

Seeing the Trees and the Forest: Attending to Australian Natural History as if it Mattered

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Abstract

Discourse in the *Australian Journal of Environmental Education* of the last ten years has not addressed a pedagogy that draws on and reflects the natural history of the continent. Australia is an ecological and species diverse country that has experienced substantial environmental change as a consequence of European settlement. Australians have historically been, and increasingly are, urban people. With high rates of urban residency in a substantially modified landscape, what role might environmental education play in assisting Australians to develop understandings of the natural history of specific Australian places? While Australia has a rich history of people observing, comparing and recording the natural history of the continent, environmental education discourse in this journal has not addressed how pedagogy might be informed by a focus on natural history. This paper draws attention to this gap in Australian environmental education discourse and offers some thoughts and ideas for a pedagogy based on the natural history of specific places.

Introduction

In December 2005 the Australian Museum announced that it would cease to publish the magazine "Nature Australia" due to falling subscriptions and financial pressures. I was at once saddened, angry, frustrated, disappointed, and if the truth be known, not particularly surprised. I felt this was the death of a flagship of the culture of natural history in Australia. As I tried to secure a copy of the last edition (my membership having just run out) I discovered that the magazine had not been available at newsagents in my area for a number of years. One of the reasons cited by the Australian Museum for withdrawing the magazine, other than financial, was the quantity and accessibility of material available on the web (Howarth in Williams, 2006). At a time when Australia has one of the highest rates of land clearing of any developed country (Australian Conservation Foundation, 2001), high rates of species extinctions (Australian State of the Environment Committee, 2001; Greuter, 1995), high rates of urban living (in 2001, 66% of population lived in 5 major cities and 87% in cities and inner regional areas) (Australian Bureau of Statistics, 2003), combined with one of the highest levels of endemism of any continent (Australian State of the Environment Committee, 2001), I wondered about the importance of a culture of paying attention to our surroundings, of knowing something about our more-than-human¹ neighbours.

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Natural history as a cultural activity is well established in Australia. One has only to look at the number of bird, animal, and plant field guides that are available in bookshops or accounts of naturalists or natural history (see for example Moyal, 2001; Nikulinsky & Hopper, 1999; Pizzey, 2000; Somerville, 2004; Tredinnick, 2003; Woodford, 2001, 2002). However, I suspect that most Australians, on the whole, have fairly limited knowledge of their local native flora and fauna. In *The Future Eaters*, Tim Flannery (1994, p. 400) expressed concern that high levels of urbanisation in Australia have "... result[ed] in a dramatic decline in urban wildlife, and in generations of young Australians growing up in concrete jungles without any opportunity to learn first-hand about or experience their unique wildlife heritage. Without that, there is little hope for the future indeed". Flannery (1994, p. 403-4) goes on to suggest that continuing urbanisation is further alienating people from their environment through reducing people's capacity to learn about aspects of the land in bushland and native gardens. How many people, for example, could name 8-10 overstorey tree species, 20-30 understorey species, 60-80 bird species, half the terrestrial or arboreal mammals, or any of the frogs, reptiles, or bats of their local area? Not to mention the insects, spiders, fungi, grasses, mosses and lichens! I would argue that at no other time in the Australia's modern history has it been so important for Australians to know who their more-than-human neighbours are, understand how they live, and take an interest in their well being and survival.

As I sit writing this paper I can hear the rasping cough of a male Eastern Grey Kangaroo in the bush outside my office. This distinctive sound is a form of submissiveness: the coughing kangaroo is acknowledging the status of the dominant male (Aldenhoven & Carruthers, 1992). The small mob that frequents the bushland beyond my office consists of three does, each with joeys, and two adolescent and two adult bucks. As a keen animal watcher, I wonder about the lives of these kangaroos: how old are they, how far do they roam, how has this last summer been for them, what troubles them? As an educator I use the more general guiding question "Who lives here and what is the nature of their lives?" to teach about the natural and cultural history of places we visit or live with². In this paper I will use this concept to highlight where I perceive there are some gaps in Australian environmental education discourse about pedagogy that draws on and reflects the natural history of Australian places. In doing so, I offer some thoughts and ideas for *Australian* environmental education that is based on the culture of natural history of particular places.

Shifting Ground – Definitions and Meanings

The terms "nature" and "culture" carry a range of meanings, many overlapping, and some contradictory (see for example Griffiths, 2003; Hay, 2002; Soper, 1995). By extension, "natural history" and "cultural history" are equally complex terms. Andrew Brookes (2002a), writing about naturalist knowledge, the limits of universalist environmental education and implications for Australia, observes that the term "naturalist" contains opposites. Brookes uses Gilbert White's seminal piece *The natural history of Selbourne* "... partly [as] a semantic device to help avoid the mire of contradictory meanings" (p. 75). Lucie Sauvé (2005, p. 13) suggests that the naturalist "current" in environmental education "... is centered on human relationships with nature. The approach may be cognitive (learning about nature) or experiential (living in nature and learning from it), or affective, or spiritual, or artistic (allying human creativity with nature's own)".

While not wanting to wander in to the mire of definitions of "natural history" and "naturalist" it might be helpful if I discuss some of the concepts I associate with a pedagogy of natural history. I would suggest that "natural history", as an area of study, is actually a cultural activity, and that consequently, natural history and cultural

history are inseparable. In my teaching, for example, I show students old tree stumps that are habitat for echidnas in our local forest. The existence of large numbers of stumps is a function of gold mining activity in central Victoria from the 1850s onwards. In this example, understanding the echidnas of our local forest is linked to cultural history, namely, patterns of European settlement, gold mining, timber collection, and forest conservation. In this sense, a pedagogy of natural history involves being attentive to one's surroundings, observing how different aspects relate to each other, recording one's observations, reflecting on and relating them to those made by others, and sharing with others observations and insights. An integral component of this process is paying attention to the relationships between humans and the more-than-human world. That is, seeing humans not as somehow separate from the environment, but as a part of a place, with a substantial capacity to shape and influence the nature of a place. I will return to this discussion later in the paper. For the want of a less ambiguous phrase, however, I will use "natural history" so as to draw attention to the particular aspects of history this paper is concerned with.

The Naturalist and Natural History in Australia

Today we have killed a porcupine [echidna], the first we have caught. It is, in appearance, between the English hedgehog and the porcupine. Its quills are only about an inch long; but it has tremendous claws, and is a truly Australian creature, having a horned snout, something like the beak of a bird, and a long, small, round tongue; being in fact, an anteater. It has the rudiments of a pouch, but does not appear perfectly marsupial. Its skin is very thick, and with the spines weighs about as much as the body. The flesh resembles pork, and is excellent eating; but we had no proper stuffing; notwithstanding it was very good (Howitt, 1855[1972], p. 287).

William Howitt's account from the 1850s of central Victoria, Sydney, and van Diemen's Land (Tasmania) is full of encounters with "unusual" wildlife. Howitt's observations, though dated, provide interesting insights into both the animal and aspects of the culture of his time. While I do not condone the eating of echidnas, Howitt's account of the taste of echidna is in some ways representative of a culture of paying attention to one's surroundings, of using all one's senses to "observe".

Australia has a well established tradition of naturalists observing, recording and discussing the nature of the Australian environment. Prior to European settlement indigenous Australians had highly developed levels of knowledge of their surroundings (Rose, 1996, 2004). They were perhaps the archetypal naturalists, their survival being dependant on their knowledge of specific attributes and behaviour of plants and animals around them. The earliest European explorations of Australia included naturalists, often in senior positions. Banks and Solander accompanied Cook in 1768-1771, Labillardière sailed with d'Entrecasteaux in 1791-3 (Duyker, 2003), Lesueur with Baudin in 1801-3, and Bauer with Flinders in 1801-3 (Fornasiero, Monteath, & West-Sooby, 2004) to name but a few. The observations and collections of early European naturalists in Australia, in many cases, form the foundation of our western scientific understanding of plants and animals of the continent. Andrew Brookes (2002a, p. 75) notes that while naturalists were active in Australia from the beginning of European settlement, for the first hundred years of settlement their role was mainly confined to contributing specimens to collections housed in Europe. Bolton (1992, p. 99) observes that "it was in Victoria, the most highly urbanised of the Australian colonies, that the first initiatives were taken to encourage the popular study of Australian wildlife". Clubs and societies associated with observing and communicating about natural history began in the late

1800s: Victoria in 1880, Brisbane in 1886, NSW in 1887 and Tasmania in 1888. It was largely as a result of the activities of these groups that in 1893 the Australian Association for the Advancement of Science began calling for government subsidised reserves for the protection of native flora and fauna (Bolton, 1992).

More recently, people such as Crosbie Morrison, Vincent Serventy, Harry Butler and Les Hiddens have inspired Australians to take an interest in their surroundings (Mulligan & Hill, 2001)³. Mulligan and Hill's account of how these motivated characters developed their environmental knowledge and rose to prominent positions as communicators and educators suggests that primary and secondary education played a fairly minor role in the development of their knowledge and appreciation. In each case, it would appear that a network of family members and friends had a greater influence on their respective formal development as naturalists and environmental educators. While this observation is not particularly surprising, it does raise concerns for me regarding the role of education in conveying knowledge, understanding of and appreciation for the natural history of Australia. How do Australians learn about their surroundings, from whom and by what means and experiences? What might environmental education shaped around the particulars of Australian natural and cultural history look like? What does Australian environmental education discourse have to say about pedagogy constructed around the particulars of an Australian culture of natural history? These questions are the focus of the remainder of this paper.

Natural History in Australian Environmental Education

In the Australian Journal of Environmental Education (AJEE) there would appear to be very little discussion or sharing of ideas of what form environmental education might take that addresses the natural history of this continent. In my review of the last ten years of the AJEE (1995-2004) I could find no direct references to pedagogy or discussions of practice addressing the natural history of Australia⁴. Several papers (see for example Davies & Webber, 2004; Malone, 2004) made reference to aspects of natural history, such as observing or paying attention to the particulars of the surrounding environment, but none directly addressed a pedagogy of Australian natural history. I will discuss these papers, and a number of others, in order to draw attention to the significance of this gap in Australian environmental education discourse.

In a Viewpoint titled "Learning to Care: Education and Compassion" John Fien (2003) proposes eight values that constitute an "ethic of deep care". These values are known as the World Ethic of Sustainability and were developed by the IUCN, WWF and UNEP. The eight values are broken evenly into two sets: people and non-human nature, relating to ecological sustainability (Interdependence, Biodiversity, Living lightly on Earth, and Interspecies equity), and; people and human-nature, relating to social sustainability (Basic human needs, Inter-generational equity, Human rights, and Participation). Fien cautions against indoctrination and goes on to discuss the dilemmas facing teachers wishing to educate about values. The four values that relate to the natural history discussion in this paper (Interdependence, Biodiversity, Living lightly on Earth, and Interspecies equity) contain broad statements regarding the need for humility, care, compassion, preservation of complex ecosystems, maintenance of ecological processes, careful and sustainable use of the environment, decent treatment of all creatures and protection from cruelty⁵. While I support Fien's intent, his discussion does not go as far as to address how a community or an individual might "preserve the complexity of ecosystems" or "maintain ecological processes" without first knowing who lives in these ecosystems and assists in their maintenance. I would suggest that a fundamental principle of "first know your surroundings" underpins all eight values;

without knowledge of your home environment what hope is there for an “ethic of deep care”?

A number of other papers in recent years have also addressed sustainability and the state of environmental education in school curriculum (A. Gough, 2004; Heck, 2003; Tilbury, 2004). Annette Gough (2004, p. 33), reporting on improvements of science teaching in primary schools in Victoria that lead to more “sustainability education” occurring, observes that “both science education and environmental education in Australian primary school curricula are a relatively rare event. This is not a recent phenomenon”. Gough (2004, p. 33) notes that environmental education, like science education, has “... long struggled to find a place in what is perceived to be an already overcrowded curriculum in both primary and secondary schools”. I find this concerning when I again consider how and where Australians, children in particular, learn about the specific entities (for example, plants, animals, rocks) that make up their surroundings. Writing in a different forum about children’s “ways of knowing”, Rod Gerber (2001, p. 62) suggests that culture has a “... substantial influence on children’s conscious behaviour in the large-scale environments in which they live”. Culture provides skills, beliefs, and attitudes that link people with society and their local environment. If a culture of paying attention to one’s surroundings is not occurring in school settings, then where does it occur?

Returning to the AJEE, both Heck (2003) and Tilbury (2004) observe that environmental education and education for sustainability are on the rise across the country, yet neither suggests how practice might reflect the natural history of a given part of Australia. However, Heck (2003) does encouragingly suggest at the end of her paper that educators need to continue the development of curriculum policy and classroom practice that promotes environmental education across the curriculum. Heck argues that attention be paid to developing education *for* the environment through consideration of how to address knowledge, skills, actions and values within existing curriculum. “To achieve this aim we need both more research and more practice in environmental education to illustrate how education contributes to a sustainable future” (Heck, 2003, p. 122).

The focus on “education for sustainability” is for me both encouraging and concerning. While I welcome an increase in education for sustainability I find it disconcerting that there is limited discourse in Australian environmental education about what is being “sustained”, that there is limited discussion of specific pedagogy, and that language of sustainability fails to address questions such as “How ought we live so that the land will not be abused?” (Jickling, 2001, p. 172).

Richard Davies and Lynn Webber (2004) have, in part, attempted to address this question. Their paper, addressing community education for the conservation of urban wildlife, reports on attempts to foster the development of sustainable living that will enhance the lives of people in NSW and benefit the native flora and fauna. The extensive review of people’s awareness and attitudes toward wildlife, conducted by the NSW National Parks and Wildlife Service, revealed that for the participants involved, wildlife in urban areas roughly falls into three categories. These were primarily based on perceived abilities to “happily co-exist” with people. The first group, described as “cute”, “harmless” and “attractive”, were found to be appropriate and desirable in an urban setting (small and attractive birds, lizards, frogs, butterflies and worms). The second group, were perceived as “attractive” and “desirable” but “inappropriate” in an urban setting due to harm they faced (koalas, echidnas, wombats, platypus, tortoise). Not surprisingly, the third group were seen as “destructive”, “annoying”, “threatening” and “undesirable” in urban places (snakes, spiders, cockroaches, caterpillars, possums, bats, bees, flies, wasps, moths, cockatoos, magpies) (Davies & Webber, 2004, p. 84)⁶. This

research highlights that the precursor to protection of urban wildlife is awareness of the contribution of native flora and fauna to the quality of life people enjoy.

Karen Malone (2004) has addressed the issue of Australians knowing about the specifics of their places from a different perspective. Through discussion of the need for places where children can engage, connect and respond to nature, Malone contends that one off educational experiences are not sufficient to nurture a child's connection and appreciation with the natural world. Malone (2004, p. 60) observes that children with little or no access to "natural elements" in school grounds "... were more likely to engage in anti-social or destructive behaviour and felt less able to engage in imaginative or creative play activities". Malone (2004, p. 64) argues that "... children's capacity to contribute to environmental sustainable development will be largely dependent on the quality of their childhood environmental experiences". Malone suggests that due to limited options in urban areas, places like botanic gardens offer important opportunities for children to explore and learn about the natural world. Malone does not directly address natural history per se, however, she does argue that diversity and choice in children's experiences is important in supporting their environmental learning. Implied in Malone's argument, I would suggest, is the need to foster a culture of paying attention to one's surroundings, of knowing about the more-than-human world.

The development of an "ethic of deep care" and "education for sustainability" requires attention to the specific qualities of, and entities within, our surroundings. While the use of "nature", "environment" or "sustainability" in the abstract is useful for engaging in debates about these issues, a lack of specifics may actually hinder discussion of detailed pedagogy addressing the particulars of our local environments. A more detailed review of the content of the AJEE would, I believe, only reinforce the point I have made here: there is a substantial gap in Australian environmental education discourse regarding the natural history of this continent.

Discussions of a Pedagogy of Natural History in Other Forums

My search for discussion of a pedagogy of natural history beyond the AJEE is by no means exhaustive, yet I was able to find a substantial number of references addressing this topic in other forums (Baker, 2005; Burkholder, 2003; Butler, Hall-Wallace, & Burgess, 2000/2001; Gruenewald, 2003; Heyd, 2005; Knapp, 2005; Krupa, 2000; List, 2005; Lopez, 2001; McElheny, Baldwin, & Sharp, 1997; Moore, 2005; Pyle, 2001; Saito, 1998; Thomashow, 2001). Given the sheer number of papers addressing this topic it is beyond the scope of this paper to review them all. I will, however, give a brief account of some of these papers to highlight the existence of this area of study within in environmental education in other countries.

The Canadian Journal of Environmental Education, in contrast to the AJEE, has published a number of papers addressing a pedagogy of natural history (see for example Bell, 1997; Brookes, 2002a; Jardine, 1998; Stewart, 2004). As previously mentioned, Sauvé (2005) maps "naturalist" as one of seven currents with a long tradition in environmental education. Sauvé does not explicitly say that her map is Canadian, North American, or international, but does qualify in setting out parameters of her mapping that "the choice of examples reflects elements of [her] own exploration of the field of environmental education, based on [her] culture of reference and [her] practical experiences; they include propositions stemming from francophone, anglophone, and latino-american contexts" (p. 13). Drawing on the work of Steve van Matre, Sauvé (2005, p. 14) describes the "naturalist" current within environmental education as mode of "... engaging in cognitive and affective encounters in/with nature via experiential approaches and the appeal of role-playing in magical or mysterious settings, in order to promote an understanding of ecological phenomena and to encourage the development

of an attachment to nature". This approach (using role-play) would appear to sit in strong contrast with those advocated by Bell (1997), Brookes (2002a), and Jardine (1998).

Anne Bell (1997) and David Jardine (1998) provide insightful accounts about ontological dimensions of learning natural history. Bell (1997, p. 137), offering an account of natural history from a learner's perspective, argues that natural history "is intended to signify first and foremost fully-embodied participation in the more-than-human world". For Bell, natural history is not just the accumulation of species names, but a holistic, embodied and situated approach to environmental education that fosters a connection between knowledge of one's surroundings and caring about the lives of the more-than-human world. Natural history is a way to be attentive to one's surroundings that offers alternatives to abstract, fragmented and technical ways of learning about the environment (Bell, 1997). An essential ingredient for Bell in the process of learning natural history is spending time with "knowledgeable companions" who act as mentors to encourage, develop understanding and validate interest.

Jardine (1998, p. 94), recounting a birding trip with friends to the area where he was raised, makes similar observations:

I had forgotten the pleasure to be had in simply standing in the presence of people who are practiced in what they know and listening, feeling, watching them work. I had forgotten the learning to be had from standing alongside and imitating, practicing, repeating, refining the bodily gestures of knowing. I had forgotten how they could show me things, not just *about this place*, but about how you might carry yourself, what might become of you, when you know this place well. [emphasis in original]

For Jardine, attending closely to the natural history of a place brings with it something "deeply pedagogical" about a place. Through attention to natural history, one learns how to carry oneself in a manner that the place becomes known, but one also becomes known *by* the place. While Jardine does not explicitly use the term "sustainability" he argues that a culture of paying attention to one's surroundings is essential if the life and our living in a place are to continue. The knowledge that comes from paying attention, he contends, must be passed on as an essential, not accidental, aspect of knowing a place.

Also in contrast with Sauvé, Brookes (2002a) questions the appropriateness of importing environmental education from one part of the world to another without due consideration of local knowledge and biogeographical, cultural and historical differences. Drawing on Gilbert White's *Selbourne*, and Australian environmental history, Brookes (2002a, p. 80) argues that in some circumstances "... not only are understandings derived from Anglo-American cultural, historical and physical environments an incomplete basis on which to develop environmental education in Australia ... they may be as unsuited to the Australian environment as are some imported farming practices". Brookes suggests new "paths" for environmental education in Australia, based largely on paying attention to the stories within environmental history. Brookes offers three considerations that are useful when considering how one might develop a pedagogy of natural history in particular places. Firstly, attend carefully to "... learning to read the story of environmental changes that have followed European colonisation" (ibid, p. 82). Secondly, be attentive to "... how taken-for-granted imported cultural influences (including technologies) shape interests and form habits" (ibid, p. 82). And finally, pay careful attention to "... how spatial history has distributed interests and knowledge" (ibid, p. 83). Brookes' careful discussion provides a strong case for how Australian

environmental history might inform the development of pedagogy that is responsive to the natural history of this continent.

Finally, Charles List (2005) draws to our attention that other scholars have attempted to raise the profile of natural history within education. List (2005, p. 368) highlights that Aldo Leopold posed the question "What is our educational system doing to encourage personal amateur scholarship in the natural-history field?". While Leopold was writing about circumstances in the USA his concern might equally apply here.

Seeing the Trees and the Forest: Toward of a Pedagogy of Australian Natural History

George Seddon (2005, p. 6) argues that it is a fiction to speak of "Australian animals and plants" because flora and fauna do not respect national borders. While there are numerous examples that support Seddon's claim (echidnas, possums and tree kangaroos in Papua New Guinea to name a few) I believe Australian identity is significantly influenced by our flora and fauna (see for example, the use of wildlife in advertising or as mascots for international sporting events).

Although contemporary Australians might cling to emblematic wildlife as a label of "Australian-ness", I suggest there is also an ongoing struggling to come to terms with the nature of the environment. Paul Carter (1987) in *The Road to Botany Bay* observes that European settlers were unfamiliar with the nature of the Australian environment: trees that lost their bark instead of their leaves, animals that bounded rather than ran, rivers that dried up and/or flowed inland, were not to Europeans, recognisable as how nature behaved. Many of the animals and plants of Australia have historically attracted much attention as "unique", unusual oddities (see for example, the discussions of the platypus, wombat, and wollemi pine in Moyal, 2001; Woodford, 2001, 2002). With declining human populations in rural Australia, knowledge is being lost amongst residents in these areas about declining habitat coverage and species numbers (Main, 2005). Seddon (2005, p. 5) observes that "... ecology is implacably particularist, and the richness of our global environment depends on this particularity, not on the citizens of the world, the rats and seagulls and the sparrows". The loss of native species and the loss of a culture of paying attention to one's surroundings leaves Australians impoverished in their capacity to imagine and develop a (species) rich sustainable future.

Developing a pedagogy of *Australian* natural history requires paying attention not only to one's surroundings but also to the implications of observing one aspect of an environment and not another. Paying attention to the weather or climate is not the same as paying attention to the habits of echidnas or honeyeaters. Observation of each leads to different ways of being in a place, different knowledge and consequently different understandings of who lives in an area and how they relate to each other (Jardine, 1998; Stewart, 2004). As Brookes (2002a, p. 77) has observed "natural history knowledge is not just the accumulation of facts, but also the layering of stories in which personal experience, social interactions, and locality together give both order and meaning to nature".

In my teaching of natural history I weave human and more-than-human stories together. To return to my earlier example of echidnas in the Box and Ironbark forests of central Victoria, paying attention to echidnas using tree stumps has led us (myself, colleague and students) to observe that the stumps reveal multiple stories of people living and working in the forest and the trees responding. Some stumps show multiple cuts (the trees coppice in response to limb loss) using different techniques (axe, two-person saw, chainsaw), from different time frames. Many stumps also show the signs of having had shingles cut from them. The use of building materials across Australia has

varied greatly since European settlement (Bolton, 1992). Prior to the introduction of corrugated iron and cheap rail transport people used local materials to build housing. Attending to echidna use of stumps connects the current forest and its inhabitants with past use, and to some extent, values and understandings. Walking through the bush we look for signs of echidnas: fresh diggings in ant nests, quills left behind in stumps and old burrows used for nesting. While we might be looking for echidnas there are other stories to encounter. Old trees with hollows, trees frequently used by goannas, possums, sugar gliders, yellow-footed antechinus, or brush-tailed phascogale, the movements of small birds, all provide segues into other stories about the forest. This is not scientific ecology, but rather learning how to be in a place, to look and learn about the entities that inhabit the place, how they relate to each other and are influenced by past activities. In a sense, a walk in the bush observing the natural history becomes a process of building an experience, not unlike writing a text (N. Gough, 1993; N. Gough & Sellers, 2004). Stories seemingly unrelated may become connected through a common element or history. Echidnas and timber shingles may seem to have little in common, but with attention to the history of particular stumps in a specific forest, their stories, pasts and futures become entwined. With attention to natural history, in this circumstance, naturalist knowledge is connected to wider community and regional issues such as salinity and community engagement in conservation (Brookes, 2001).

This is a necessarily brief account of what it is to wander in the bush paying attention to the stories of the inhabitants, past and present. There are many other stories not covered here (indigenous history, Box-Ironbark forests limited largely to dry, rocky ridges, declining woodland bird species and numbers of arboreal mammals through loss of habitat and fragmentation, to name but a few). Like the echidna-tree stump-shingle story, these stories also confirm the inseparable relationships between humans and their more-than-human neighbours. The details of the echidna story are by no means representative of other places, yet they do provide a window into how and what might come from paying close attention to one's surroundings.

Concluding Remarks

In 1853 William Howitt observed in central Victoria "flocks" of Bush Stone-curlews making their beautiful eerie call. These cryptic birds were once widespread in south-eastern Australia, are now mainly restricted to the northern part of the continent, largely due to loss of habitat. It might be difficult to quantify the ecological impact of the loss of this species, and others like it, from an environment, however, I believe their loss is our loss. The loss of such a species leaves Australian culture impoverished and in a weaker position from which to imagine and develop a sustainable future.

Future environmental educators will need not only deep personal experience of places where they teach, but also the ability to deconstruct epistemologies and cultural influences. Hard work, the right attitude, and good intentions will not be enough; environmental education presents a substantial intellectual challenge ... any willingness to entertain critical discussion about environmental education in Australia and the magnitude of the problem it faces is itself a kind of optimism ... (Brookes, 2002a, p. 85)

Education is not a value free activity (Fien, 2003; Jickling & Spork, 1998). Education is a human creation given shape, meaning and purpose by history, values and changing patterns of power (Fien, 2003). The challenges facing Australian environmental education do indeed present a "substantial intellectual challenge". Like Ian Robottom (2004), I believe that the curriculum of environmental education should be embedded in local environmental issues. Any Australian environmental education or education

for sustainability should, I believe, grow out of paying attention to one's surroundings, and hence be informed by a pedagogy of natural history. While education about issues such as climate change remains important, I hope that this paper might stimulate some thoughts and discussion of pedagogical responses to the particulars of the environments we live and work with. As a continent, Australia contains a wide range of species in many different ecosystems: the development of environmental education pedagogy ought to be based on and reflect this diversity. The future of many species and ecosystems is likely to be linked to our willingness and capacity to do so.

Acknowledgements

This paper was written with the support of the School of Outdoor Education and Environment, La Trobe University, Bendigo. Thank you to Kathleen Pleasants and reviewers for their encouraging feedback on this paper.

Keywords: Natural history; naturalist; Australia; place-based education.

Endnotes

1. This term originates from Abram's (1996) *Spell of the sensuous*. Drawing on Abram's work, Bob Jickling (2001) argues that reduced linguistic capacity diminishes our ability to engage in critical environmental thought and discourse. I have used the term 'more-than-human' to highlight alternative ways to conceptualising our surroundings and associated relationships.
2. I am indebted to my colleague Andrew Brookes for establishing much of the natural history aspects of the degree programs in which I now teach. Much of this paper is informed by his research in this area (in particular Brookes, 1998, 2001, 2002a, 2002b).
3. See in particular Chapter 5, "Taking nature to the public: journalists, broadcasters and writers as educators".
4. While there are some great teaching resources that focus on the natural history of areas (see for example, AAEE 2006) there would appear to be little discussion in Australian journals, such as the AJEE, of merits, philosophy or techniques of a focus on natural history. I strongly suspect that a guided walk in the beech forests of Tasmania would look and feel different when compared to a snorkel around a reef in northern Queensland (physical environmental differences aside), yet where is there debate about the merits of knowing something about how an echidna or a coral lives? Or a discussion of pedagogical responses to the declining populations of Regent Honeyeaters and Crested Bellbirds in central Victoria?
5. My account of these values is by necessity very brief. Please see the original paper for more detail.
6. Again, my account of this paper is by necessity very brief. See the original for more detail.

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