'vile woods' to which they had been sent, or sentenced¹²⁶. While the Aborigines revered nature, and saw it as a continuation of a distant Dreamtime, Europeans struggled in search of meanings. Above all, Australia seemed a place to exploit, not a place to conserve, because nature itself seemed unconcerned with conservation,

Over all, there was unruly nature that had to be civilised; and surveyed topographical and geographical mapping — from Thomas MITCHELL in 1838 and Robert DALE in 1844 to Paul STREZLECKI in 1845, the eastern part of the continent was reduced to European lines and spaces. If surveys were hazardous, art was adventure, and from the 1830s, artists stressed the civic virtue that metropolitan order could be applied and made to work in Australia. Few were comfortable with what they saw, and imposed familiar meanings. In 1820, Joseph LYSETT, a convict

artist, painted a bush landscape in New South Wales that could easily have been drawn in England. A Swan river landscape in 1827 by J.W. HUGGINS, made the same point. In reaction, or response, some favored the expedition experience of narrative illustration in the 1840s, a memorable theme, as in S.T. GILL's painting of STURT's Overland Expedition 1844. Others, however, retreated into familiar contemporary European discourses, drawing notably upon German and English romanticism. Not unlike some colonial writers, these constructed the bush as an arcadia worthy of GOETHE or WORDSWORTH, in which nature could be worshipped, if not fully understood¹²⁷.

The prospect of awakening, even seduction, by unruly austral nature, came suddenly to some. Thomas WATLING, a convict artist, who at first complained that 'there was not much to amuse my pencil,' and found the 'sameness' of the eucalypt-dominated bush boring beyond description, eventually gave way to rich Romantic prose, describing 'trees wreathing their fantastic roots on high, dissimilar in tint and foliage cumbent, upright, fallen or shattered by the lightning... whilst sympathetic glooms of twilight glimmering groves, and wildest nature lelled in sound repose, might much inspire the soul....'¹²⁸ By the middle of the century, the process of discovery by self-discovery a colonial blending of novelty and custom was illuminated by the work of several European artists, including John GLOVER, Eugene VON GUERARD, and Conrad MARTENS.

Artists Visions: European Resonances

John GLOVER, born in England (1776 - 1849), migrated in 1831 to Tasmania, bringing to Australia the visible preoccupations of an European artist. His earlier landscapes of Italy and England — tinted with their contemporary emphasis on the 'picturesque' merge imperceptibly into his vision of Australia, and it is only the late 1840s that he manages to capture the bright light and open space no longer, in this case, empty space of the settled continent. GLOVER's older contemporary, Eugene VON GUERARD (1812 - 1901), born in Vienna, came to Melbourne with the gold rush in 1852, and brought with him the ideals of German romanticism, learned during his student days at Düsseldorf with Caspar David FRIEDRICH. For romanticism, Nature was God's Bible, the 'reading' of whose text turned sketchbooks into scripture. Just as trees made cathedral aisles, and rocks formed sacred cycles, and the earth merged into heaven, so vegetation revealed Nature as a divine organism¹²⁹. Whether by art, or of scientific observation, the collection of scientific information was an act of prayer.

First in landscapes, then in domestic settings, then in representations of European farms and mines, von

¹²⁵ Walter BENJAMIN, *Imagined Communities: Reflections on the Origin and Spread of Nationalism* (London: Verso, 1983), chapter 10, 'Census, Map, Museum'.

¹²⁶ JEANS(ed.), op. cit. 14.

¹²⁷ JEANS (ed.), op. cit. 15.

¹²⁸ MARTIN, op. cit. xxi.

¹²⁹ Candice BRUCE, *Eugen VON GUERARD* (Canberra: Australian National Gallery, 1980), 11.

GUÉRARD's paintings portray Nature with a restrained, implicit, impersonal violence, revealing cycles of nature, death and regeneration. Where there are people, they are displaced aborigines, romantic warriors, wandering the Earth or Europeans, in homesteads, living in lonely tension between habitation and Nature. At the intersection of landscape painting and topographical art, von GUÉRARD relayed a powerful understanding of the environment its motifs, and patterns; woven into this, lie threads of classical myth and allegory, within which Europeans in this strange land are portrayed like the miner at Ballarat — a Ulysses, struggling in a war against nature, destined one day, if lucky, to return home.

Contemporary with VON GUERARD, Courad MARTENS (1808 - 1878), a professional artist, born in England—who became a friend of DARWIN as artist on the famous voyage of HMS *Beagle* brought to the new land a romantic sensibility, but went on to become the best known recorder of the Australian landscape between 1835 and 1878, as he gradually discovered the peculiar sensibilities of light and colour in the bush. A similar dedication to selfeducation appears in the work of other European artists. One such was the Swiss artist Abram Louis BUVELOT (1814 - 1888), who studied in France, and was wellknown for his paintings of the Matterhorn before he migrated to Melbourne in the 1860s; there, he relayed the work of the Barbazon painters into a personal evocation of settled country and the bush¹³⁰.

In his seminal work on *Art and Illusion*, E. H. GOMBRICH suggests that what we see is inevitably conditioned by our cultural expectations. John BERGER argues a similar point in understanding what we see in terms of our political economy¹³¹. In Europeanising Australia, an early tendency was to represent unfamiliar reality as 'picturesque' inventing a new reality using colours familiar to the artist, but also familiar to his experience. By the artistic act, the everyday becomes beautiful, and its pursuit, desirable. The act of artistic transfer was uncontroversial; what made it problematic, was the extent to which it conditioned expectations among investors, migrants, and the naturalist's eye. Sydney PARKINSON, artist-naturalist on COOK's first voyage, reported that 'the country looked very pleasant and fertile, and the trees, quite free from underwood, appeared like plantations in a gentlemen's park.'¹³² This was not a distorted aesthetic judgement, but a constructed impression. Some historians would argue that the construction contained a economic purpose;

but above all, it showed how to define a space and place that in reality almost defied control.

Ross GIBSON has defined landscape as 'land that has been translated...as an element of myth...' It might signify Nature, but is not Nature itself. 'The very notion of nature is a cultural construct'.¹³³ By the middle of the century, with possession established and livelihoods secured, there was time to appreciate what was unique in that construct. Thomas BAINES symbolized the continuing quest of the curious, and others looked to control landscape through the station, and the garden. As European architecture reminded colonists of 'home', so colonial gardens became signifiers of the transformation of what had been exotic into what would be natural a process elevated by VON GUERARD, S.T. GILL, and William TIBBITS.

As we look at their paintings, botanic gardens and rural estates appear as not just arcadian anecdotes, but as representations of a marriage of convenience between the 'picturesque' and pastoral imperialism¹³⁴. The result was confluent with an European tradition that sought an identity through landscape — a constructed view of Australia depicted in literature and art, but also by the systematic sciences of geography and geology¹³⁵. The earth sciences, emerging from the idealist abstractions of *Naturphilosophie*, demanded empirical information to complete the European picture of the world. The adventure of European art and science found Australia both opportune, and an opportunity.

Material Realities: Resources and Spaces

An early relationship between novelty and custom dominated the world of surveying and mapping, as it had in art. Developing the land was, of course, an immediate priority for European settlement, and optimistic accounts of the proximity and potential of natural resources were recorded from the first voyage of James COOK and BANKS to the East Coast of Australia in 1769. Like these and most other expeditions mounted by the Royal Navy, George VANCOUVER's reconnaissance of the Western Australian coast in 1791 bore the hallmark of Admiralty instructions and a naturalist charged to 'examine the nature of the soil, the climate, .. and to determine whether 'the usual grains ... and fruits of Europe are likely to succeed.' They were also to note minerals that 'bear the appearance of [ores] of metals, coal or limestone, or any other thing likely to be useful.'¹³⁶ Governor Arthur PHILIP's first reports from the colony of New South

¹³⁰ Patricia R. McDONALD and Barry PEARCE, *The Artist and the Patron: Aspects of Colonial Art in New South Wales* (Sydney: Art Gallery of New South Wales, 1988), and Ron RADFORD and Jane HYLTON, *Australian Colonial Art, 1800-1900* (Adelaide: Art Gallery of South Australia, 1995).

¹³¹ John BERGER, *Ways of Seeing* (London: Penguin, 1972).

¹³² Cited in David WADE CHAMBERS, *Imagining Landscapes* (Geelong, Victoria: Deakin University, 1984), 36.

¹³³ Ross GIBSON, *South of the West: Postcolonialism and the Narrative Construction of Australia* (Bloomington: Indiana University Press, 1972), 75.

¹³⁴ Howard TANNER (ed.), *Converting the Wilderness: The Art of Gardening in Colonial Australia* (Sydney: Australian Gallery Directors Council, 1979-80), passim

¹³⁵ See Paul CARTER, *Living in a New Country: History, Travelling and Language* (London: Faber and Faber, 1992), 122.

¹³⁶ MARTIN, op. cit. 23

Wales in 1788 accordingly described the botany and zoology of the Sydney region, and outlined the economic potential of local timber, seeds and flax. The land was to prove hard won, and in 1803, George CALEY described the difficulties of winning crops from the frail, infertile soil, and slender grasses, using European methods inappropriate to the land. But as early as 1802, cedar was being exported and in 1806, Joseph BANKS compiled a list of happy prospects likely to ensue from the cultivation of sealing and fishing, sandalwood and furs, wool and coal.

Coal was discovered in the Hunter region as early as 1797, and sparked interest in iron and mineral prospects, but as agriculture was of first importance, geological interests were deferred. It was not until 1803 (three decades before the Geological Survey of Great Britain was established) that the Secretary of State for War and the Colonies appointed A.W.H. HUMPHREY the first 'H.M. Mineralogist' in the New South Wales. Sadly, his adventures came to grief in 1812 when Governor MACQUARIE decided he had found nothing 'worthy of notice', and sacked him. Of course, 'A different man who has real Scientific Knowledge', MACQUARIE agreed, 'might be very Useful and Make Very important Discoveries in Various parts of this Widely extended Colony', and steps were taken in this direction in 1823¹³⁷, but it was not until 1850 that, concerned by the gold rush in California, and the establishment of copper and gold mines in South Africa, and anxious to extend surveys along the lines of those already underway in Canada and India, Governor FITZROY appointed Samuel STUTCHBURY, a native of Bristol and an experienced Pacific traveller, as the first geological surveyor of New South Wales¹³⁸.

In 1851, Sir Henry YOUNG, Lieutenant Governor of South Australia, obtained permission to find a man to

survey that colony, 'and make known its mineral resources to the colonists'. He wanted a scientific man of high professional reputation, and disinterestedness, 'as would impart to his Report the stamp of conclusive authority' to 'promote the practical applications of geology to mining purposes'¹³⁹. Sir Henry DE LA BECHE, Director of the Geological Survey of Great Britain, recommended STUTCHBURY, already en route to NSW for the purpose. STUTCHBURY was not, of course, the first and certainly not the only geologist interested in Australia, nor was the discipline an exclusively British undertaking, as during the 1840s, a number of European scholars including Paul DE STRZELECKI, Ferdinand VON SOMMER, Ludwig LEICHHARDT and Johann MENGE visited the continent and wrote extensively on their observations¹⁴⁰.

Given the peculiarities of the surface features, controversies abounded. On reaching Sydney in 1836, DARWIN travelled westward to see the Blue Mountains, where he, like MITCHELL in 1838¹⁴¹, struggled to explain the origins of the famous gorges, whether cut by fluvial or marine action¹⁴². Where artists found the 'picturesque' among the waterfalls¹⁴³, other visitors wrestled to explain the sandstone extrusions, and to predict veins of minerals, iron and coal. In the process, landscapes were painted, and geological maps were prepared, some suggesting analogies with European, African or American stratigraphies, others suggesting particularities that had no precedent in European exploration. From the 1850s onwards, men who had looked upon Australia with eyes trained in Europe, and brought with them the idea that Europe was the geological model of the world¹⁴⁴. Europeans sought correlations in the rocks and strata of Australia that would confirm the wisdom of God in the

¹³⁷ *Historical Records of Australia*, VII (1), 587, cited in T.G. VALLANCE, 'The Start of Government Science in Australia: A.W.H. HUMPHREY, His Majesty's Mineralogist in New South Wales, 1803-12, Proceedings of the Linnean Society of NSW, 105 (2), (1981), 107-146

¹³⁸ Similar appointments were made in Victoria in 1852, and Tasmania in 1859, and in Queensland as late as 1868. See D.F. BRANAGAN and T.G. VALLANCE, 'Samuel STUTCHBURY (1798-1859), Australian Dictionary of Biography, 6 (1851-1890), 216-217

¹³⁹ Institute of Geological Sciences (Geological Museum, London), G.S.M. 1/6 f. 99/103. Sir Henry YOUNG to Lord GREY, 13 January 1851.

¹⁴⁰ See P.E. DE STRZELECKI, *Physical Description of New South Wales and Van Diemen's Land* (London, 1845), and D.F. BRANAGAN, 'STRZELECKI's Geological Map', in Records of the Australian Academy of Science, 2 (4), (1972), F. VON SOMMER, 'A Sketch of the Geological Formation and Physical Structure of Western Australia', Quarterly Journal of the Geological Society of London, 5 (1849), 51-53; Ludwig LEICHHARDT, *Journal of an Overland Expedition in Australia* (London: T. and W. BOONE, 1847); Johann MENGE, 'Geology of South Australia', South Australia Register, June - October, 1841

¹⁴¹ Thomas MITCHELL, *Three Expeditions into the Interior of Eastern Australia* (London: T. and W. Boone, 1838). On DARWIN's visit, see NICHOLAS, F.W. and J.M. NICHOLS, *Charles DARWIN in Australia* (Sydney: Cambridge University Press, 1989).

¹⁴² R.W. YOUNG and C.R. TWIDALE, 'Geomorphology in Australia', in H.J. WALKER and W.E. GRABAU (eds), *The Evolution of Geomorphology* (New York: John Wiley, 1933), 30.

¹⁴³ John LOW, 'Locating the Blue Mountains', Locality, 5; Julia HORNE, 'Travelling through the Romantic Landscapes of the Blue Mountains', Australian Cultural History, No. 10 (1991), 89.

¹⁴⁴ David BRANAGAN and Thomas VALLANCE, 'The Earth Sciences; Searching for Geological Order', in: Roy MACLEOD (ed.), *The Commonwealth of Science: ANZAAS and the Scientific Enterprise in Australasia, 1888-1988* (Melbourne: Oxford University Press, 1988), 132.

creation, and the arrangement of that creation in Europe and the world known to them.

Coal, for instance, was thought it must occupy a stratigraphical niche equivalent to those in which it was found in Europe fastening a debate on the age and likely locations of coal (it is found in strata younger than in Europe) that vexed the imperial geological community for the next thirty years. Similar debates revolved around the age of the landscape (DARWIN thought it was younger than it is), the expected courses of rivers, and the explanation of particular environmental features, such as the stony deserts¹⁴⁵. Fossils of a given age were 'out of step,' and could not be used to date strata as they were used in Europe. In the end, old conventions had to be dropped, and new ones, invented. The process was one of negotiation. Gradually, just as European political conventions were used to draw colonial boundaries, European theories were modified to account for local differences¹⁴⁶. From locality, grew knowledge that international experts were asked to confirm. In turn, geologists took art, as information, and identified the landscapes that were to be distinguished as mineral and mining spaces. For years, these colours, symbols, even scales varied across colonial boundaries, but eventually in 1875 the Victorian Survey issued a geological map of the whole of known Australia producing a mineralogical text of intercolonial unity, and colonial nationalism¹⁴⁷.

Between 1842 and 1844, Joseph Beete JUKES (1811-1869), a former student of MURCHISON at the Royal School of Mines, visited Australia as the naturalist on board HMS *Fly*, and used his extensive observations to prepare a map of known Australian geology, which was published in 1850¹⁴⁸. Between 1850 and 1855, STUTCHBURY's geological and mineralogical surveys were also accompanied by maps, drawings and sketches, recording and presenting scientific data about the coasts

and once gold was discovered the new mining areas near Bathurst. Eventually, he mapped some 32,000 square miles of Eastern Australia. His vision was a European one, informed by his experience of the Somerset coal-fields in England, and a style of pen and ink sketch common among English artists of the 1830s and 1840s¹⁴⁹. When STUTCHBURY fell from viceregal favour, and his appointment ended¹⁵⁰, the Rev. W.B. CLARKE assumed the mantle of Australia's resident geologist, and with his work, consolidated the era of systematic geological mapping.

CLARKE read geology with Adam SEDGWICK at Cambridge, and became a Fellow of the Geological Society of London in 1826, at the age of only twentyeight. He emigrated to Australia in 1839, as headmaster of The King's School at Parramatta. The 'remarkable Reverend CLARKE', as he was known, explored much of New South Wales on foot and horseback¹⁵¹. He prepared a geological map of the colony following contours anticipated by his artist contemporaries, refashioning the landscape as a scientific space, less to be worshipped as an exemplar of divine wisdom, than as a resource in the service of man.

For the next twenty years, the art and study of landforms retained a mixture of public and private initiative. Geology was informed by artists who flocked to the gold-fields, and the 'picturesque' was transformed into the practical. Geological mapping and landscape art became partners, of a kind. In 1852, prompted by the gold discoveries of the previous year, the newly separated colony of Victoria sought a 'Mineral Surveyor', and appointed A.R.C. SELWYN, first Director of its Geological Survey¹⁵². Four years later, it was time, according to Sir Roderick MURCHISON, Director of the Royal School of Mines, for the Colonial Office to send a 'practical geologist' to

¹⁴⁵ See T.G. VALLANCE and D.F. BRANAGAN, 'Beginnings of Geological Knowledge in New South Wales', Excursion Papers, 25th International Geological Congress, 1975).

¹⁴⁶ See T.G. VALLANCE, 'Origins of Australian Geology,' Proceedings of the Linnean Society of New South Wales, 100 (Part I) (1975), 13-43.

¹⁴⁷ David Branagan, 'The History of Geological Mapping in Australia', in D.H. BORCHARDT (ed), *Some Sources for the History of Australian Science*, Historical Bibliography Monograph No. 12 (Sydney: University of New South Wales History Project, 1982).

¹⁴⁸ J. Beete JUKES, *Narrative of the Surveying Voyage of HMS 'Fly'* (London: T. and W. Boone, 2 vols, 1847) and *A Sketch of the Physical Structure of Australia, so far as it is at present Known* (London: T. and W. Boone, 1850).

¹⁴⁹ Samuel STUTCHBURY, 'Fifteenth Report upon the Geological and Mineralogical Structure of the Colony of New South Wales', in NSW Legislative Council Votes and Proceedings, 1855 (1), 1185-1190.

¹⁵⁰ David BRANAGAN, 'Samuel STUTCHBURY and his Manuscripts', Michael HOARE and L.G. BELL (eds), in: *Search of New Zealand's Scientific Heritage*, Bulletin of the Royal Society of New South Wales, No. 21 (1983), 7-17. See also 'Samuel STUTCHBURY and the Australian Museum', Records of the Australian Museum, Supplement 15, (1992), 99-110.

¹⁵¹ CLARKE Papers (Mitchell Library, Sydney), MSS 139/49. CLARKE to THOMSON, 27 March 1867, 21 November 1868. THOMSON to CLARKE, 15 December 1868. See Ann MOZLEY, 'William BRANWHITE CLARKE (1789-1878)', Australian Dictionary of Biography, 3 (1851-1890), 420-422; Elena GRAINGER, *The Remarkable Reverend CLARKE* (Melbourne: Oxford University Press, 1982).

¹⁵² His salary was raised by Lieutenant Governor LA TROBE from £500 to £800, and later to £900. See D.F. BRANAGAN and K.A. TOWNLEY, 'Alfred Richard Cecil SELWYN (1824-1902)', Australian Dictionary of Biography, 6 (1851-1890), 102.

survey the entire country systematically¹⁵³. Each colony, MURCHISON argued, also required a geological surveyor, who alone could advise the government and private enterprise how best to open out advantageously the mineral resources of distant regions, many of which are as yet entirely "unknown lands" as respects their internal productions¹⁵⁴.

This vision was slow to materialise. The disbanding of Selwyn's survey in 1869 for such political reasons marked the end of aggressive geological exploration. The fine map of Robert Brough SMYTH in 1875 was a high water mark in geological mapping, but also a pyrrhic victory, at a time when Victorian politicians thought they needed only one map, and that once this was made, further maps were unnecessary. Pressed by the search for rarer minerals, and by international interest in Australia as an ancient continent, with lessons for geomorphology and landscape evolution in general, geological interest continued unabated, and helped shape historical understanding of the continent¹⁵⁵. The next several decades saw increased interest in systematic mapping, notably for geological atlases. By the 1890s, however, as geological mapping grew more scientific, so landscape art grew more impressionistic. Traditions shaped first by Eurocentrism gave way to a more naturalistic Australianism, the chief features of which were visible in the work of the so called Heidelberg School (named after a rural suburb of Melbourne)¹⁵⁶. In the paintings of Tom ROBERTS, Arthur STREETON, Charles CONDER and Fred McCUBBEN, subjects are not the romantic, or curious, native landscapes that fascinated an earlier generation, but rather the workings of harbours, rivers, cities, the mining and pastoral industries, and the pioneering past of European Australia and its peoples.

Gradually, as an nativeborn Australian eye developed masculine, it has been said, but frequently borrowed by women so a scientific environmentalism overtook the picturesque as a canon of taste. Australians ceased to see their landscape as 'sublime', less of gentle greens and blues, and more with savage scarlet, browns and yellows. As artists focussed more on change than continuity, so the practices of mining, mapping and landscape art cohered in a new unity, reflecting the occupation and domination of the land not as admiration for the natural, but as

a struggle with Nature. Agriculture and mining formed part of that struggle. Visual depictions of mining, especially from the advent of photography, represent the struggle as mastering and possessing what an earlier generation had either worshipped, or tried to explain. Inevitably, that relationship was tense, as the earth was moved and landscape was torn by European agencies, and in European interests.

These traditions persist, and today help to define the ways in which Australians view their ancient landscape constructed, violent, and densely complex, devastated and renewed by fire, drought and flood. The Australian landscape remains as meaningful to art as it is to science. But within the last generation, its meanings have been enriched by a surge of appreciation for the history and interpretative significance of aboriginal art¹⁵⁷. In this representation, landscape offers a text that requires to be read as both natural resource and religious belief. A sympathetic reading of the land, endowed with new meanings, show animal representations become rivers and lakes, literally embodying and empowering the landscape. Ancestors, songlines, and stories enrich representations of people and places, flora and fauna, in symbiotic fashions that neither modern cartography nor landscape art easily permit. It is perhaps too early for Western and aboriginal knowledge systems to 'interrogate each other' systematically, as many would wish¹⁵⁸. But Australia contemplates the prospect of a far richer culture when these complex metaphors are made part of our discourse, transforming their ancient novelty into our modern vernacular, and travellers' tales into resident understanding.

Conclusion

By the turn of the present century, the imperial and colonial fascination with novelty and curiosity with strange places, plants, and animals of intense economic and scientific interest had been overlaid by a vision of Australia as a place of exploitable wealth. Artistic resonances had come to coexist with material realities. Perhaps something was lost in the bargain. Theories of landscape painting seemed to count for little against photographic representations of mining reserves. Still, there survived a sense of location discovered, and of a newness, found. That newness pervaded the work of artists and naturalists

¹⁵³ See Robert STAFFORD, *Scientist of Empire: Sir Roderick MURCHISON' Scientific Exploration and Victorian Imperialism* (Cambridge: Cambridge University Press, 1989).

¹⁵⁴ Institute of Geological Sciences (Geological Museum, London), G.S.M. 1/6/9 f. 266. MURCHISON to H. MCRIVALC, 7 January 1856.

¹⁵⁵ Cf. David CARMENT, *History and the Landscape in Central Australia: A Study of the Material Evidence of European Culture and Settlement* (DARWIN: Australian National University, North Australia Research Unit, 1991).

¹⁵⁶ Jane CLARK and Bridget WHITELAW, *Golden Summers: Heidelberg and Beyond* (Melbourne: National Gallery of Victoria and International Cultural Corporation of Australia, 1985); Victoria HAMMOND and Juliet PEERS, *Completing the Picture: Women Artists and the Heidelberg Era* (Melbourne: Artmoves, 1992); and Ann GALBALLY, *Arthur STREETON* (Melbourne: Lansdowne Press, 1971).

¹⁵⁷ The 'protocol' of the European encounter, upon which much material culture studies has been based, is surveyed in the classic work of D.J. MULVANEY, *Encounters in Place: Outsiders and Aboriginal Australians, 1606-1985* (St. Lucia: University of (Queensland Press, 1989).

¹⁵⁸ See WATSON-VERRAN and TURNBULL, op. cit.; WATSON, *Investigating the Social Foundations of Mathematics: Natural Number in Culturally Diverse Forms of Life*, *Social Studies of Science*, 20 (2), (1991), 283-312.

who formed an antipodean cousinage — first among Europeans, then among Europeans of Australian birth.

Bernard SMITH has suggested that the informational art that informed the voyages of Cook fostered 'a pictorial mode of empirical naturalism that determined the course of the most progressive painting in Europe during the nineteenth century'¹⁵⁹. That informational exchange continued well into the 20th century, as reciprocities between Europe and Australia were transformed by Australian light and colour. Today, among visitors to Australia, the artist's 'gaze' is now framed by excitement, as well as by expectation¹⁶⁰. This excitement reflects not only scientific knowledge, but also traditional knowledge, in which the world of art and knowledge form a harmonious whole. Aboriginal landscapes are also information, from the rock art of antiquity to the bark drawings of recent times¹⁶¹. The marker that is mysterious Uluru (Ayers

Rock) is more meaningful of Australia than the Sydney Opera House¹⁶².

To these complex meanings, and their significance for natural knowledge, I am unable to speak, except as one among many who has seen and been disturbed by the haunting, mythologised rock art of Kakadu. But they confirm the different identities that Australia embodies. In December 1851, W.B. CLARKE rode out from Sydney to complete a geological survey of the Southern Alps near Victoria, and recalled: 'I lay facing the east, and saw all the processes of dressing the day, and wished I had been a Turner to have transferred the tints of that glorious drapery, in which morning marched along the horizon to my canvas'¹⁶³. Sadly, no illustration of that bright, confident morning survives; fortunately, Nature daily repeats the performance, and it is one that everyone in Australia can possess.

¹⁵⁹ SMITH, op. cit. 102

¹⁶⁰ John URRY, *The Tourist Gaze: Leisure and Travel in Contemporary Societies* (London: Sage Publications, 1990), 1; Richard WHITE, *The Outsider's Gaze and the Representation of Australia*, in Don GRANT and Graham SEAL (eds), *Australia in the World: Perceptions and Possibilities* (Perth: Black Swan Press, 1994),

¹⁶¹ See CHAMBERS, op. cit. 52-53 and David TURNBULL, *Maps are Territories* (Geelong: Deakin University, 1989), 32.

¹⁶² Julie MARCUS, 'The Journey out to the Centre: The Cultural Appropriation of Ayers Rock', in Anna RUTHERFORD (ed.), *Aboriginal Culture Today* (Sydney: Kangaroo Press, 1988).

¹⁶³ Cited in MARTIN, op. cit. 133

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