# Becoming animate in education: immanent materiality and outdoor learning for sustainability

David A. G. Clarke & Jamie Mcphie

**Abstract**

Outdoor environmental education has long postulated a link between experiences outdoors in 'natural' environments and environmental concern. This paper suggests a straightforward relationship is problematic due to its implicit assumption of a nature/culture divide. Critical outdoor education has sought to overcome this dualism by describing a relational understanding of the world emphasizing ecological systems and highlighting humanity's 'connection' to the environment. This relational approach aims to tackle the 'crisis of perception', argued to be the root cause of anthropogenic planetary degradation. We draw from the philosophical work of Deleuze and Guattari to suggest that relational ontologies, as currently conceived, may reinforce a static conception of the world by emphasizing 'points of being' (subject and object). Deleuze and Guattari proffer immanent materiality, where points of being are dispelled by movement and 'becoming'. We then describe 'animism' as a mode of living where the world is understood to be immanent and constantly becoming. The consequences of animism are explored with regards to conceptions of 'nature', 'place' and 'outdoor' learning for sustainability. Creative practices to tackle the 'crisis of perception' are suggested as approaches that circumvent static conceptions of the world implied by points in relations and prevailing conceptions of nature as 'other'.

## Introduction

Outdoor and environmental education literature has long postulated that learning experiences outdoors in 'natural' environments can result in pro-environmental awareness and action (Bögeholz, 2006; Bogner, 1998; Christie & Higgins, 2012; Cooper, 2010; Duerden & Witt, 2010; Ewert, Place, & Sibthorp, 2005; Higgins, 1997; Kals, Schumacher, & Montada, 1999; Knapp, 1999; Mittelstaedt, Sanker, & VanderVeer, 1999; Tarrant & Green, 1999; Wells & Lekies, 2006). Whilst the impetus for such research and theory can be traced back through the literature to earlier roots in the environmental movement, more recently these ideas have taken their cue from endeavours such as the United Nations Educational, Scientific and Cultural Organization decade of sustainability education, Section IV of Agenda 21,1 environmental non-governmental organization education programmes and research funding, and various national governmental education policies and initiatives (e.g. the Scottish Government's emphasis on outdoor learning, education for sustainable development and global citizenship and the recent move incorporating these elements into the Professional Standards for teachers in Scotland) (Higgins & Kirk, 2006; Martin, Dillon, Higgins, Peters, & Scott, 2013).

As Lugg (2007) identifies, discourse concerning the capacity for outdoor experiences to inform environmental awareness and action has lacked a 'learning process' perspective, instead attempting to 'prove' that various forms of experience, in what are deemed to be

natural environments, can result in measurable or observable outcomes. Sandell and Öhman (2013) suggest that this notion of a simple relationship between experiences in nature and environmental concern is problematic for two reasons. Firstly that it is difficult to prove such relationships in educational research, and secondly that 'environmental concern' can mean different things. Whilst these points are valid, there remains a third and more fundamental problem with this approach. Inherent in this perspective is the concept of a nature/culture divide whereby learners can be 'exposed' to 'natural' or 'wilderness' environments and then, presumably, returned to what logic would infer are the 'artificial' surroundings of their normal lives. Concurrently a more questioning 'critical outdoor education' has sought to tackle this implied dualism through an ecological and Earth systems perspective of holism (often promoting 'ecological literacy') highlighting how humans are 'connected' to the rest of the 'natural world' and emphasizing the implication of 'social systems' to a greater or lesser degree (Cachelin, Rose, Dustin, & Shooter, 2011; Colwell, 1997; Gruenewald, 2003; Magntorn, 2007; Martin, 2008; Thomas & Thomas, 2000). These critical approaches can be said to rely on a relational understanding of the world where elements and parts interact in complex ways. Further to this, critical approaches highlighting a phenomenological understanding of the world, where experiences of 'being' and 'dwelling' are prioritized, have attempted to dispel dualisms and understand outdoor experiences in the 'natural' world (Bonnett, 2013; Payne & Wattchow, 2010; Quay, 2013; Wattchow, 2004). In these approaches, 'place' is often highlighted, with some arguing that notions of place should be considered above ecological emplacement in systems (Bonnett, 2012). At its heart, the difference between these approaches is that of the ontological perspective taken. In this article we discuss these ontological approaches and suggest a way forward, to our knowledge not yet apparent in outdoor sustainability education discourse, which we believe requires us to think differently once again about how we tackle the 'crisis of perception', argued to be the root of humaninduced planetary degradation.

Whilst the importance of ontology to research approaches has been examined in outdoor-related literature (Allison & Pomeroy, 2000), we discuss ontology here in relation to both the manner in which theory describes reality (i.e. objectively, subjectively or relationally) and the manner in which we, as learners and educators, see (and assume to be the nature of) the world around us. We argue that relational approaches underpinning critical outdoor sustainability education, although a step away from essentialist/reductionist paradigms (which are based on dualistic understandings of the world), often retain a binary bias that it may be helpful to overcome. Drawing from Deleuze and Guattari (2004) we contend that relational approaches which highlight our 'relationship', or 'connection', or even 'disconnection' to 'nature', and, indeed, the concept of 'nature' itself, ultimately depict falsely boundaried entities. We then offer animism as a way of seeing founded on an ontology of immanent materiality as one direction through this problem. We use the term animism in a manner after the work of Bird-David (1999), Harding (2009), Descola (2011) and Ingold (2011) to describe a mode of being (becoming) that embodies both 'seeing' and 'acting' within a world ontologically understood by its inhabitants (animists) to be constituted by immanent materiality; to be whole, alive and forever becoming. Immanent materiality is opposed to the prevailing transcendental conception of a world of objects set in space that we experience as we go about our lives. Rather, it suggests a world of affect where the boundary between objects is dispelled, thus dispelling objects. Further to this, immanent materiality dismisses notions of a world understood to consist of 'dualisms'. For instance, divisions between mind/body, agency/ structure and artificial/natural are eschewed. We suggest that this ontological understanding of the world—not primarily in an academic sense, but in our day-to-day assumptions regarding the nature of the reality in which we act as practitioners—could be of significance to outdoor environmental and sustainability education. We conclude by discussing what this philosophy of 'becoming' may mean for concepts of nature, place and 'outdoor' learning in our practice and suggest some initial directions forward. Whilst the

path this article takes may be interpreted as questioning the validity of positivist assertions about the world, we would stress that positivism is a way of seeing no less valid than others based on its ontological assumptions. However, whilst we have been made aware of the potential sixth mass extinction through moderately positivistic climate science, it does not mean we should continue to choose to base our reality, and indeed our resulting action, on a positivist model.

**Gaia theory and the 'crisis of perception'**

In Gaia theory, planet Earth is understood as a self-sustaining whole,[2] each aspect working in a manner (without forethought or intention) that maintains the continuity of Gaia (Lovelock, 1979, 1988, 2006). Within this conception, human culture cannot be considered as anything other than a feature of planet Earth, and therefore of Gaia. Humans, and their produce, are as natural as a tree or a volcano. A volcano may, in fact, be the most apt analogy, as it is volcanic action that appears the most probable cause of the largest mass extinction the planet has faced since the appearance of life some 3,600 million years ago. The release of carbon dioxide at the turn from the Permian to the Triassic, 251 million years ago, resulted in a runaway positive feedback loop of warming—the greenhouse effect, which saw temperatures rise by 6°C, resulting in the loss of as much as 95% of all species on the planet (Benton & Twitchett, 2003). This is an achievement that we appear on course to replicate. The 'natural' self-regulation, the existence of which is still disputed (Moody, 2012), of Gaia is not without its hiccups then, at least from the perspective of valuing biodiversity. The International Panel on Climate Change[3] (IPCC, 2007, 2013) state that the effect of humanity in the last 263 years has been significant, with geoscientists naming this era of the planet's physical history the age of Humans (Steffen, Crutzen, & McNeill, 2007):

We no longer live in the Holocene . . . but in the Anthropocene. Chemical, physical and biological changes are dramatic and sometimes frankly alarming: atmospheric carbon dioxide concentrations are now at levels last seen more than two million years ago and rising fast; invasive species have been introduced to every continent and a sixth great mass extinction event may be with us in mere centuries; landscapes are transformed. Imagining a look back from some far future, it is hard to see how the twenty-first century could not be seen as a turning point in Earth history. (Zalasiewics, 2013, p. 9)

Because of these effects, the ability for Gaia to continue to self-regulate in a manner supportive of current species—including humans—is under question, through a similar process to that which occurred 251 million years ago.

Such is the consternation surrounding the term 'Gaia', due to perceived teleological connotations, that scientists examining the possibilities of self-regulation of Earth often refer to themselves as Earth Systems scientists (Moody, 2012). Teleology is the ascribing of 'purpose' or intention to physical phenomena. It suggests an overriding plan or 'end goal' that, for some, infers a divine presence. Any implication of its occurrence in the biological sciences has been particularly contentious, with critics noting the logical problems inherent in the concept but also the difficulty of straightforwardly describing biological processes without implying teleology (Reiss, 2009). Earth Systems scientists are thus wary of the etymology of the term Gaia (deriving from the Greek goddess of the Earth). Where teleology suggests purpose, systems theory is concerned with effects in complex relationships that may produce 'self regulation' of phenomena. Systems theory is a way of conceiving of reality that prioritizes the relationships between components, or parts, of a larger whole. In this way, systems theory is concerned with understanding both substances and processes in non-linear terms, an approach distinct from the linear methods that underpin the reductionist worldview of mainstream scientific enquiry. Systems theory,

then, may provide a direction forward for further understanding of self-regulation through negative feedback loops, said to be a key mechanism of Gaia as established by Lovelock's Daisy World models (Lenton & van Oijen, 2002), but is also argued to be essential to sustainability education through the development of 'systems thinking' capacities (Sterling, 2004). Indeed, thinking systemically about how the human race is 'connected' to the rest of the world has grown in popularity in sustainability education and critical outdoor education discourse (Cachelin et al., 2011; Colwell, 1997; Cutter-Mackenzie & Smith, 2003; Gruenewald, 2003; Jordan, Singer, Vaughan, & Berkowitz, 2009; Magntorn, 2007; Martin, 2008; Morris & Martin, 2009; Orr, 1992; Porter & Cordoba, 2009; Rose & Cachelin, 2013; Sterling, 2004; Strachan, 2009; Thomas & Thomas, 2000), with systems thinking constituting, for example, the metaphysical foundation for 'ecological literacy', as illustrated by Fritjof Capra (1996). Systems thinking is attractive as it is seen to tackle a 'crisis of perception' in which the prevailing objectivist and positivist worldview implied by linear and reductionist approaches to knowledge generation (or knowledge 'gathering' from a positivist perspective) has a significant influence on western perceptions of the environment as separate from humanity. Within this view, fragmentation and instrumental rationality are prioritized over other modes of participating in the world, directly resulting in anthropogenic environmental catastrophe (Abram, 1996, 2011; Bohm, 1980; Capra, 1996; Hamilton, 2002; Harding, 2009; Ingold, 2011; Merchant, 1994; Orr, 1992, 2004; Plumwood, 2002; Sterling, 2004). However, whilst the 'crisis of perception' may be a legitimate one, we will argue that systems thinking, and some popular conceptions of relational ontologies in general, may be open to some of the criticisms they seek to overcome.

## Relational ontologies: against pointillism, for a plane of immanence

Relational ontologies, such as that which underpins systems theory, conceive of the social/ natural world as organized by relations rather than by substances (Emirbayer, 1997). In this way they seek to overcome dualistic thinking (most notably Cartesian dualism, which divides human rationality and the physical world into two distinct realities) (Castree, 2003). Whitehead's (1929) development of process philosophy is regarded as an important divergence from prevailing substance-orientated philosophies. Drawing from Whitehead, Stables (2007) expresses how, by moving towards process philosophy, a conception of environmental literacy should embrace both the reading and the writing of events. Describing how people respond to the world in terms of events and happenings over entities—that is, to constantly occurring processes rather than static objects—Stables notes:

a sign(al) is more like a punch, a kick, or a charge than a 'thing': like a word in a text, it moves us on. (The word as black ink on white paper appears, of course, substantial, yet this too is fading away, but too slowly for us to notice.) (Stables, 2007, p. 60)

Reality, then, is not simply defined by form or substance but by relations and processes. Relational ontologies can prioritize a topological sense of space as 'weaving and relating, forever in the making' (Wylie, 2007, p. 199), which supplants more static notions of Euclidean space (Marston, Jones, & Woodward, 2005; Wylie, 2007). Rather than relations being forged in an already-given space, relations are creative of spaces; they make spaces. In light of this, relational theories, such as Pierre Bourdieu's field theory and Bruno Latour's actor network theory, and indeed ecological systems, propose an ontology 'between' agency and structure, where the notion of two separate realms—mind and body, natural and cultural, subject and object, agent and structure—is illusory (Wylie, 2007).

On the divisibility of these binaries we would agree that there is no clear-cut boundary.

As Hutchins (2010, p. 706), referring to the work of cyberneticist and process philosopher Gregory Bateson (1972), suggests: 'the danger of putting boundaries in the wrong place is, as Bateson warned, that doing so will leave important phenomena unexplained, or worse, inexplicable'. However, we contend that the descriptions of many relational theories, including systems theory, still seem to separate and validate 'objects' by the very terminology used. For example 'system', 'relation', 'between' and 'network' suggest boundaried entities between the relations, 'dots' to be connected. These words imply points, parts, nodes and objects that, although connected to everything else (which is a leap from a 'detached' positivism or structuralism, and does not solely rely on a cognitively constructed reality as argued by constructivism), are still affected by remnants of binary bias due to the boundaried and thus static notions that they infer (Doel, 2000).

Let us take an outdoor learning activity where students are asked to identify species in a local park as an example. The aim of the activity may be to help the students understand part of the ecosystem in the park, perhaps with a view to explore the nature and fragility of biodiversity. Identification sheets are dispatched and the students begin to name the species they encounter. The students are looking for 'points' in the eco 'system'. Ingold (2011) draws from Deleuze and Guattari (2004) to suggest that there are three ways to consider an animal. The first is to signal its subjectivity with a name in the way we name pets. This is to anthropomorphize and to subjugate it. The second is to see it:

as a living embodiment of certain attributes or characteristics by which it may be classed, as one sort or another. This is to make an object of the animal, and to group it under the anonymity of an appellative. Such is the way of science and the State, inseparable partners in the colonial projects of control by classification. (Ingold, 2011, p. 174)

This, of course, is the only manner in which we name species in the West beyond the subjective, and is the mode of naming, and thus 'seeing', that the students are engaged in, in the activity above. It is the manner in which we refer to species during outdoor and environmental education practice, pointing here to Rhododendron ponticum and there to Columba palumbus. On this view, Alistair Reid takes issue:

Say the soft bird's name, but do not be surprised to see it fall headlong, struck skyless, into its pigeonhole—Columba palumbus and you have it dead, wedged, neat, unwinged in your head. (Alastair Reid, 1978, p. 3, cited in Ingold, 2011)

The point is not reserved for scientific names but rather for the use of nouns in naming, as they falsely suggest that animals can be considered independently of their environments. In contrast to this is to regard the animal as a 'going on' (Ingold, 2011, p. 174). In this respect, the animal is considered a manifestation of its processes of continually coming into existence and acting. This is a view commensurate with that of process metaphysics. For example, in this way a wolf 'is not fundamentally a characteristic or a certain number of characteristics; it is "wolfing"' and is thus caught up in its relations with the world (Deleuze & Guattari, 2004, p. 265). The giving of noun names to both animals and places in the western tradition can be considered a form of metaphysical entrapment to a staticized4 worldview, as indicated by Reid (1978) above. Where verbs are active, nouns imply false permanence and affirmation. In this way, western language can be accused of painting a world of fragmentation and of objective forms over an animate, and living world. Bohm, the physicist and process thinker who advocates the 'rheomode', a verb-based language, suggests that we should be:

emphasizing the role of language in shaping our overall world views as well as in expressing them more precisely in the form of philosophical ideas. For as suggested . . . these worldviews and their general expressions (which contain tacit conclusions about everything, including nature, society, ourselves, our language, etc) are now playing a key role in helping to

originate and sustain fragmentation in every aspect of life. (Bohm, 1980, p. 39)

With regards to our example, then, a species cannot be said to be a 'separate' process, let alone a separate 'point' within the (eco)system, because it is at once swept up in the processes in which it is going on. Whilst we have concentrated on the 'animal', the argument is by no means limited to these taxonomically defined 'entities', extending rather to incorporate any anthropomorphically established border or boundary. To tackle these established boundaries is to attempt what Deleuze and Guattari (2004) term an absolute deterritorialization. To consider the world as consisting of processes swept up in one single smooth space, or 'plane of immanence', rather than constituted of existent objects to be connected, whether animals, plants, oceans, nature, people or their produce, is a view distinct from many current relational understandings (i.e. systems theory, field theory and actor network theory). John Muir (1988, p. 110) famously suggested, 'when we try to pick out anything by itself, we find it hitched to everything else in the Universe'. This may imply that we should examine the relations between different species in a Darwinian 'tree-like' hierarchy, yet Deleuze and Guattari intimate another way in which we can interpret Muir, using the example of a wasp and an orchid:

The line . . . of becoming that unites the wasp and the orchid produces a shared deterritorialization: of wasp, in that it becomes a liberated piece of the orchid's reproductive system, but also of the orchid, in that it becomes the object of an orgasm in the wasp, also liberated from its own reproduction. A coexistence of two asymmetrical movements that combine to form a block, down a line of flight that sweeps away selective pressures. The line . . . does not link the wasp to the orchid, any more than it conjugates or mixes them: it passes between them, carrying them away in a shared proximity in which the discernibility of points disappears. (Deleuze & Guattari, 2004, p. 324)

The wasp could now be seen as the mobile sexual organ of the orchid just as the orchid is the wasp's orgasm. In this way we do not concentrate on the relation of a species of fauna to a species of flora, as if they were isolated separate entities, because the orchid is the wasp(ing) and the wasp is the orchid(ing) just as we are not Homo sapiens but a haecceity (an individuation—a thing defined by aspects that make it a particular thing, rather than characteristics that make it a kind of thing) of interwoven lines of becoming, forming multiple knots both human(ing) and environment(ing) (see Ingold [2011, p. 91] for an excellent discussion, played out by an ant and a spider, of how relational ontologies can validate fragmentary views of reality by prioritizing impetus and orientation 'from the points', rather than the flow of materiality or the 'lines of becoming'). This being the case, Deleuze and Guattari proffer the root-like mesh of the rhizome as the model of both the theoretical and the physical in opposition to the prevailing tree-like understanding of hierarchical 'patriarchal, authoritative knowledge' (Somerville, 2011, p. 72) and taxonomy by physical characteristics.

Whilst relational ontologies try to expose the topological spaces and connections between the assumed nodes/dots/points in (for example) systems, Deleuze and Guattari (2004) contend that 'lines of flight' (or 'lines of becoming') are not defined by the points they seem to connect (a concept that Doel [2000, p. 120] calls 'pointillism') and have no beginning or end, only middles. In this regard they can be considered physical flows of processual materiality. As Deleuze and Guattari state (2004, p. 323; emphasis added): 'a becoming is neither one nor two, nor the relation of the two; it is the in-between, the border or line of flight or descent running perpendicular to both'. 'Becoming', then, is the constant temporal motion of physical material (including energy and force) that constitutes all, without division or boundary, which produces an animate world devoid of dualisms or static objects. The term 'becoming' is used over 'being' because, although the latter is continuous and animate as opposed to static (like 'to be'), it does not suggest continual transformation through time into something continually emerging as 'becoming'

does. Wylie notes the contrast between a Deleuzian 'becoming' and a Heideggerian phenomenological perspective of 'being':

The notion of becoming first captures the Deleuzian sense of a world continually in the making, continually proliferating. It also captures the strongly anti-phenomenological bent of Deleuze's writing; in so far as 'becoming' is explicitly a radical alternative to what Deleuze would see as the static and sedentary tonalities of Heideggerian notions of dwelling and 'being-in-the-world'. (Wylie, 2007, p. 201; original emphasis)

This point is perhaps the key element in our argument in this paper. The notion that essentialist positions in outdoor sustainability education literature are too simplistic is highlighted by critical outdoor education, but critical outdoor education may not go far enough in tackling the staticity implied by points in relations. Systems-informed critical outdoor education suggests the points of being relate to each other through a process of non-linear cause and effect; in contrast, a Deleuzian conception tells us the relation is one of affect,5 an inter-relation, and that as points disappear:

there is nothing left for the spatial scientist but the play of joints (and . . . and . . . and) . . . What remains is precisely that which maintains the different detached pieces in their incalculable disjointure—AND . . . AND . . . AND—: the interval takes all; the ontology of being gets carried away by the conjunctives. (Doel, 2000, p. 130)

In this way, points of 'being' disappear, and we are left only with movement, and subsequently a very different view of the world. With this understanding, phenomenological perspectives in outdoor education (where the subject that is dwelling in the world is a centralized 'point' of 'be-ing' and perception) require a sense of temporality that sweeps away the borders of the subject, the self, leaving a haecceity.

In light of this philosophy of becoming, Coole and Frost (2010, p. 5) believe that the 'ways we understand and interact with nature are in need of commensurate updating'. Nature, as we shall discuss, is used here not as an aestheticized term referring to a green or wooded 'other', as is the case in much outdoor and environmental education literature and research, but as an all-encompassing word for the state of the world, the smooth space or 'plane of immanence'. This understanding is characterized where Deleuze and Guattari (2004) demonstrate the difference between a transcendental plane of seeing built upon organization and development, of structure and genesis, in which the plane itself necessarily remains hidden or secondary, and a plane of immanence where materiality is prior to structure and genesis. In this way, the transcendental conception of the plane is one of:

a plan(e) that cannot be given as such, that can only be inferred from the forms it develops and the subjects it forms, since it is for these forms and these subjects. (Deleuze & Guattari, 2004, p. 293; original emphasis)

This transcendental plane may appear in any view that 'establishes the proportional relations of a structure' (Deleuze & Guattari, 2004, p. 293). In our thesis, a transcendental plane is apparent in both reductive mechanism within educational endeavours and misconceived relational ontologies, prioritizing nodal or pointal conceptions of sustainability education (i.e. prioritizing points of being, whether the nodes in a system of relations or a single subjective observer). Deleuze and Guattari (2004) go on to illustrate the alternative in the immanent plane, or an immanent materiality. Within this conception:

there are no longer any forms or developments of forms; nor are there subjects or the formation of subjects. There is no structure, any more than there is genesis . . . There are only haecceities, affects, subjectless individuations that constitute collective assemblages . . .

We call this plane . . . the plane of consistency or composition . . . It is necessarily a plane of immanence and univocality. We therefore call it the plane of Nature, although nature has nothing to do with it, since on this plane there is no distinction between the natural and the artificial. (Deleuze & Guattari, 2004, pp. 293–294)

This ontology of becoming tackles the fragmentation implicit in a 'pointillist' paradigm regarding the current 'crisis of perception'. It may allow us to open up to animistic ways of being (or becoming); and ways of viewing the material world that challenge the dominant mechanistic paradigm and yield more ecologically informed outdoor learning practice; practice that treats humans as 'of' the environment (and vice versa), rather than 'separate from' or 'in relation to' it. Where systems theory informed practice prioritizes skills and values for tackling our place in a network of relationships, thus maintaining a distance between humans and the Earth, an ontology of becoming sees no distinction. If the success of sustainability education rests on the tackling of the 'crisis of perception' (the shifting of our perceptions to acknowledge the indissolubility of people and planet), then immanent materiality may have much to offer.

**Embracing immanent materialism: animistic perceptions through an ontology of 'becoming'**

Although in its original and oft-implied conception animism is described as the imparting of spirit or teleological properties to 'inanimate objects' (see Tylor, 1874), we use the term in a manner after the work of Bird-David (1999), Harding (2009), Descola (2011) and Ingold (2011) to describe a mode of being (becoming) that embodies both 'seeing' and 'acting' within a world ontologically understood by its inhabitants (animists) to be constituted by immanent materiality; to be whole, alive and forever becoming. Bird-David (1999) demonstrates how animism, rather than being a simple anthropomorphication of 'objects' encountered by a people, returns on the anthropologist to reveal the dualistic assumptions inherent within the western concept of anthropomorphication itself, and thus anthropology's attempts to describe culture as distinct from nature. Animism cannot be said to anthropomorphize a separate world to the 'human world' because immanent materiality removes the conception of people as operating in a distinct ontological plane. Thus the notion of projection across a mind/body gap is eliminated. With this understanding, the requirement of 'anthropomorphism' is rendered an inversion of logic performed by those who hold a nature/culture dualism to be ontologically prior. As Descola points out:

If one fully acknowledges this evidence, then it becomes scientifically risky to go on using, even as a methodological prop, a distinction between nature and culture which is so uncommon elsewhere. Nevertheless, this is what anthropologists of all persuasions have done for more than a century when they viewed non-modern cosmologies as differing from ours in that they incompletely objectify nature, shrouding it under a symbolic veil weaved by mystical minds incapable of dissociating what pertains to humanity and what pertains to beings and phenomena that exist apart from human will and action. (Descola, 2011, p. 14)

Descola (2011) describes animistic societies as demonstrating an ontological understanding of similarity of interiority between human and non-human others, whilst acknowledging dissimilar physical appearances (physicality). In this way, although non-human others (whether stones, trees or human produce; axes, knives, mobile phones, coffee mugs and the air surrounding them all) take on appearances quite different from that of the human, they are understood to be of the same essence, animation and intentionality—that is, they are alive. This understanding of life moves beyond western conceptions of an 'internal animating principle that is installed in some things but not in others' to embrace a process of unfolding of continuous and evolving lines of flight in which beings (becomings)

of all kinds are constituted and 'held in place' (Ingold, 2011, p. 237). The integral place of difference within a plane of continuity (immanence) moves to fulfil Plumwood's (2002, p. 60) requirement that, 'dismantling a dualism based on difference requires the reconstruction of relationship and identity in terms of a non-hierarchical concept of difference'.

Deleuze and Guattari's (2004) description of the life-world as a meshwork of interacting lines circumnavigating to form rhizomes of becoming, as an animate meshwork that we all inhabit (or rather, which constitutes us all), is one that Ingold (2011) posits animists know as a fundamental worldview. It is a view of a world that, rather than existing objectively, is forever becoming. He suggests that, contrary to western conceptions, animistic peoples do not hold beliefs about objective 'nature', a fundamentally Cartesian approach based in a transcendental plane, but are united:

in a way of being that is alive and open to a world in continual rebirth. In this animistic ontology, beings do not propel themselves across a ready-made world but rather issue forth through a world-in-formation, along the lines of their relationships. (Ingold, 2011, p. 63)

Animists, then, see and act on a plane of immanent materiality, not believing about the world (i.e. attributing life to 'objects' that are considered inanimate and 'other'), but becoming of the world. The most fundamental consequence of existing in a reality that is forever becoming, in the animistic sense, is the response of 'astonishment'. For Ingold (2011), astonishment is the sense of awe that comes from being forever on the brink of a world becoming. It instils certain values, but importantly these values are directly manifest in a way of acting in the world, a way of responding predicated on ontologically understanding the world as becoming:

Surprise . . . exists only for those who have forgotten how to be astonished at the birth of the world, who have grown so accustomed to control and predictability that they depend on the unexpected to assure them that events are taking place and that history is being made. By contrast, those who are truly open to the world, though perpetually astonished, are never surprised. If this attitude of unsurprised astonishment leaves them vulnerable, it is also a source of strength, resilience and wisdom. For rather than waiting for the unexpected to occur, and being caught out in consequence, it allows them at every moment to respond to the flux of the world with care, judgment and sensitivity. (Ingold, 2011, p. 75)

These actions of 'care, judgment and sensitivity' that emerge from holding an animistic worldview potentially circumvent the notion of a 'values/action gap' problem of sustainability education highlighted by Kollmuss and Agyeman (2002). Animistic action is predicated on the tacit knowledge of reality, in a similar way in which taking action for perceived anthropocentric 'gain', before considering consequences to a broader deeper emplacement, may be resultant of a positivist and objectivist worldview as suggested by the 'crisis of perception' (Capra, 1996; Harding, 2009; Orr, 2004). To summarize, rather than asking why our professed values do not result in pro-environmental action, it may prove useful to move to examine how our often unarticulated assumptions about the nature (as in state) of the world we live in result in our current behaviours.

Animism, then, is a mode of becoming, incorporating both 'seeing' and 'doing', which is open to, and respectful of, the immanent processes that constitute the world. Bird-David demonstrates the contrast, and validity, of animism to Cartesian dualism in her study of the Nayaka people of South India:

Against 'I think, therefore I am' stand 'I relate, therefore I am' and 'I know as I relate.' Against materialistic framing of the environment as discrete things stands relationally framing the environment as nested relatednesses. Both ways are real and valid. Each has its limits and

its strengths. (Bird-David, 1999, p. 78)

However, where Bird-David sees no threat from framing the environment as composed of discrete objects, or points of being, our argument, echoing voices from within the sciences, philosophy and education, is quite the reverse. It is precisely the manner in which we staticize and fragment the world into objects, whilst reserving an ontologically distinct realm for the human mind, which lies at the heart of the ecological crisis (Abram 1996; Bohm, 1980; Capra, 1996; Harding, 2009; Ingold, 2011; Merchant, 1994; Orr, 1992, 2004; Plumwood, 2002; Sterling, 2004). We contend that this argument is as true for critical outdoor sustainability education, emphasizing relations to 'nature', as much as it is for outdoor education approaches based on essentialist interpretations of the world. The process of becoming animist should not be perceived as a choice to be made, but rather a way of becoming resultant of growing in a world that is demonstrably animate. That is, framed and presented as such. We believe 'outdoor' learning experiences offer great potential for demonstrating the animate nature of the world to learners, but that barriers to this approach also exist within current discourse.

## Animism and sustainability education: nature, place, creative 'verbing', story-telling and 'outdoor' learning

Whilst critical outdoor education and deep ecology maintain that 'we are part of nature' (Cachelin et al., 2011; Cohn, 2011; Colwell, 1997; Gruenewald, 2003; Magntorn, 2007; Martin, 2008; Morris & Martin, 2009; Porter & Cordoba, 2009; Sterling, 2004; Strachan, 2009; Thomas & Thomas, 2000), it has been our intention to demonstrate that 'nature' does not have parts and that the use of language which suggests a 'reconnection', or highlights the human place in a series of relationships with the environment, may do little to attain its goals of tackling the 'crisis of perception', in that it may enforce preconceived notions of nature and the environment as distinct from and distant to humanity. This appears a pertinent point for consideration given arguments in outdoor and environmental education that people should spend more time in 'wild nature' so as to develop affinity with the 'natural' environment and thus become more sustainably minded. We believe, however, that nature must either constitute all, or nothing. When, for instance, does plankton stop being 'nature'? When it has gone through catagenesis and become oil? When the oil is refined into plastic? When the plastic is used in the production of an mp3 player? Either each one of these processes is nature, or none of them are. As Morton (2007, p. 186) suggests: 'we can't mourn for the environment because we are so deeply attached to it—we "are" it'. Whilst some authors acknowledge that we should have a greater 'situated' and 'process'-aware conception of nature in our practice (Sandell & Öhman, 2010), there remains a current in outdoor and environmental education research that appears unaware of Morton's, and other eco-critics', realization of the impossibility of a 'disconnection', instead resting on unarticulated assumptions concerning the nature of a human/nature relationship. In the dualist/essentialist camp, studies that differentiate between 'direct' and 'indirect' experiences of 'nature' (Duerden & Witt, 2010), measure 'connectedness to nature' (Liefländer, Fröhlich, Bogner, & Schultz, 2013) or, from a health perspective, use views, experiences or 'doses' of 'nature' or 'green spaces' as an intervention (Barton & Pretty, 2010; Kaplan, 2001; Maller, Townsend, Pryor, Brown, & St Leger, 2005; Ulrich, 1984; van Dillen, de Vries, Groenewegen, & Spreeuwenberg, 2012) are examples of these. We wonder how it is ever possible to have an 'indirect' experience of nature, or to seek out an experience 'in nature', when we are always, constantly, of nature? An ontology of becoming would imply that significant results produced by these studies demonstrate the strength of people's perceptions and conceptions of a discrete and separate nature. This is in contrast to assumptions that afford a distinct type of 'nature', a genetic link to humanity that increases environmental concern or produces ameliorative effects as advocated by Wilson's (1984) biophilia hypothesis and Ulrich et al.'s (1991)

psycho-evolutionary stress reduction theory. We believe that something much more complex is at work here and that this realization opens up new ways of interpreting these results that move us away from practice that looks to 'reconnect with nature' in an interventionist sense. The extent to which these results may be resultant of socio-cultural habituation of a certain conception of 'green' environments and embodied placebo responses is worth exploring, for instance (Mcphie, 2012). We suggest that a discourse which reinforces a distinct and fragmented 'nature' is one to overcome if we are to promote animistic ways of seeing in our practice. Whilst we must be careful not to tar critical outdoor education with exactly the same brush of 'oversimplification', it remains the case that a simplification is present where any boundary of 'being' is placed between 'becomings'. With this in mind, relational or systems-informed approaches require a more nuanced understanding. Additionally, any static notion of 'place' as a site for education comes up for discussion.

Wattchow and Brown (2011) argue for the replacement of 'wild nature' with that of 'place', in their view a less romanticized term, which allows the contestability, in ecological, cultural and historical terms, of locations to surface. Morton demonstrates how places and animists become without the requirement for a staticized boundary of 'nature':

Indigenous cultures have not much time for nature as imagined in and against modernity. Animism is decidedly not nature worship. For example, according to Keith Basso's study of the Western Apache's use of narrative in the naming of places, there is no difference between a place and the socially reproving and improving stories that the Apache associate with it, and thus, there is no nature. There is no gap between the human and the nonhuman realms. The Apache view is much closer to ecology without nature than conventional ecocriticism. (Morton, 2007, p. 180)

Place, in Morton's (2007) description, is quite apart from the concept of 'nature' that suggests an aesthetic distance, where place draws people out into the world. Place-based education is receiving a great deal of attention in outdoor and environmental education literature (Gruenewald, 2003; Howard, 2012; Smith & Sobel, 2010; Somerville, Davies, Power, Gannon, & de Carteret, 2011; Wattchow & Brown, 2011). While, for example, Bonnett (2012) wishes to draw the conversation regarding our relationship with the morethan-human world from a broader discussion of an ecological whole to a localized conception of how we experience the world in specific places, we believe an ontology of immanent materiality, after Deleuze and Guattari (2004), necessarily allows both to occur simultaneously. Indeed from this perspective it is impossible to speak of people without also speaking of places (Ingold, 2011). Within an ontology of becoming, places, and the way they are experienced, must move from being to becoming. With this notion, phenomenological understandings of a subject being (verb sense) in the 'whole' must lose the final subject and 'become' with the rest of the world. Ingold tackles the realization of 'being' moving to 'becoming' in regards to places with his concept of wayfaring:

Here, surely, lies the essence of what it means to dwell. It is, literally to be embarked upon a movement along a way of life. The perceiver-producer is thus a wayfarer, and the mode of production is itself a trail blazed or a path followed. Along such paths, lives are lived, skills developed, observations made and understandings grown. But if this is so, then we can no longer suppose that dwelling is emplaced in quite the way Heidegger imagined . . . To be, I would now say, is not to be in place but to be along paths. The path, and not the place, is the primary condition of being, or rather of becoming. (Ingold, 2011, p. 12; original emphasis)

How then might we tackle tacit assumptions of separation implied by western culture, which we believe are poorly assailed by calls for 'reconnection' in outdoor education literature, whilst also embracing 'places becoming' (or Ingoldian 'paths')? Gough (2008)

opens up the static concept of 'places as profoundly pedagogical', instead demonstrating how places may become pedagogical through embracing post-structuralist tendencies. Gough's concepts of 'unnaming' and 'uncounting' nature, drawn from the short stories of Le Guin (1986, 1987), resonate particularly strongly with our own thoughts, suggesting that we 'could do with some creative unnaming in our work. We could start with some of the common names of animals and plants that signify their instrumental value to us rather than their kinship' (Gough, 2008, p. 78). Further to this, we suggest room for the 'creative verbing' of the processes our students experience and become, the places, species and happenings we encounter. Ingold (2011) describes how the Koyukon of Alaska name animals as descriptions, stories and as riddles, sometimes only half described. In contrast to our, rather static, C. palumbus, the Koyukon have 'flutters around the shore' to describe the Spotted Sandpiper (2011, p. 169) and, perhaps most enigmatically, 'far away yonder there appears a flash of fire' for the vanishing Red Fox (2011, pp. 172–173). We see this as a way of working in contrast to our example in the park given earlier. Students can be urged to verb their surroundings, storying the world they encounter, whether 'natural' or 'artificial'. In this way they may see how materiality crosses this fictitious boundary passing from 'life', to the 'built environment', to 'nature' with no concern for such arbitrary borders. Stories, according to Ingold (2011), not only help to animate the world, but also spring from epistemologically firmer ground than approaches of classification and taxonomy. This is because classification categorizes a thing on the basis of intrinsic characteristics, independent of the context in which it is constituted, the relations that have immediately gone before it, currently surround it or will follow it:

In a story, by contrast, it is precisely by this context and these relations that every element is identified and positioned (Ingold 2007a, p. 90). Thus stories always, and inevitably, draw together what classifications split apart. (Ingold, 2011, p. 160; original emphasis)

In relation to place, Somerville et al. (2011) draw from Deleuze and Guattari to suggest that the enabling of place pedagogies is constituted in the stories (and other representations) we tell of places, opening up the possibility of supplanting dominant narratives of inequality and colonization of places through establishing novel storylines (lines of flight). They promote a place pedagogy of 'world-making' where the deterritorialization of striated discourses is combined with the acknowledgement of the relationality of the world, a view commensurate with immanent materiality. Attempting animistic world-making through storying the world with outdoor learners will require experimentation and is a challenge we look forward to undertaking.

A narrow understanding of 'outdoor' learning as a distinct site for sustainability education is of course rendered problematic by this view, which eschews an indoor/outdoor binary. The very notion of being 'indoors' brings to mind a false boundary that Ingold (2011) suggests has resulted in the concept of 'space' being so prominent in western ideas of reality. We live, however, not in space, or in rooms that act as 'an enclosed capsule for life suspended in the void' (2011, p. 147), but along paths to places (although never arriving), where each path is a line of human movement. Places, then, are not defined by an outer boundary to possible movement, but by movement itself (Ingold, 2011). 'Outdoor' learning may be understood in a broader sense, then, as a mode of learning both indoors and out, by examining the root of the word 'room'. 'Raum' in German has a meaning contrasting with the English concept of enclosed space, instead suggesting 'open space'. This is because the etymology of 'raum' comes from the clearing of a way through, the creation of 'space' (Ingold, 2011). In the English usage this created a fixed boundary around 'room', whereas in German the boundary of 'raum' was understood as a horizon 'from which something begins its presencing' (Heidegger, 1971, p. 154, quoted in Ingold, 2011). In this way we are never really 'indoors', but are constantly living 'outdoors', of the weltraum (worldspace/room) beyond. Animistic ways of seeing are not boundaried and striated by western concepts such as indoor/outdoor. In practical terms, experiences of an animate world less influenced by homogenized human

produce are more likely to demonstrate the essential 'becomingness' of the world—through, for example, learning as part of the elements (Higgins, 2010) and experiencing diurnal rythms (Faarlund, Dahle, & Jensen, 2007). The rich and visceral experiences provided by 'outdoor' learning are by no means compromised in a world becoming; if anything, they become more important. The world 'becomes' in countless ways and, although 'indoor' classrooms are also becomings, they can further a homogenized and staticized view of the world. Yet fixed conceptions of 'nature' as 'other', implied by suggesting we need to '(re)connect' to it, do precisely the same thing. If we strive to deterritorialize these staid assumptions in current outdoor and environmental education discourse, it may lead to more flexible, productive and healthy interrelationships along the human–environment process. We contend that it is the manner in which reality is codepicted in learning situations, whether indoors or outdoors, that holds the most potential for sustainability education through animistic ways of seeing.

A philosophy of becoming may have many implications for practice, with 'unnaming nature' and 'creative verbing' as merely initial suggestions. Certainly we should look to be cautious of the language we use to depict the world, but we may also look to assess our own assumptions regarding students, learning outcomes and attempts to reconnect with 'nature'. We by no means promote this perspective as an affirmation of the one truth, rather urging practitioners to consider what some of the points we have raised mean for their own practice. As Plumwood writes on the problem of overcoming dualisms in environmental philosophy:

The path to the promised land of reflective practice passes over the Swamp of Affirmation, which careful and critical travellers, picking their way through, can with some difficulty cross. Intrepid travellers who have found their way across the Swamp of Affirmation into the lands beyond often fall either into the Ocean of Continuity on the one side or stray in the waterless and alien Desert of Difference on the other, there to perish. The pilgrim's path to the promised land leads along a narrow way between these two hazards, and involves heeding both difference and continuity. (Plumwood, 2002, p. 3)

Animism then, in the Ingoldian (2011) sense of ontologically understanding the world as immanently material, supported by Descola's (2011) conception of difference in physicality whilst acknowledging continuity in interiority, lands us somewhere on the path described by Plumwood (2002). Where exactly this is we might come to see by following it.

**Notes**

1. Section IV of Agenda 21 is concerned with the implementation of Agenda 21 (a non-binding, voluntary United Nations action plan for sustainable development). Section IV includes science, technology transfer, education, international institutions and financial mechanisms.

2. Self, subject, individual, whether Gaia or a person, will seem a problematic concept given the philosophy described later. On a plane of immanent materiality, modes of individuation are different to the common understanding of a self-contained subject. They are haecceities: 'You will yield nothing to haecceities unless you realize that that is what you are, and that you are nothing but that . . . You have the individuality of a day, a season, a year, a life (regardless of its duration)—a climate, a wind, a fog, a swarm, a pack (regardless of its regularity). Or at least you can have it, you can reach it' (Deleuze & Guattari, 2004, p. 289; original emphasis). In this way, the subject deterritorializes.

3. The International Panel on Climate Change (IPCC) is the body established by the United Nations to assess the scientific basis of a risk of human-induced climate change. They affirm

'with very high confidence that the global average net effect of human activities since 1750 has been one of warming' (IPCC, 2007, p. 3; original emphasis). The more recent IPCC assessment report (AR5) further establishes the prevalence, alarming degree and virtual certainty of human induced climate change (IPCC, 2013). The primary causes of this change in climate are fossil fuel use, land-use change and agriculture (IPCC, 2007), which are argued to be resultant of unsustainable hyperconsumption.

4. Staticized is used here to describe the mode of misperception created by understanding the world to be transcendent (striated, structured, staid). Conversely, in a world understood to exist on an immanent plane there are only haecceities (becoming, movement, flux, conjunctives).

5. Seigworth and Gregg have emphasized that there is no single, generalizable theory of affect and never will be: 'Affect arises in the midst of in-between-ness: in the capacities to act and be acted upon. Affect is an impingement or extrusion of a momentary or sometimes more sustained state of relation as well as the passage (and the duration of passage) of forces or intensities' (2010, p. 1). Affect has been labelled as 'forces of encounter', 'molecular events of the unnoticed' (Seigworth & Gregg, 2010), a prepersonal, non-conscious experience of intensity (Massumi, 2002) and an 'Intermediary concept' (Lapoujade, 2000, in Brown & Tucker, 2010): '. . . affect marks the indeterminate and eventful nature of concrete action as it expresses and further complexifies the material flux in which it participates' (Brown & Tucker, 2010, p. 236; original emphasis).

**References**

Abram, D. (1996). The spell of the sensuous. New York, NY: Vintage Books.
Abram, D. (2011). Becoming animal: An earthly cosmology. New York, NY: Random House.
Allison, P., & Pomeroy, E. (2000). How shall we "know?" Epistemological concerns in research in experiential education. Journal of Experiential Education, 23(2), 91–98. doi:10.1177/105382590002300207
Barton, J., & Pretty, J. (2010). What is the best dose of nature and green exercise for improving mental health? A multi-study analysis. Environmental Science & Technology, 44(10), 3947–3955. doi:10.1021/es903183r
Bateson, G. (1972). Steps to an ecology of mind. Chicago, IL: University of Chicago Press.
Benton, M. J., & Twitchett, R. J. (2003). How to kill (almost) all life: The end-Permian extinction event. Trends in Ecology & Evolution, 18(7), 358–365. doi:10.1016/S0169-5347(03)00093-4
Bird-David, N. (1999). "Animism" revisited: Personhood, environment, and relational epistemology 1. Current Anthropology, 40(S1), S67–91. doi:10.1086/200061
Bögeholz, S. (2006). Nature experience and its importance for environmental knowledge, values and action: Recent German empirical contributions. Environmental Education Research, 12(1), 65–84. doi:10.1080/13504620500526529
212 D. A. G. Clarke and J. Mcphie
Bogner, F. X. (1998). The influence of short-term outdoor ecology education on long-term variables of environmental perspective. The Journal of Environmental Education, 29(4), 17–29. doi:10.1080/00958969809599124
Bohm, D. (1980). Wholeness and the implicate order. London, UK: Routledge.
Bonnett, M. (2012). Environmental concern, moral education and our place in nature. Journal of Moral Education, 41(3), 285–300. doi:10.1080/03057240.2012.691643
Bonnett, M. (2013). Sustainable development, environmental education, and the significance of being in place. Curriculum Journal, 24(2), 250–271. doi:10.1080/09585176.2013.792672
Brown, S. D., & Tucker, I. (2010). Eff the ineffable: Affect, somatic management, and mental health service users. In M. Gregg & G. J. Seigworth (Eds.), The affect theory reader (pp. 229–249). Durham, NC: Duke University Press.
Cachelin, A., Rose, J., Dustin, D., & Shooter, W. (2011). Sustainability in outdoor education: Rethinking root metaphors. Journal of Sustainability Education, 2. Retrieved from http://

www.jsedimensions.org/wordpress/wp-content/uploads/2011/03/CachelinEtAl20111.pdf

Capra, F. (1996). The web of life. London, UK: HarperCollins.

Castree, N. (2003). Environmental issues: Relational ontologies and hybrid politics. Progress in Human Geography, 27, 203–211. doi:10.1191/0309132503ph422pr

Christie, B., & Higgins, P. (2012). The impact of outdoor learning experiences on attitudes to sustainability: A brief review of literature. Field Studies Council Report 06/2012. Edinburgh: Field Studies Council/University of Edinburgh.

Cohn, I. (2011). Indigenous ways—Fruits of our ancestors. Journal of Adventure Education and Outdoor Learning, 11(1), 15–34. doi:10.1080/14729679.2010.532992

Colwell, T. (1997). Viewpoint: The nature—culture distinction and the future of environmental education. The Journal of Environmental Education, 28(4), 4–8. doi:10.1080/00958964.1997.9942830

Coole, D., & Frost, S. (2010). New materialisms: Ontology, agency, and politics. Durham, NC: Duke University Press.

Cooper, G. (2010). Outdoor learning, environment and sustainability—Seeing the big picture. In M. Zajelšnik (Ed.), Encountering, experiencing and exploring nature in education (pp. 130–134). Ljubljana, Slovenija: Center šolskih in obšolskih dejavnosti.

Cutter-Mackenzie, A., & Smith, R. (2003). Ecological literacy: The 'missing paradigm' in environmental
education (part one). Environmental Education Research, 9(4), 497–524. doi:10.1080/1350462032000126131

Deleuze, G., & Guattari, F. (2004). A thousand plateaus: Capitalism and schizophrenia. (B. Massumi, Trans.). London, UK: Continuum.

Descola, P. (2011). Human natures. Quaderns de l'Institut Català d'Antropologia, 27, 11–26.

Doel, M. A. (2000). Un-glunking geography: Spatial science after Dr Seuss and Gilles Deleuze. In M. Crang & N. Thrift (Eds.), Thinking space (pp. 117–135). London, UK: Routledge.

Duerden, M. D., & Witt, P. A. (2010). The impact of direct and indirect experiences on the development of environmental knowledge, attitudes, and behavior. Journal of Environmental Psychology, 30(4), 379–392. doi:10.1016/j.jenvp.2010.03.007

Emirbayer, M. (1997). Manifesto for a relational sociology. American Journal of Sociology, 103(2), 281–317. doi:10.1086/231209

Ewert, A., Place, G., & Sibthorp, J. (2005). Early-life outdoor experiences and an individual's environmental attitudes. Leisure Sciences, 27(3), 225–239. doi:10.1080/01490400590930853

Faarlund, N., Dahle, B., & Jensen, A. (2007). Nature is the home of culture-Friluftsliv is a way home. USDA Forest Service Proceedings RMRS P49. Retrieved from http://www.fs.fed.us/rm/pubs/rmrs_p049/rmrs_p049_393_396.pdf

Gough, N. (2008). Ecology, ecocriticism and learning: How do places become 'pedagogical'? TCI (Transnational Curriculum Inquiry), 5(1), 71–86.

Gruenewald, D. A. (2003). The best of both worlds: A critical pedagogy of place. Educational Researcher, 32(4), 3–12. doi:10.3102/0013189X032004003

Hamilton, C. (2002). Dualism and sustainability. Ecological Economics, 42(1–2), 89–99. doi:10.1016/S0921-8009(02)00051-4

Harding, S. (2009). Animate earth: Science, intuition and Gaia. Totnes, UK: Green Books.

Heidegger, M. (1971). Poetry, language, thought. (A. Hoftstadter, Trans.). New York, NY: Harper and Row.

Immanent materiality and outdoor learning for sustainability 213

Higgins, P. (1997). Outdoor education for sustainability: Making connections. Journal of Adventure Education and Outdoor Leadership, 13(4), 4–11.

Higgins, P. (2010). Pedagogy for 'global intimacy. In T. Wiseley, I. Barr, & B. King (Eds.), Education in a global space: Research and practice in initial teacher education (pp. 180–188). Edinburgh: International Development Education Association of Scotland.

Higgins, P., & Kirk, G. (2006). Sustainability education in Scotland: The impact of national and international initiatives on teacher education and outdoor education. Journal of Geography in Higher Education, 30(2), 313–326. doi:10.1080/03098260600717414

Howard, R. (2012). Adventure spaces: How we view our adventure places. Pathways: The Ontario

Journal of Outdoor Education, 24(3), 6–7.

Hutchins, E. (2010). Cognitive ecology. Topics in Cognitive Science, 2(4), 705–715. doi:10.1111/j.1756-8765.2010.01089.x

Ingold, T. (2011). Being alive: Essays on movement, knowledge and description. Oxford, UK: Routledge.

IPCC. (2007). Summary for policymakers. In S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt … & H. L. Miller (Eds.), Climate change 2007: The physical science basis. Contribution of working group I to the fourth assessment report of the Intergovernmental Panel on Climate Change. Cambridge, UK: Cambridge University Press.

IPCC. (2013). Summary for Policymakers, Working Group I Contribution to the IPCC Fifth Assessment Report, Climate Change 2013: The Physical Science Basis. Retrieved from http://www.climatechange2013.org/images/uploads/WGIAR5-SPM_Approved27Sep2013.pdf

Jordan, R., Singer, F., Vaughan, J., & Berkowitz, A. (2009). What should every citizen know about ecology? Frontiers in Ecology and the Environment, 7(9), 495–500. doi:10.1890/070113

Kals, E., Schumacher, D., & Montada, L. (1999). Emotional affinity toward nature as a motivational basis to protect nature. Environment and Behavior, 31(2), 178–202. doi:10.1177/00139169921972056

Kaplan, R. (2001). The nature of the view from home: Psychological benefits. Environment and Behavior, 33(4), 507–542. doi:10.1177/00139160121973115

Knapp, C. E. (1999). In accord with nature: Helping students form an environmental ethic using outdoor experience and reflection. Charleston, WV: ERIC/CRESS, Appalachia Educational Laboratory.

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? Environmental Education Research, 8(3), 239–260. doi:10.1080/13504620220145401

Lapoujade, D. (2000). From transcendental empiricism to worker nomadism: William James. Pli, 9, 190–199.

Le Guin, U. K. (1986). Always coming home. London, UK: Victor Gollancz.

Le Guin, U. K. (1987). Buffalo gals and other animal presences. Santa Barbara, CA: Capra.

Lenton, T. M., & van Oijen, M. (2002). Gaia as a complex adaptive system. Philosophical Transactions of the Royal Society B: Biological Sciences, 357(1421), 683–695. doi:10.1098/rstb.2001.1014

Liefländer, A. K., Fröhlich, G., Bogner, F. X., & Schultz, P. W. (2013). Promoting connectedness with nature through environmental education. Environmental Education Research, 19(3), 370–384. doi:10.1080/13504622.2012.697545

Lovelock, J. (1979). Gaia: A new look at life on Earth. Oxford: Oxford University Press.

Lovelock, J. (1988). The ages of Gaia: A biography of our living earth. Oxford, UK: Oxford University Press.

Lovelock, J. (2006). The revenge of Gaia. London, UK: Penguin Books.

Lugg, A. (2007). Developing sustainability-literate citizens through outdoor learning: Possibilities for outdoor education in higher education. Journal of Adventure Education & Outdoor Learning, 7(2), 97–112. doi:10.1080/14729670701609456

Magntorn, O. (2007). Reading nature: Developing ecological literacy through teaching (Unpublished doctoral dissertation). Kristianstad University, Sweden.

Maller, C., Townsend, M., Pryor, A., Brown, P., & St Leger, L. (2005). Healthy nature healthy people: 'Contact with nature' as an upstream health promotion intervention for populations. Health Promotion International, 21(1), 45–54. doi:10.1093/heapro/dai032

Marston, S., Jones, J. P., & Woodward, K. (2005). Human geography without scale. Transactions of the Institute of British Geographers, 30(4), 416–432. doi:10.1111/j.1475-5661.2005.00180.x

214  D. A. G. Clarke and J. Mcphie

Martin, P. (2008). Teacher qualification guidelines, ecological literacy and outdoor education. Australian Journal of Outdoor Education, 12(2), 32–38.

Martin, S., Dillon, J., Higgins, P., Peters, C., & Scott, W. (2013). Divergent evolution in education for sustainable development policy in the United Kingdom: Current status, best practice, and opportunities for the future. Sustainability, 5(4), 1522–1544. doi:10.3390/su5041522

Massumi, B. (2002). Parables for the virtual. Durham, NC: Duke University Press.

Mcphie, J. (2012). The healing power of natures: Observations on the restorative benefits of outdoor health interventions. Paper presented at the 6th Annual Adventure Therapy Conference, Hruba Skala, Czech Republic.

Merchant, C. (1994). Ecology: Key concepts in critical theory. Atlantic Highlands, NJ: Humanities Press.

Mittelstaedt, R., Sanker, L., & VanderVeer, B. (1999). Impact of a week-long experiential education program on environmental attitude and awareness. Journal of Experiential Education, 22(3), 138–148. doi:10.1177/105382599902200306

Moody, D. (2012). Seven misconceptions regarding the Gaia hypothesis. Climatic Change, 113(2), 277–284. doi:10.1007/s10584-011-0382-4

Morris, D., & Martin, S. (2009). Complexity, systems thinking and practice. In A. Stibbe (Ed.), The handbook of sustainability literacy (pp. 156–164). Totnes, UK: Green Books.

Morton, T. (2007). Ecology without nature: Rethinking environmental aesthetics. London, UK: Harvard University Press.

Muir, J. (1988). My first summer in the Sierra. Boston, MA: Houghton Mifflin.

Orr, D. (1992). Ecological literacy: Education and the transition to a postmodern world. New York, NY: State University of New York Press.

Orr, D. W. (2004). Earth in mind: On education, environment, and the human prospect. Washington, DC: Island Press.

Payne, P. G., & Wattchow, B. (2010). Phenomenological deconstruction, slow pedagogy, and the corporeal turn in wild environmental/outdoor education. Canadian Journal of Environmental Education (CJEE), 14, 16–32.

Plumwood, V. (2002). Feminism and the mastery of nature. New York, NY: Routledge.

Porter, T., & Cordoba, J. (2009). Three views of systems theories and their implications for sustainability education. Journal of Management Education, 33(3), 323–347. doi:10.1177/1052562908323192

Quay, J. (2013). More than relations between self, others and nature: Outdoor education and aesthetic experience. Journal of Adventure Education & Outdoor Learning, 13(2), 142–157. doi:10.1080/14729679.2012.746846

Reid, A. (1978). Weathering: Poems and translations. Edinburgh, UK: Canongate.

Reiss, J. (2009). Not by design: Retiring Darwin's watchmaker. Berkeley, CA: University of California Press.

Rose, J., & Cachelin, A. (2013). Critical sustainability: Promoting pedagogies of placefulness in outdoor education. Journal of Sustainability Education, 5. Retrieved from http://www.jsedimensions.org/wordpress/wp-content/uploads/2013/06/Rose-Cachelin-resubmission.pdf

Sandell, K., & Öhman, J. (2010). Educational potentials of encounters with nature: Reflections from a Swedish outdoor perspective. Environmental Education Research, 16(1), 113–132. doi:10.1080/13504620903504065

Sandell, K., & Öhman, J. (2013). An educational tool for outdoor education and environmental concern. Journal of Adventure Education & Outdoor Learning, 13(1), 36–55. doi:10.1080/14729679.2012.675146

Seigworth, G. J., & Gregg, M. (2010). An inventory of shimmers. In M. Gregg & G. J. Seigworth (Eds.), The affect theory reader (pp. 1–28). Durham, NC: Duke University Press.

Smith, G. A., & Sobel, D. (2010). Place- and community-based education in schools. New York, NY: Routledge.

Somerville, M. A. (2011). Becoming-frog: Learning place in primary school. In M. A. Somerville, B. Davies, K. Power, S. Gannon, & P. de Carteret (Eds.), Place pedagogy change (pp. 65–80). Rotterdam, The Netherlands: Sense Publishers.

Somerville, M. A., Davies, B., Power, K., Gannon, S., & de Carteret, P. (Eds.). (2011). Place pedagogy change. Rotterdam, The Netherlands: Sense Publishers.

Stables, A. (2007). Is nature immaterial? The possibilities for environmental education without an environment. Canadian Journal of Environmental Education, 12(1), 55–67.

Steffen, W., Crutzen, P. J., & McNeill, J. R. (2007). The Anthropocene: Are humans now overwhelming
the great forces of nature. Ambio: A Journal of the Human Environment, 36(8), 614–621. doi:10.1579/0044-7447(2007)36[614:TAAHNO]2.0.CO;2

Sterling, S. (2004). Whole systems thinking as a basis for paradigm change in education: Explorations in the context of sustainability (Unpublished doctoral dissertation). University of Bath, UK.

Strachan, G. (2009). Systems thinking: The ability to recognize and analyse the inter-connections within and between systems. In A. Stibbe (Ed.), The handbook of sustainability literacy (pp. 84–88). Totnes, UK: Green Books.

Tarrant, M. A., & Green, G. T. (1999). Outdoor recreation and the predictive validity of environmental
attitudes. Leisure Sciences, 21(1), 17–30. doi:10.1080/014904099273264

Thomas, G., & Thomas, J. (2000). Moving water paddling as critical outdoor education. Australian Journal of Outdoor Education, 5(1), 47–54.

Tylor, E. B. (1874). Primitive culture: Researches into the development of mythology, philosophy, religion, language, art and customs (Vol. 1). New York, NY: H. Holt and Company.

Ulrich, R. S. (1984). View through a window may influence recovery from surgery. Science, 224 (4647), 420–421. doi:10.1126/science.6143402

Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. Journal of Environmental Psychology, 11(3), 201–230. doi:10.1016/S0272-4944(05)80184-7

van Dillen, S. M., de Vries, S., Groenewegen, P. P., & Spreeuwenberg, P. (2012). Greenspace in urban neighbourhoods and residents' health: Adding quality to quantity. Journal of Epidemiology and Community Health, 66(6), e8. doi:10.1136/jech.2009.104695

Wattchow, B. (2004, July). Lived-experience in outdoor education: Explorations for the educational practitioner/researcher. Paper presented at International Outdoor Education Research Symposium Conference: Connections and disconnections: Examining the reality and rhetoric, La Trobe University, Bendigo, VIC, Australia.

Wattchow, B., & Brown, M. (2011). Pedagogy of place: Outdoor education for a changing world. Monash, Australia: Monash University Publishing.

Wells, N. M., & Lekies, K. S. (2006). Nature and the life course: Pathways from childhood nature experiences to adult environmentalism. Children, Youth and Environments, 16(1), 1–24.

Whitehead, A. N. (1929). Process and reality. An essay in cosmology: Gifford lectures delivered in the University of Edinburgh during the session 1927–1928. New York, NY: Macmillan.

Wilson, E. O. (1984). Biophilia. Boston, MA: Harvard University Press.

Wylie, J. (2007). Landscape. London, UK: Routledge.

Zalasiewics, J. (2013). The epoch of humans. Nature Geoscience, 6(1), 1–76.