Chapter 21
Educating Beyond the Cultural and the Natural: (Re)Framing the Limits of the Possible in Environmental Education

David A.G. Clarke

Becoming Rocked

"I didn't know we were at the disco" said a student down to my right hand side. He was remarking on my leg, which was drumming up and down at the knee under the odd, angled pressure I was exerting upon it. The student, ostensibly acting as a 'spotter' in case I fell, was one of 12 who had come on this trip to Fontainebleau Forest about an hour's drive south of Paris. Fontainebleau is world renowned for its sandstone boulders, which are climbed by thousands of people each year. Although I had visited 'Font' several times before, for the undergraduate students, undertaking a degree in 'Outdoor Adventurous Activities', this was their first time wandering the sometimes thick, sometimes gladed, sometimes deserted Oak, Scots Pine and Beech forest.

We had been climbing at a spot called Le Diplodocus in the Trois Pignons area of the forest all morning. I had been sitting on a bouldering mat having some lunch when some of the students had started trying to climb a short slab route off to my right. I'd seen a local ascend the route not 10 min earlier with little problem, and so was interested when these students, among them some very talented climbers, were struggling to get to the top. From where I sat it looked 'do-able'. I wandered over. I was drawn over. I could picture placing my right foot on the solid foot hold, stepping up to 'smear' my left foot wide and high, balancing, and then biting in with the rubber on my left shoe to step up to the broad 'jug' hold at the top– three simple moves. After helping spot the students for a while they offered up a slot. 'Dave?' said Tom, indicating to the rock.

To say the rocks are climbed might be something of a mistake. The rock is not inert in the process. Rather, it climbs us as much as we climb it. Years of climbers

D.A.G. Clarke (✉)
Moray House School of Education, University of Edinburgh, Edinburgh, UK
e-mail: david.clarke@ed.ac.uk

K. Malone et al. (eds.), *Reimagining Sustainability in Precarious Times*,
DOI 10.1007/978-981-10-2550-1_21

returning to the same famous circuits (sets of climbs of roughly the same difficulty) and routes (the individual climbs themselves) leave their mark on the rock in the form of chalked up hand holds, blackened foot holds and a gradual 'polishing' of the holds which makes each attempt at a route infinitesimally more difficult than the previous attempt. But the rock acts on the climber in very physical ways also, asking her to contort, balance, rush, be still, endure, sprag, smear, bridge, create, push, pull and above all, feel – through searching fingers and weighted toes, and the gentle pendulum of a balance nearly caught. There is none of this without the rock. If the rock is climbed, then the climber is rocked.

Pauliina Rautio (2013) is a human geographer whose research on the way children experience their material world demonstrates this 'intra-relational' existence:

> Stones have (intra-)agency: stones do things to us and with us. They have us pick them up, feel them, close them in our fist (if particularly smooth and rounded) or hold them between our thumb and forefinger (if small and edgy). They condition our walking: on a frosty morning when the roads are slippery the sight of gravel on the ground makes us pace with ease. Stones play with us if they are flat in the right way. We throw them onto water to make them bounce – just to make them bounce. And if our co-operation is optimal they bounce quite a few times (Rautio, 2013, p. 404).

The students and I spent most of the time looking, in a haptic sense, at the rock face[1]. We chatted to each other as we stroked our fingertips over the rippled sandstone, searching for nuances in the face that might hold a toe (the foothold was all important for this particular climb). So here we were, our 'matters of concern' before us (Latour, 2004), imbricating us, intra-acting upon each other (Barad, 2007), and all blurring at the edges through our intra-acting; or, more accurately, becoming more real as a result of it. In 'Font' the routes are numbered, and often named, so climbers can follow a circuit, or return year on year to a problem yet unsolved; an old friend they want to get to know better. Blue 11 at Le Diplodocus was becoming a friend, taunting me warmly, daring me to stand on my left foot. Trust the hold; trust the rubber on my shoe. Trust the students spotting me (another matter altogether). And reach the top.

The purpose of this chapter is to introduce the reader to a material approach to environmental education. In my recent work with undergraduates, along with my colleague Jamie Mcphie, I have been interested in helping students to think about their conceptions of their material existence and have found new materialist literature useful for this endeavour. This exploration of a material environmental education has arisen through critiques that Jamie and I have made of sustainability education approaches which stress human 'connectivity' to the environment through place-based education, ecological literacy, or attempts to 'connect' to 'nature' (Clarke & Mcphie, 2014, 2015; Mcphie & Clarke, 2015). Interrogating the human/culture dualism has been an important aspect of this work. This chapter, then,

[1] Haptic because, as Karen Barad (2008, p.327) notes: "Can we trust visual delineations to define bodily boundaries? Can we trust our eyes? Connectivity does not require physical contiguity. (Spatially separate particles in an entangled state do not have separate identities, but rather are part of the same phenomena.)".

introduces the reader to some of the literature we have found generative, and, it is hoped, prompts consideration for an education that moves beyond shallow, deep or dark ecological conceptions of the human/nature relationship. In doing so I hope to open up a platform from which new materialist, intra-relational, immanent and, perhaps, animistic (these terms overlap more than they can be said to 'relate' to each other) environmental education practice might spring.

The Material Turn

Sustainability education has often been conceived as responding to a 'crisis of perception'. There are certainly alternative ways of conceiving the world to dominant Western understandings, and it is reasonable to assume that our ways of conceiving have an influence on our actions. Are there, then, more 'sustainable' ways of conceiving? Ways of understanding reality that, through the manner in which the 'human' is conceived in relation to the wider world, result in change that might be productive for the 'human' and the 'nonhuman'? It is certainly an idea worth exploring. And I wonder what the concept 'Anthropocene' means for our ways of seeing and what alternative conceptions exist? Whilst there is healthy debate amongst geoscientists as to 'when' this 'new' epoch arose (Zalasiewicz et. al., 2015) there is also debate, in broader fields, as to the manner in which we might conceive of any change in geo-temporal era – i.e., who is to say when one epoch finishes and another begins? For instance, Donna Haraway (2015) recently decentred the 'anthro' in the Anthropocene, noting that "[n]o species, not even our own arrogant one pretending to be good individuals in so-called modern Western scripts, acts alone; assemblages of organic species and of abiotic actors make history, the evolutionary kind and the other kinds too" (p. 159).

Whilst some embrace the concept of the 'Anthropocene' as evidence of the damage that humanity has done, or celebrate its occurrence as an opportunity on the path of human progress (see Hamilton, 2015), the rush to label humans as the central instigator of environmental crises does not sit well theoretically with posthumanist theory that attempts to erode the dualism of humans and 'nature'. Splitting history into distinct geological phases is, after all, a very Western human thing to do, as is naming one of them after our selves. What does the 'Anthropocene' *do*? Eileen Crist (2013, p.129–130) invites us to dwell on the 'shadowy repercussions of naming an epoch after ourselves: to consider that this name is neither a useful conceptual move nor an empirical no-brainer, but instead a reflection and reinforcement of the anthropocentric actionable worldview that generated "the Anthropocene"'. Jason Moore's (2014) 'capitalocene' paints a different picture to the dominant narrative once again. Moore moves beyond the implied dualism of the Anthropocene (that humans are 'overwhelming the great forces of nature' [Steffen, Crutzen, & McNeill, 2007]) to instead depict capitalism as a *world–ecology*. This conception, Moore (2014) argues, is useful for overcoming a prevailing problem, that "[p]hilosophically, humanity is recognized as a species within the web of life; but in terms of our

methodological frames, analytical strategies, and narrative structures, human activity is treated as separate and independent" (p. 2) – our ways of seeing, then, can be likened to the volcanic action that most likely brought on the great Permian-Triassic extinction (Clarke & Mcphie, 2014; Mcphie & Clarke, 2014). And history, as they say, repeats (Pimm et al., 2014).

My story of my experience with Blue 11, and Rautio's (2013) description of our diffusion with the material world more generally, spring from an emerging and promising current of alternatives to the prevailing conception that is beginning to seep into our 'methodological frames, analytical strategies and narrative structures' (Moore, 2014, p. 2). These alternatives, variously and often enigmatically named, are united by their move past dualistic conceptions and transcendent notions of reality to re-imagine, often to blur and make 'messy' (Mcphie, 2014), the human relation to the world in order that we may productively tackle socio-ecological crises. Ivakhiv (2014) describes this entanglement of new narratives and perspectives as an:

> … ontopolitical milieu of contemporary social, cultural, and environmental theory, a milieu in which posthumanism, critical animal studies, actor-network theory, assemblage theory, critical realism, agential realism, nonrepresentational theory, enactive and embodied cognitivism, post-phenomenology, multispecies ethnography, integral ecology, and various forms of "new materialism," "geophilosophy," and "cosmopolitics" fashion themselves as intellectual responses to the predicament indicated by such terms as the ecocrisis, the climate crisis, and the Anthropocene (Ivakhiv, 2014, p. 1).

Such an array of new terminology might appear unsettling to the uninitiated. But many of these neologisms serve to demonstrate their intent by themselves. More than this, they can allow the reader to think generatively. Rather than acting as a signifier to a pre-given realm of reality the term 'geophilosophy', derived from the materialist philosophy of Gilles Deleuze and Felix Guattari (2004), is more of a process that cultivates the readers thoughts. What does it make you think to read the term? For me, sometimes, the expression implies a rupturing of any transcendent divide between the *mental abstract* and the *geophysical*. When I read the term my thoughts can become as tangible as fjords, or French boulders – no longer any chasm of categories of reality between them and the 'real' world. The challenging of modernist dualisms, such as mental/physical, is a feature common to the diverse approaches Ivakhiv (2014) lists. This is not, as Ivakhiv (2010) points out, because dualisms are inherently bad (though there may indeed be negative consequences of basing action solely on dualisms), but rather because the (often unquestioned) importance we place on them may smother other ways of thinking.

The nature/culture dualism is one such schism that may be stultifying other modes of educating for sustainability. Presently much research, theory, and academic effort supports the notion that spending time in 'nature' can inform environmental awareness, and even 'reconnect' 'us' to 'it' (Cheng & Monroe, 2012; Christie & Higgins, 2012; Frantz & Mayer, 2014; Liefländer, Fröhlich, Bogner, & Schultz, 2013; Sommerville & Williams, 2015). However, the term – 'nature' – is used variously and incongruously in the field of environmental education. For example, sometimes the term is used to refer to the 'ecological processes' of the

planet. For instance approaches that advocate 'ecological literacy' often suggest helping people better understand the 'natural ecological process' of the planet (McBride, Brewer, Berkowitz, & Borrie, 2013). Alternatively 'nature' can refer to geographically delineated places, supposedly untrammeled (or only partially trammeled) by people. For instance some authors advocate 'nature experiences', as if there is a transcendent 'nature' that is somehow apart from the everyday lives of people (e.g. Zelenski, Dopko, & Capaldi, 2015). In the first of these examples, students may be urged to consider the ecological systems that they draw from, and which they affect in their day-to-day life choices. In the second, students may spend time in supposedly 'natural' places, so as to have firsthand aesthetic experiences, gain propositional knowledge of 'wildlife' and 'natural processes' and as a result start to care for it/them. There are many variations of these approaches and 'nature' is not always essentialised in environmental education literature (see Gough, 2004, for example). However, other fields of enquiry have moved much further in their exploration of the concepts of the 'human' and the 'natural', as indicated by Ivakhiv (2014). As the term appears so central to environmental education, researchers, theorists, and practitioners could make more use of this rich world of alternatives.

In Environmental and Human Geography for instance Lorimer (2012, p. 2) tracks a profusion of conceptions of 'nature' referring, rather, to multinatural ontologies constituted by "a diverse array of non-deterministic and non-dualistic materialisms". The focus on materiality, or *new* materialisms, allows a dissolving of the essentialist barrier that is set up by the terms 'human' and 'nature' as well as the constructivist view of culturally constructed natures. Coole and Frost's (2010) edited collection, *New Materialisms*, acts as a confluence of this 'material turn' in cultural studies, demonstrating that it is a turn that has been picking up speed across fields as diverse as anthropology, archeology, feminist studies, and political studies for example, even producing its own areas of science studies, rhizome studies, and contemporary animisms as well as its own academic battles (the static Object-Orientated-Ontologists vs the fluid process-relationalists for example – see Taylor, 2016, for a recent diffractive encounter along these lines). There is also a burgeoning field of new materialist (or post-qualitative) research methodologies that aim to move beyond what is described as the discursive and dualistic limitations of representational social science (Koro-Ljungberg, 2016; Lather & St. Pierre, 2013; St. Pierre, Jackson, & Mazzei, 2016). The potential for new materialist approaches to impact research, policy and practice in environmental education is great (Clarke & Mcphie, 2015). My research focus has been on how education can help young people conceive of their material coalescence *of* (rather than 'with' or 'in') the material world (Clarke & Mcphie, 2014). The implications of this 'new' theory seem particularly significant given the emphasis environmental education discourse places on changing people's perceptions of their dependence on (or, from a new materialist perspective, coalescence *of*) the world. Indeed, commenting on this material turn in social science, Payne (2016, p.170) has recently noted that 'undoubtedly, it is an exciting (theoretical) time for environmental educators and researchers'.

Shallow, Deep, Dark and Flat Environmental Education

So what of 'nature'? New materialists might say that the term is highly anthropocentric, implying that humans have *the* 'culture'. Why is it, for instance, that the action and produce of bowerbirds are *not* conceived as culture, and everything *outside* of their dances, bower building and selection and display of colourful artifacts conceived as 'nature'? Architect, designer, choreographer, and educator Eva Perez de Vega (2014) walks us through four different conceptions of the 'nature/culture' problem. She highlights the popular *deep* ecology of Arne Naess (1973) as an attempt to move beyond the prevailing dominance of culture in our perceptions of the nature/culture relationship, an approach that Naess famously termed a *shallow* ecology. Naess' premise was that we needed to move from a shallow 'anthropocentric' conception, where human culture was the dominant concern, to a deeper 'ecocentric' conception of the world, where 'nature' was considered the home of human culture, and therefore more central to human concerns than modern society would suggest. Many authors postulate what a pedagogy influenced by Naess' work, and greater consideration for ecological process in general, might look like (e.g. Haigh, 2006; Orr, 1992; Stone & Barlow, 2005). Whilst there may be some examples of practice embracing deep ecology and ecological processes in general the absence of these approaches in mainstream education, certainly in the UK, demonstrates that a *shallow* ecological perspective is dominant in schooling in the West. Students may have separate time for 'nature study' or field trips where 'nature' is experienced as an 'other'. Deep ecology has not even greatly influenced popular adventurous forms of outdoor education, where the environment is treated staggeringly uncritically. In this practice there may be plenty of time set aside for synoptic weather charts, footpath erosion, and leave no trace principles, but seldom any for discussion of the petrochemical industries required for Gore-Tex® jackets, satellite navigation, and portable gas canisters, not to mention the socio-environmental justice issues created by the economies upon which these industries are founded (Cachelin, Rose, Dustin, & Shooter, 2011). Environmental education theory has, of course, accessed the philosophical perspective of *deep* ecology, and it has even been seen as firm conceptual ground on which to construct environmental education practice (Kopnina, 2014; Nicol, 2003). However, de Vega draws on Timothy Morton's (2010) *dark* ecology to demonstrate the lingering dualism in Naess' (1973) formation, and the romantic and perhaps limiting conception of 'nature' that *deep* ecology relies on, celebrating green 'nature' over the 'culture' of humans. Might there be a way forward beyond *deep* environmental education?

Morton's (2007, 2010) *dark* ecology, articulated in his books *The Ecological Thought* and *Ecology without Nature*, suggests that the greatest barrier to ecological thinking is the concept of 'nature' itself. This is because the notion of 'nature' sets up an aesthetic distance between 'us' and the 'world'. Morton complains that we cannot mourn for the environment because we are deeply connected to it – 'we' are it – and 'we' includes our industrial processes, urbanisation, pollution and waste; all of which are ecological events that are not 'killing nature', but producing their own

dark ecosystems. In this conception the petrochemical industries are as 'natural' as a wild flower meadow. Morton maintains that *Deep* ecology's ecocentrism, retaining modernist ideas of 'nature', is not much better than *shallow* ecology's anthropocentrism in clearing up the metaphysical puzzle. Whereas in *shallow* ecology uncivilised 'nature' is to be tamed by 'culture', de Vega demonstrates how in Naess' (1973) *deep* ecology there is a favouring of the perceived idyll of 'nature' over the presumed depravity of 'culture'; in both cases, however, a metaphysical divide remains. In contrast, a *dark* ecology allows us to cut out the romantic, picturesque, idyllic and trite from our environmental conception – an operation that is, perhaps, much needed in environmental education discourse. A *dark* environmental education would move beyond ecological principles as popularly conceived. Morton's *ecological thought* is one that acknowledges the co-existence of all things – things already coping with environmental catastrophe. According to Morton, to begin to think our way into this new world we have created we must, above all, reject 'nature'; whatever else it might be, *dark* environmental education would be an education without 'nature'.

Whilst retaining an implicit favouring of romantic ideas of 'nature', Naess' philosophical call is one that at least attempts to remove the dualism between 'nature' and 'culture'. Plumwood (2000) recalls the debates between Arne Naess and his mountaineering friend Peter Reed; where Naess stressed that an environmental ethic must spring from acceptance that 'nature' is the home of culture, thus advocating a monistic *unity* (i.e. that humans and 'nature' are of the same essence), Reed was vehemently dualist, falling back on romantic conceptions of the sublime and awe inspired by the *difference* of 'wild' places as the grounds from which environmental action would rise (a fundamentally *pluralistic* view). In contrast to these approaches a Deleuzo-Guattarian *flat* ecology places the emphasis on the continuous and immanent materiality of the world, before the formation of signifying language (i.e. 'nature' and 'culture') (Deleuze & Guattari, 2004). de Vega (2014) employs the term *flat* as it demonstrates the anti-hierarchical plane of continuity, and yet a quasi-form of difference, implied by Deleuze and Guattari's ontology. From this perspective we can become immediately skeptical of the fixity we place on the world and realise that, rather than having to fit the world into the language we use, we may instead acknowledge that our language may be limiting in all sorts of ways. Deleuze's *flat* ontology (ecology) may appear monistic in its conception of the world, but it allows for the expression of difference (pluralism) manifesting 'of' this apparent monism. Deleuze and Guattari justify this twist by rejecting the notion that the world is made up of one substance (monism), or many (pluralism). Instead, they argue that all things are produced by a process of continual *becoming* consisting of folds, speeds and intensities, rather than a static state of either monistic or pluralistic *being*. This monist-pluralist conception lays a path between the dualistic *shallow* ecology of pure *difference* on the one hand, and Naess' attempt at monistic *unity* on the other. Deleuze and Guattari (2004, p.23) refer to 'the magic formula we all seek – PLURALISM = MONISM – via all the dualisms that are the enemy, an entirely necessary enemy, the furniture we are forever rearranging'. In this way, the world is a processual and relational production:

> As we have seen, Naess' deep ecology subjectifies nature; Morton's dark ecology rejects nature; while Deleuze's flat ecology intensifies nature, treating it as a comprehensive ontology of complex material systems defined not by their identifying properties, not by whether they have natural or artificial essences, but by their process of production – their morphogenesis (de Vega, 2014, p. 7).

Instead of a world consisting of objects or subjects, there is a smooth space of univocity, or plane of immanence – a *flat* ecology. This understanding led Deleuze and Guattari (2004) to voice the *haecceity* (I will attempt to explain this concept shortly), rather than the *object*, as the fundamental property of reality; a move that puts an end to human exceptionalism and a move that has creative, exciting, and confusing implications for environmental education[2]. For instance, what would be the point of a *flat* environmental education? If all things are in a state of material flow, then, why does it matter *how* things flow? Does this new perspective offer anything to the ethics upon which we base environmental pedagogy? Karen Barad (2008) suggests that the becoming material processes that constitute her ontology of *agential realism* produce an *ethics of mattering*. Noting that knowing, being and doing are inseparable she (Barad, 2008) reasons that "ethics is not about right response to the other, but about responsibility and accountability for the lively relationalities of becoming of which 'we' are a part" (p. 333). In educational terms this has a profound significance. For, as Spuybroek (2011 as cited in Mcphie & Clarke, 2015) notes, those involved in education "are not recipients but participants" (p. 240); a *flat* environmental education is therefore a pedagogy of engagement and of participation with a world that is *already* participating.

If environmental education is really about realising that we are already participants of a participating world, then pedagogy built on process materialism could be very useful; it could demonstrate the diffusion of people and planet by attempting to erase the borders of both, and yet retain the persuasive power of difference. Action then, would spring from *both* an understanding that environmental degradation is akin to cutting off one's own arm. In fact, we would no longer perceive *an environment* or *one's own arm*, but rather immanence – *a life* (Deleuze, 2001) *and* a form of awe (what Ingold terms "astonishment" [2011, p. 75] and Morton "enchantment" [2010, p. 104]) which results from living in a world which is seen as constantly becoming, rather than static, staid, and stultifying. Perhaps, more powerfully than both of these points, a process relational pedagogy may demonstrate the eventing nature of existence to learners; comprehending the animate nature of their becoming may be inseparable from consideration for consequence. In *Deleuze and Environmental Damage*, Mark Halsey (2006) draws on Deleuze's reading of Michel Tournier to conclude that 'nature' may be the *possible*, stubbornly passing as the *real*. Halsey concludes that if this is so:

> …the object of future socio-ecological struggles should not – indeed cannot – be the 'environment' or 'humanity', but the techniques and processes which govern their image(s) and frame the limits of the possible (Halsey, 2006, p. 257).

[2] Nature and culture are of course conceived as objects in the prevailing approach – physically and temporally delineated: boulder and climber; object and subject.

As Noel Gough (2004) has articulated, educating beyond the 'natural' and the 'cultural' must therefore be about helping create educational practice that allows students to experiment with the 'real' (Clarke & Mcphie, 2015).

Mapping Haecceitical 'Selves': (Re)Framing the Limits of the Possible with Students

A year before our trip to Fontainebleau the students had undertaken a module entitled 'Concepts of Outdoor Education'. During the module we had ascended the 900-meter North Ridge of Mount Tryfan in Snowdonia, North Wales. Below us the dull grey waters of Cwm Ogwen were surrounded by farmland; fields delineated by dry stonewalls climbing high into the surrounding mountains could be glimpsed in the occasional gaps in the cloud that was moving down the valley and around the prominence on which we were perched. At this point in the module we had moved through de Vega's four ecologies and we were now questioning the received wisdom of the 'human subject' existing 'in' the 'objective world'. Earlier in the week I had introduced the idea of the haecceity to the students. The term haecceity comes from the philosophical work of Duns Scotus (1266–1308 [Vos, 2006]), though an analogous concept is present in many animistic peoples' understanding of the world, and so it is much older than the late middle ages. In general we tend to think of the world as populated by objects. The concept of haecceity works against this axiom to instead argue that processual unboundaried things, multiplicities and becomings constitute the fabric of the world. For a technical definition of haecceity the term is best contrasted with the term quiddity (also from Duns Scotus [Vos, 2006]). A quiddity is an object as we, in the West, are most used to understanding a thing. It is a thing defined by the characteristics that make it a *particular type of thing* – or the question '*what type* of thing is that?'. By contrast a haecceity is a thing defined by its *thisness*, its process of becoming, and, in contrast to the question 'what type of thing is that?' a more appropriate response might be 'look at this! What's it/they doing/producing?!' as haecceities are by definition multiplicities, each thing one *and* many, and unique in their becoming.

> There is a mode of individuation very different from that of a person, subject, thing, or substance. We reserve the name haecceity for it. A season, a winter, a summer, an hour, a date have a perfect individuality lacking nothing, even though this individuality is different from that of a thing or a subject. (Deleuze & Guattari, 2004, p. 287–288)

Essentialising the world into, on the one hand 'nature', and on the other hand 'culture', is to see the world as made of quiddities. Both shallow and deep ecology retain a quidditical view of the world. A *flat* environmental education would, by contrast, urge students to consider the material intra-relations that constitute their current *thisness* – their haecceitical self. A flat environmental education questions where bodies and environments begin and end – or even if they *can* begin and end. In this way the student is not urged to 'connect with nature', as there is no 'nature'.

Rather, they are urged to consider how they are materially manifested *of* the world. The task I had given the students while we sat on the lichen covered rocks of Mount Tryfan was a challenging one: to map their haecceitical selves; to consider how they came to be *this* currently occurring process – student-mountain-view-lecturer, all at once. This was an experiment with pedagogy to see if students might take to the idea of viewing themselves as literally becoming constituted of the world, not 'in nature', or 'the environment'. I hoped to achieve something of what Jeffrey Cohen (2015, p.16) describes in his beautiful exploration of the lithic inhuman; *Stone*. Here Cohen draws from new materialists Jane Bennet and Manual Delanda to offer the potential of stone:

> Stone's time is not ours. For many, this disjunction will never be noticed, triggering neither affect not insight. For those for whom rock's alien intimacy becomes palpable, however, its temporal noncoincidence is profoundly disorientating. A climber faces the face of the mountain, and in that interface relation unfolds, bringing each into intimacy: fraught, perilous, fleeting, familiar, suspended above the certainty of ground. Something happens in such interfacial zones: anarchic irruption…generative encounter, an erosion of secure foundation, an ethical moment of connection-forging. Lithic-induced perspective shift triggers an ontological and temporal reeling, a rocky movement of affect, cognition, horizon.

Some student took to the idea with good intentions by, for instance, talking about the physical effects of the exercise on their bodies and the resulting affects their bodies had on the 'environment' – sweat evaporating and CO_2 from their breath. Others were more interested with the philosophical nature of what I was asking. It did raise some interesting discussion and questions from some of the students – questions that did indeed seem as if they might have the potential to push at the students frame(s) of the possible – perhaps with practice from both the students, and myself, we could achieve a more productive understanding of a pedagogy that challenges the seemingly metaphysically stable. Mcphie and Clarke (2015) draw from a range of posthumanist, new materialist and process-relational theory to describe a series of encounters with students where the facilitators create opportunities for reframing the limits of the possible of students' environmental engagement. There is much theory that can be used to draw undergraduates into discussion that may challenge their preconceptions of the 'real'. By way of example, anthropologist Tim Ingold (2011) demonstrates how some cultures already perceive the world from a radically different perspective. Some animistic cultures, for instance, tend to have a processual metaphysical conception of the world. That is, they start from the premises that the world relationally constitutes them (and they the world), and is therefore moving and active, rather than from the premise that they exist, as separate entities, within a static world that is then populated with objects that they perceive and then represent in their heads – they have no 'nature'. Bird-David's (1999) study of the Nayaka of Southern India, for instance, demonstrates how the Nayaka experience their lives as eventing *with* their environments:

> Their attention is educated to dwell on events. They are attentive to the changes of things in the world in relation to changes in themselves. As they move and act in the forest, they pick up information about the relative variances in the flux of the interrelatedness between themselves and other things against relative invariances (Bird-David, 1999, p. 74).

In this way the animistic Nayaka produce their knowledge of the world, but it is a manner of producing knowledge that results in direct action/ethical consequences. Bird-David (1999) expresses this fact by comparing the dominant Western approach to the 'acquisition' of knowledge to the Nayaka relational co-production of knowledge. In the West, to gain knowledge of a tree, or any other aspect of the world, we tend to fragment what we have before us, cutting it into parts that can then be analysed to get a full understanding of what the tree 'is'. The Western approach has nothing to do with the production of action or morality, but purely with the production of a form of abstract knowledge. Bird-David demonstrates the stark contrast in the approaches:

> If "cutting trees into parts" epitomizes the modernist epistemology, "talking with trees," I argue, epitomizes Nayaka animistic epistemology. "Talking" is short-hand for a two-way responsive relatedness with a tree— rather than "speaking" one-way to it, as if it could listen and understand. "Talking with" stands for attentiveness to variances and invariances in behavior and response of things in states of relatedness and for getting to know such things as they change through the vicissitudes over time of the engagement with them. To "talk with a tree"—rather than "cut it down"—is to perceive what *it* does as one acts towards it, being aware concurrently of changes in oneself and the tree. It is expecting response and responding, growing into mutual responsiveness and, furthermore, possibly into mutual responsibility (Bird-David, 1999, p. 77).

Ingold (2011) posits that the animistic state of coming to exist with a world in perpetual becoming results in a state of 'astonishment' for the animist. This astonishment, rising from the mutual flux of the 'self' and the 'world', may produce actions of 'care, judgment, and sensitivity' (p. 75). Bird-David (1999) acknowledges that relational epistemology, although the dominant form of knowing among the Nayaka, is just one of several ways in which they learn with the world. In her work she suggests that this epistemology is, however, apparent in all cultures, including those in the West, but that it may be marginalised by other dominant ways of knowing. Nicol (2003) calls for educational practitioners to formulate their practice conceptually by grounding their teaching in epistemological diversity to overcome the dominance of dualistic ways of knowing the world. A relational epistemology, promoting new materialist or animistic ways of seeing, may compliment this approach well. What we can do then, is experiment with practice along these lines.

As some of the students looked around the stones, heather and sheep poo, valiantly trying to map their haecceitical selves on the side of Mount Tryfan, others sat, looking out across the valley and remarking on the occasional Royal Air Force fighter jet, tearing through the space between us and the ground as it roared towards the sea. The play of air on things in flight can make an excellent talking point for some of the concepts we have been considering in this chapter. Clouds, viewed from the side or from above, demonstrate that, rather than objects existing in a vacuous space, they are instead swept up in a processual flow, themselves entangled in the world's becoming. Snowfall demonstrates this same thing in wonderful fashion. It expresses that there is not space in-between the two faces of a valley, but rather a continuous play of materiality – a middle you do not see without the snow tumbling

through, and tumbled by, it. Ingold (2010a) refers to the all-encompassing nature of the processes that make up the world as the "weather-world", highlighting how the weather is "not so much what we perceive, as what we perceive in" (p. 131). Ingold (2010b) directs his students to fly kites so as to demonstrate their haecceitical becoming, describing how the kites appeared to be 'objects' when they were built inside:

> But when we carried our creations to a field outside, everything changed. They suddenly leaped into action, twirling, spinning, nose-diving, and – just occasionally – flying. So what had happened? Had some animating force magically jumped into the kites, causing them to act most often in ways we did not intend? Of course not. It was rather that the kites themselves were now immersed in the currents of the wind. The kite that had lain lifeless on the table indoors had become a kite-in-the-air. It was no longer an object, if indeed it ever was, but a thing. As the thing exists in its thinging, so the kite-in-the-air exists in its flying. Or to put it another way, at the moment it was taken out of doors, the kite ceased to figure in our perception as an object that can be set in motion, and became instead a movement that resolves itself into the form of a thing (Ingold, 2010b, p. 7).

Ingold is making two points here, partly he is poking fun at scholarly claims of the agency of 'objects' (which is different to suggesting an immanent agency *of* the world), but more importantly for our purposes, he is demonstrating an educational exercise that can be used to allow students to explore the concepts discussed in this chapter in intra-relational terms. For the students perched on the side of a Welsh mountain we made do with discussions of fighter jets and seagulls in flight, which in turn lead to less conceptually challenging questions of UK foreign policy and whether seagulls would even be on Tryfan if people didn't drop their sandwiches up there. Even though the general conversation had diverged to the more conservative 'leave no trace' questions[3], at least two students approached me with questions that I perceived to be testing the limits of the 'human' and the limits of the 'environment' as we descended the mountain that afternoon. These conversations, and many like them, demonstrate to me that students are often excited and enthusiastic to learn that you can attempt to (re)frame the limits of the possible.

The Middle

In a process-relational world of becoming there are no beginnings or ends, and certainly no conclusions. There are, however, plenty of middles, and this is where we find ourselves now. The title of this section is thus an attempt to illustrate the ontology described in the chapter, and this may be one way to help engender new materialist and animistic ways of seeing with learners, demonstrating the intra-relational

[3] And this includes one of the biggest ethical questions for students of outdoor education – 'why this place?' Can we justify the carbon emitted as a result of our drive to Fontainebleau, or up here to North Wales? What alternative practices might we create? – This is, of course, a question that all educators should ask themselves. See Tuck and McKenzie (2014) for a discussion of the politics of new materialisms and place in research.

becoming of the world with students in any way we can. In the past, for instance, I have asked students to read the illustrative prose of Deleuze and Guattari to instigate discussions of the human relationship to the world:

> 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 as cited in Clarke & Mcphie, 2014, pp. 211–212, emphasis in original).

There are many intriguing and generative passages in Deleuze and Guattari's writing and it is often stimulating to ask students what their individuality means to them, and if they can think of anything outside of their immediate bodies that constitutes their individuation. Often the answers are things like family, friends and material possessions, but sometimes students map larger assemblages including the fast food dinner of the previous night, the infrastructure that enabled the ingredients to arrive at the restaurant and tracts of land turned over for intensive beef farming. Students can then ask themselves 'in what ways do I become changes *of* the world?'

References

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Durham, NC: Duke University Press.

Barad, K. (2008). Queer causation and the ethics of mattering. In N. Giffney & M. Hird (Eds.), *Queering the non/human* (pp. 311–338). Aldershot, UK: Ashgate.

Bird-David, N. (1999). 'Animism' revisited: Personhood, environment, and relational epistemology. *Current Anthropology, 40*(1): S67–S91. Retrieved from http://www.press.uchicago.edu/ucp/journals/journal/ca.html

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

Cheng, J. C.-H., & Monroe, M. C. (2012). Connection to nature: Children's affective attitude toward nature. *Environment and Behavior, 44*(1), 31–49. doi:10.1177/0013916510385082.

Christie, B., & Higgins, P. (2012). *The Impact of outdoor learning experiences on attitudes to sustainability: A Review of literature*. Retrieved from University of Edinburgh website: http://anaturalcurriculum.org.uk/assets/Literature-review-UofE.pdf

Clarke, D. A., & Mcphie, J. (2014). Becoming animate in education: Immanent materiality and outdoor learning for sustainability. *Journal of Adventure Education & Outdoor Learning, 14*(3), 198–216. doi:10.1080/14729679.2014.919866.

Clarke, D. A., & Mcphie, J. (2015). From places to paths: Learning for Sustainability, teacher education and a philosophy of becoming. *Environmental Education Research*, 1–23. Advance online publication. doi:10.1080/13504622.2015.1057554.

Cohen, J. (2015). *Stone: Ecology of the inhuman*. Minneapolis, MN: University of Minnesota Press.

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

Crist, E. (2013). On the poverty of our nomenclature. *Environmental Humanities*, *3*, 129–147. Retrieved from http://environmentalhumanities.org

de Vega, E. P. (2014). *Thinking the ecological present.* Retrieved from http://www.eistudio.net/ACADEMIC/epdvs_ThinkingTheEcologicalPresent.pdf

Deleuze, G. (2001). *Pure immanence*. New York: Urzone.

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

Frantz, C. M., & Mayer, F. S. (2014). The importance of connection to nature in assessing environmental education programs. *Studies in Educational Evaluation, 41*, 85–89. doi:10.1016/j.stueduc.2013.10.001.

Gough, N. (2004). RhizomANTically becoming-cyborg: Performing posthuman pedagogies. *Educational Philosophy and Theory, 36*(3), 253–265. doi:10.1111/j.1469-5812.2004.00066.x.

Haigh, M. (2006). Deep ecology education: Learning from its Vaisnava roots. *Canadian Journal of Environmental Education*, *11*(1), 43–56. Retrieved from http://cjee.lakeheadu.ca/index.php/cjee/index

Halsey, M. (2006). *Deleuze and environmental damage: Violence of the text*. Aldershot, UK: Ashgate Publishing.

Hamilton, C. (2015). The Theodicy of the 'Good Anthropocene,'. *Environmental Humanities*, *7*, 233–238. Retrieved from http://environmentalhumanities.org

Haraway, D. (2015). Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin. *Environmental Humanities*, *6*, 159–165. Retrieved from http://environmentalhumanities.org

Ingold, T. (2010a). Footprints through the weather-world: walking, breathing, knowing. *Journal of the Royal Anthropological Institute*, *16*(1), S121–S139. doi: 10.1111/j.1467-9655.2010.01613.x

Ingold, T. (2010b). *Bringing things back to life: Creative entanglements in a world of materials*. Retrieved from http://www.socialsciences.manchester.ac.uk/medialibrary/morgancentre/research/wps/15-2010-07-realities-bringing-things-to-life.pdf

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

Ivakhiv, A. (2010) About. *Immanence* [Blog]. Retrieved from http://blog.uvm.edu/aivakhiv/about/

Ivakhiv, A. (2014). *On matters of concern: Ontological politics, ecology, and the Anthropo(s)cene.* Retrieved from http://environmentsandsocieties.ucdavis.edu/files/2014/04/On-Matters-of-Concern.pdf

Kopnina, H. (2014). Future scenarios and environmental education. *The Journal of Environmental Education, 45*(4), 217–231.

Koro-Ljungberg, M. (2016). *Reconceptualizing qualitative research: Methodologies without methodology*. Thousand Oaks, CA: Sage.

Lather, P., & St. Pierre, E. A. (2013). Post-qualitative research. *International Journal of Qualitative Studies in Education, 26*(6), 629–633. doi:10.1080/09518398.2013.788752.

Latour, B. (2004). Why has critique run out of steam? From matters of fact to matters of concern. *Critical Inquiry, 30*(2), 225–248. doi:10.1086/421123.

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.

Lorimer, J. (2012). Multinatural geographies for the Anthropocene. *Progress in Human Geography, 36*(5), 593–612. doi:10.1177/0309132511435352.

McBride, B. B., Brewer, C. A., Berkowitz, A. R., & Borrie, W. T. (2013). Environmental literacy, ecological literacy, ecoliteracy: What do we mean and how did we get here? *Ecosphere, 4*(5), 1–20. doi:10.1890/ES13-00075.1.

Mcphie, J. (2014). Mr. Messy and the ghost in the machine: A Tale of becoming… a working-class academic (researching environ(mental) health). *Rhizomes, 27*. Retrieved from http://rhizomes.net

Mcphie, J., & Clarke, D. A. G. (2014, September). *A Walk in the park: Considering practice for environmental education through an immanent take on the 'material turn'* (pp. 9–13). Paper presented at Under Western Skies conference, Mount Royal University, Calgary, Alberta, CA.

Mcphie, J., & Clarke, D. A. G. (2015). A walk in the park: Considering practice for environmental education through an immanent take on the material turn. *Journal of Environmental Education, 46*(4), 230–250. doi:10.1080/00958964.2015.1069250.

Moore, J. (2014). *The Capitalocene, Part I: On the nature & origins of our ecological crisis*. Retrieved from http://www.jasonwmoore.com/uploads/ The_ Capitalocene__Part_I__June_2014.pdf

Morton, T. (2007). *Ecology without nature: Rethinking environmental aesthetics*. Cambridge, MA: Harvard University Press.

Morton, T. (2010). *The ecological thought*. Cambridge, MA: Harvard University Press.

Naess, A. (1973). The Shallow and the deep, long-range ecology movement. *Inquiry: An Interdisciplinary Journal of Philosophy, 16*(1–4), 95–199. doi:10.1080/00201747308601682.

Nicol, R. (2003). Outdoor education: Research topic or universal value? Part three. *Journal of Adventure Education & Outdoor Learning, 3*(1), 11–27. doi:10.1080/14729670385200211.

Orr, D. W. (1992). *Ecological literacy: Education and the transition to a postmodern world*. New York: Suny Press.

Payne, P. G. (2016). What next? Post-critical materialisms in environmental education. *The Journal of Environmental Education, 47*(2), 169–178. doi:10.1080/00958964.2015.1127201.

Pimm, S. L., Jenkins, C., Abell, R., Brooks, T., Gittleman, J., Jopa, L., et al. (2014). The Biodiversity of species and their rates of extinction, distribution, and protection. *Science*, *344*(6187). doi:10.1126/science.1246752.

Plumwood, V. (2000). Deep ecology, deep pockets, and deep problems: A Feminist ecosocialist analysis. In E. Katz, A. Light, & D. Rothenberh (Eds.), *Beneath the surface: Critical essays in the philosophy of deep ecology* (pp. 59–84). Cambridge, MA: The MIT Press.

Rautio, P. (2013). Children who carry stones in their pockets: On Autotelic material practices in everyday life. *Children's Geographies, 11*(4), 394–408. doi:10.1080/14733285.2013.812278.

Somerville, M., & Williams, C. (2015). Sustainability education in early childhood: An Updated review of research in the field. *Contemporary Issues in Early Childhood, 16*(2), 102–117. doi:10.1177/1463949115585658.

Spuybroek, L. (2011). *Sympathy of things: Ruskin and the ecology of design*. Rotterdam, the Netherlands: V2 publishing.

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

Stone, M. K., & Barlow, Z. (2005). *Ecological literacy: Educating our children for a sustainable world*. San Francisco: Sierra Club Books.

St. Pierre, E. A. S., Jackson, A. Y., & Mazzei, L. A. (2016). New empiricisms and new materialisms: Conditions for new inquiry. *Cultural Studies↔ Critical Methodologies, 16*(2), 99–110. doi:10.1177/1532708616638694.

Taylor, C. A. (2016). Close encounters of a critical kind: A diffractive musing in/between new material feminism and object-oriented ontology. *Cultural Studies↔ Critical Methodologies, 16*(2), 201–212.

Tuck, E., & McKenzie, M. (2014). Place in research: Theory, methodology, and methods. New York: Routledge.

Vos, A. (2006). *The philosophy of John Duns Scotus*. Edinburgh, UK: Edinburgh University Press.

Zalasiewicz, J., Waters, C. N., Williams, M., Barnosky, A. D., Cearreta, A., Crutzen, P., et al. (2015, June 21). When did the Anthropocene begin? A mid-twentieth century boundary level is stratigraphically optimal. *Quaternary International*. Advance online publication. doi:10.1016/j.quaint.2014.11.045.

Zelenski, J. M., Dopko, R. L., & Capaldi, C. A. (2015). Cooperation is in our nature: Nature exposure may promote cooperative and environmentally sustainable behavior. *Journal of Environmental Psychology, 42*, 24–31. doi:10.1016/j.jenvp.2015.01.005.