Chapter 2
The Anthropocene's Call to Educational Research

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Introduction

This chapter is set within two parallel social processes in contemporary western societies: the continuing penetration of advanced capitalism and the growing response to the devastating impact of climate change framed within the Anthropocene. It considers the analysis of advanced capitalism proposed by philosopher Rosi Braidotti (2014) and the gathering momentum of academic scholarship framed within the concept of the Anthropocene. Described as "a new phase in the history of both humankind and of the Earth, when natural forces and human forces became intertwined, so that the fate of one determines the fate of the other" (Zalasiewicz, Steffen, & Crutzen, 2010, p. 2231), the Anthropocene is proposed as a new geological age. Strongly advocated by Nobel prize winning atmospheric chemist Paul Crutzen (2002), this proposal is currently under consideration by the Geological Society of London to determine whether the new age will be formally accepted into the Geological Time Scale.

While debates continue about when the Anthropocene epoch began, the most significant aspect of the concept of the Anthropocene is in the way it has galvanised scholarly activity. Individual academic papers are not able to demonstrate its force but a preliminary review of conferences with 'Anthropocene' in the title revealed at least five international conferences in 2014 in Europe, the United Kingdom, United States, and Australia. These conferences shared a common concern with "the fundamental viability of how humans have organised the relationship between society and nature" in relation to the impact of human induced climate change (Earth System Governance, 2014, p. 5).

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New posthuman philosophical approaches generated within the scholarly activity of the Anthropocene offer a radical re-thinking of the relationship between the human subject and the world in the face of human induced climate change and the attendant massive species loss and environmental destruction. Embedded within these issues, the unequal distribution of wealth and resources, the growth in global poverty, and escalating global conflicts, dispossession, and war are parallel social problems related in complex ways to the exploitation of the planet (Taylor, 2014). These new approaches mark an epistemic shift in western thought and offer new ontologies, epistemologies, and methodologies for research. This chapter addresses the question of how educational research, in particular, might respond to the call of the Anthropocene.

What Does the Anthropocene Do?

The provocations of the Anthropocene can be understood as ontological, epistemological, and methodological. Philosopher Clare Colebrook (2010) identifies the ontological challenge of addressing climate change: "[c]limate change is not only a change of the climate but a change in the very way in which we think" requiring us "to develop new concepts of the human, new figures of life, and new understandings of what counts as thinking" (p. 15). Other scholars, motivated by similar concerns, focus on the ontological implications of species extinction in the environmental humanities (e.g. Rose, 2011; van Dooren, 2014). The epistemological challenges of the Anthropocene lie in the necessity to not only deconstruct the nature/culture binary but to move beyond the binary constructions that underpin the belief that the human species can be understood as separate from nature or the environment. This has generated interdisciplinary conversations to more sustainably connect nature and culture, economy and ecology, and the natural and human sciences, in order to address the profound impact of global warming (e.g. Gibson, Rose, & Fincher, 2015). Methodologically the Anthropocene has functioned as a tool for innovation and imagination to generate emergent constellations of life and knowledge because "we cannot solve problems using the same kind of thinking that created them" (Nordic Environmental Social Science, 2013).

The Context of Advanced Capitalism

In opposition to the radical re-thinking of Anthropocene scholarship, the forces of advanced capitalism continue to penetrate western societies and the developing world. This important oppositional context is rarely addressed in relation to Anthropocene research although it necessarily forms the background to all of the corrective moves. In a recorded interview for the Open University, Rosi Braidotti (2014) describes advanced capitalism as a 'continuous process ontology' that codes

and recodes the rules that construct our socioeconomic sphere. Through these processes previous emancipatory positions (such as feminism or environmental activism) are co-opted to the politics of consumption because difference is capitalised upon and highly valued in terms of creating new markets (the green market, the liberated female market). In other words, possible subject positions such as those of gender, race, and class are subsumed into the market economy and disconnected from their emancipatory potential to make a difference in the world. In this way advanced capitalism has assimilated and transformed the very subject that contained the possibility of transformation. Even more concerning, advanced capitalism has crossed all kinds of borders, absorbing "animals, seeds, plants, and the earth as a whole" into the politics of the market. "Seeds, cells and genetic codes, all of our basic earth others, everything that lives, has become controlled, commercialised and commodified" (Braidotti 2014).

In considering the possibilities for change, Braidotti (2014) says that the "transformative gesture is seldom the spectacular and is never an individual solitary gesture, it is a collective activity", that is, it requires collective activity in a similar way to the global movement of Anthropocene scholarship. She offers a prototype for a model of action adapted from classical forms of 'the politics of location'. A politics of location involves an acknowledgement that we can only begin from the place from which we speak in recognition of our particular position in the scheme of things. She believes that we need a more detailed and accurate account of the subjectivities we are constructing within advanced capitalism and then to work together to transform these through 'conversations'. These conversations would involve rethinking of our relationship to both living and dying in which we understand living needs to encompass all of our earth others and everything on which they are dependent for their continued wellbeing. A re-conceptualisation of dying is inevitable when we begin to contemplate the systematic depletion of all life forms on Earth. The details of Braidotti's (2014) proposals align with the most recent Anthropocene scholarship about entanglement, common worlds, and the revaluing of Indigenous knowledges.

The Rise of Posthuman Philosophical Approaches

The new theoretical approaches that have emerged within Anthropocene scholarship are marked by a shift in consciousness characteristic of a new paradigm. They focus on the inseparability of the human from the matter of the planet, seeking to decentre the human being. Though diverse, these approaches share a focus on rethinking the human subject as co-constituted within the more-than-human world. They are interdisciplinary, collective, and philosophically radical in the sense of developing new onto-epistemological positions. Philosophers Karen Barad (2007), Donna Haraway (2008), and Immiboagurramilbun (2013) have contributed to the development of this scholarship offering key concepts that I will elaborate on in this chapter. The concept of 'intra-action' reconceives the human subject as produced within the agency of the world (Barad 2007); the concept of the 'common worlds'

recognises the multi-species nature of our existence (Haraway, 2008); and the concept of 'thinking through Country' brings together Indigenous and western nature/culture approaches (Immiboagurramilbun, 2013; Somerville, 2013).

Postqualitative Methodologies in Educational Research

Postqualitative research methodologies are closely aligned with the posthuman paradigm because "rethinking humanist ontology is key in what comes after humanist qualitative methodology" (Lather & St Pierre, 2013, p. 629). In their editorial to a Special Edition of the International Journal of Qualitative Studies in Education Patti Lather and Elizabeth St Pierre propose that in recognising an ontological position of 'entanglement' all categories of humanist qualitative research are no longer impossible. The underpinning belief of humanist qualitative research, that language, the human, and the material world are separate entities, becomes untenable (Lather & St Pierre, 2013, pp. 629–630). In a similar position to Clare Colebrook's (2010) edict that the new epoch of the Anthropocene requires a re-thinking of what it means to be human, they challenge researchers with the paradox that in all previous paradigms of qualitative research the human is not only at the centre but is assumed as an already prior category in all qualitative inquiry.

Postqualitative inquiry begins with the assumption that there is no a priori category of the human. Any beginning point for research within this framework must necessarily assume the always-already-becoming of entanglement of the human subject with the becoming world (Lather & St Pierre, 2013, p. 630). In identifying new directions in current postqualitative research, they propose that much of the leading edge arises from three domains of inquiry: Australian Aboriginal cultural practices; the new (to education) area of animal studies; and new materialism (Lather & St Pierre, 2013, p. 629). In the following sections I take up these ideas through exploring the concepts of intra-action, common worlds and thinking through Country as they have been enacted in my own research practice taking up Lather's (2013) injunction to "start where we are" (p. 640).

Entanglement and the Method of 'Intra-action'

The concept of intra-action is borrowed from philosopher of physics, Karen Barad (2007), as developed in her book *Meeting the Universe Halfway*. Barad's central theme in the book is entanglement:

> To be entangled is not simply to be intertwined with another as in the joining of two separate entities, but to lack an independent self-contained existence (Barad, 2007, p. x).

Carefully plotting this concept from its origins in quantum physics, Barad (2007) offers a new way of understanding how the individual subject emerges only through the mutual entanglements of different bodies of matter, each with their own force or

agency. She calls this 'agential realism' in which "the primary ontological unit is not independent objects with independently determinate boundaries and properties but rather phenomena that signify the ontological inseparability of agentially intra-acting components" (Barad, 2007, p. 23). There is no prior existence for the indi-vidual subject because subjects emerge only through their intra-relating. She proposes that time and space, like matter and meaning, only come into existence through their being iteratively reconfigured within each intra-action.

In response to the way this concept was applied by Karin Hultman and Hillevi Lenz-Taguchi (2010), I decided to experiment with a small empirical study that incorporated the concept of intra-action in its design. I engaged two young children, 3 year old Charmaine and her 4 year old sister Lulu, to collaborate with me in this experiment. In a comparative analysis of two photographs of young children's play using humanist and posthumanist approaches the researchers compared a typical human-centred analysis with a new materialist analysis of one photo of a girl play-ing with sand and another of a child on a climbing frame in an early years learning setting (Hultman & Lenz-Taguchi, 2010). Given the static and representational nature of this data analysis I wondered what might be possible if the research design proceeded from the concept of intra-action and what practices of documentation might evolve. Over a 12 month period I recorded the intra-actions of Charmaine and Lulu within the places of their choice, which included the backyard, local walks, and the nearby river (Somerville & Green, 2015). The following is an account of one of these events of place:

> The next event takes place at a different spot a bit further along the river. A little more clean, a bit more wild, with a wide dirt/sand beach beside a large expanse of shallow water. A ridge of river stones stretches across to a little island. Water bubbles over stones. We take snacks in a biscuit tin and a picnic rug. Both girls take shoes off and walk to river stone crossing, slippery with a light layer of silt. Charmaine feels her way with feet on rounded surface of slippery stones; Lulu doesn't like slippery, unstable feel of stones, stays on sandy beach. Charmaine comes back. They look around, try different things, ask for snacks, have little tiffs, need attention. I remove myself from the action, to enable whatever will happen to emerge.
>
> After a little while Charmaine sits down, fully clothed, in shallow water at the very edge of the river with the tin emptied of its snacks. She scoops handfuls of wet sandy mud, driz-zling it through her fingers alternately onto a half-submerged log and a flat rock. She con-tinues to scoop sandy mud with fingers and biscuit tin from the river, drizzling it through her fingers to make a drizzle castle, then washes it away with water from the tin and then makes it again. She does this on the flat stone and then on the log and then back again for twenty to thirty minutes of complete absorption. For all this time she is completely silent.

I recorded a small segment of this activity, once it was fully established, with a three minute video on my iPhone. Each time I review this video and show it to others we are amazed by the stillness and silence of this normally noisy, overactive, rambunc-tious child. Only her hands and arms move except for a slight turn of her head and upper body as she switches from log to flat stone as the platform for her sand drizzle castle. There are no human voices at all, only the sound of water bubbling over river stones, the chirruping of birds, and slight tinny clicks as tin meets pebbly sandy mud and water in Charmaine's play. Normally running around from place to place, Charmaine sits entirely contained, attention captivated by sandy mud and water

within the small arm, hand and finger movements of scooping, drizzling and washing. To be with this video is to be immersed in body, movement, and nonhuman sound.

Understood through the lens of intra-action, water, sand, tin, and girl are acting on each other simultaneously (Hultman & Lenz-Taguchi, 2010). If I view them as transforming each other, I see that the water mixed with the sand and scooped in Charmaine's hand each change the other. The muddy sand of the river bed becomes a drizzle castle, the tin becomes a scooper and container of water, the hands of the child become tools, open and close, body becomes creator as arms lift and drop, head turns, eyes focus. If I understand all of the bodies as causes I see how the physical qualities of sand, water, log platform, and body of girl bring each other into being, no one element is prior according to these ideas of ontological entanglement. I can see how new problems emerge as an effect of their mutual engagement: How does sand drizzle into castle, what amount of sand to scoop, how to hold fingers for best result, how does it wash away, what happens if I do it this way or that? In this way I can see that sand, water, tin, and girl simultaneously pose questions in the process of trying to make themselves intelligible as different kinds of matter involved in an active and ongoing relation. The water wets the sand to enable it to drizzle; tin carries water to wash drizzled sand away, arm, hand and fingers move in relation to sand, water, and tin as whole girl-being is formed in this relational moment of becoming which is also a moment of intense learning. The human is not removed in intra-action but is seen through the lens of entanglement where all are produced moment by moment in the relations between sand, water, tin, and child as part of this more-than-human world.

'Common Worlds' and Multi-species Ethnographies

A 'common worlds' understanding of place has been applied in a global early childhood studies collective (Taylor & Ketchebaw-Paccini, 2015). This approach has been developed as a response to the question of how humans can live well with each other and in balance with the planet's ecological systems, proposed as the most pressing and confronting political and ethical imperative of our times (Taylor, 2014). A common worlds approach is another way of addressing the intransigent nature/culture binary in western thought:

> Instead of rehearsing the nature/culture binary … the notion of common worlds encourages us to move towards an active understanding of and curiosity about the unfolding and entangled worlds we share with a host of human and more-than-human others (Taylor & Guigni, 2012, p. 111).

Common worlds theory involves a shift from a focus on human-human social relationships to consider heterogeneous relations between a whole host of living beings, non-living, and living forces. Rather than assuming that these relations are built upon communications between already formed subjects, a common worlds approach

understands these relationships as generative encounters with others, shared events that have mutually transformative effects. It is through these relations with others that we become, and continue to become who we are: "actual encounters are what make beings" (Haraway, 2008 as cited in Taylor & Guigni, 2012, p. 112). The Common Worlds Early Childhood Collective has generated a number of multispecies ethnographies, a focus shared across a major research strand of Anthropocene scholarship.

Becoming-Frog

I followed the entangled relations between children and frogs over many years in the Morwell River Wetlands project (e.g. Somerville, 2007; Somerville, 2011; Somerville & Green, 2015). The longstanding Morwell River Wetlands program offered alternative storylines and ways of learning that enabled children to learn about themselves and their place in the world differently. The Morwell River wetland is very much a common worlds phenomenon, a part-natural, part-artificial wetlands area constructed by the power company. Neither pure nature nor pure culture, it is located in the original overflow from the river, which was channeled into a pipe to make way for the coalmine. Constructed by the company's mining rehabilitation engineer, the wetland has pools and banks, swathes of trees, logs and dead timber for habitat, islands and causeways. These form the evolving landforms created for creatures to re-inhabit this place. The primary school has had a relationship with the wetland since its construction in the 1990s, and has monitored its evolution through the frogs, native trees, shrubs and grasses, and other creatures that have come to inhabit the place.

In this project children participated in the ongoing formation of the Morwell River wetlands as part of their learning. They came with their families to the monthly frog census monitoring at dusk to identify and record the different frog calls. This place-based sustainability program was integrated across all grades and all subject areas. In the early grades the children studied the needs and life cycles of frogs, rearing tadpoles in the classroom and learning in a mini wetlands constructed in the school grounds. The middle grades were involved in monitoring the wetlands through the frogs and other animals that came to live there, integrating literacy and numeracy, history and geography, civics and health with their visits to the wetlands. Children in the upper grades conducted scientific analyses of the wetlands' wellbeing by monitoring water quality and identifying the micro and macro organisms significant in its development as a living system. I was transfixed on a visit to one class when I viewed the children becoming-frog in a frog dance they had choreographed entirely to frog calls.

I had visited the crowded portable classroom earlier in the day and watched the children navigate desks, chairs, boxes, hanging artworks, and other objects that make up this decidedly working class school classroom. My attention was especially drawn to Mary, a child with Down syndrome, moving awkwardly in this

crowded space accompanied by an integration aide. When I returned after school, the teacher and the integration aide, still working in the well-worn classroom, invited me to watch a short DVD of the rehearsal for the Christmas concert. There on the interactive screen, larger than life-size, the children came to life as frogs, dancing their frog dance to music made entirely of frog calls. The classroom, cleared of debris, became the space of the wetlands. Children becoming-frog moved frog limbs, fingers splayed, jumping, leap frog, becoming-frog to frog music. Mary, in particular, loved the performance, moving freely in this frog dance collective, unaccompanied by her integration aide. In one brief sequence towards the end she smiles pure pleasure into the camera, body liberated in frog dance.

On another occasion when our teacher education students designed activities in the wetlands for Grade 3/4 children I observed the 'exquisite care and attention' of one of the children who discovered a frog hidden under a log:

> Kneeling on the ground, Gemma gently lifts up the log to show us a small stripy brown frog half buried in moist brown soil amidst a flurry of ants. Monica asks her 'why doesn't the frog hop away?' Gemma leans further towards its stripy brown body, 'I think the frog knows we are here because it's moving its legs and digging itself in a little bit more', she responds with fingers and hands making frog digging movements. 'It isn't scared of us because it knows it's the same colour as the ground and we won't be able to see it'. Pauses a moment then continues, 'the frog's not worried by the ants because if the ants were biting it the frog would jump away. If the frog was eating the ants they wouldn't be under the log living there with the frog'.

In this moment Gemma enters the world of frog. She moves her hands and fingers like the frog digging into the moist soil, she thinks in frog-knowing that we cannot see it; she feels as a frog-not-worrying about the ants flurrying all around it. She enters frog-ant world through wondering how they are living there together in that hidden moist place under the log. Gemma becomes-other to herself through her immersion in the world of frog. In the common worlds of the Morwell River wetlands, (trans)formed by the power company, Gemma learns that the world she shares with power company, electricity lines, wetlands, and her school, is also central to other life forms such as that of the frog. By shifting our attention with Emma to the earth under the artificial log that provides habitat for the frog we can experience the frog-ness of Emma's moment-by-moment becoming. A common worlds approach enables us to imagine a world that is imperfect, always in formation, which we can be immersed in small local actions.

Thinking Through Country

The methodology of thinking through Country was developed collaboratively between U'Alayi researcher Chrissiejoy Marshall and myself for a research project about water in the drylands of Australia. As such it is Indigenous-led but represents a move beyond a specific Indigenous-non-Indigenous binary as a knowledge framework. It is contemporary rather than a representation of a traditional or pure

Indigenous past (Immiboagurramilbun, 2013; Somerville, 2013). For Chrissiejoy, in order to make any knowledge claims at all, she has to think through Country, the specific Country of the Narran Lake where she grew up on a property landlocked by white settler holdings.

Starting in the centre top of the painting this jigsaw piece is viewed as a mud map of the Noongahburrah country. The black lines are the rivers within, and marking the boundaries of this country, and the black orb in the centre represents the Narran Lake, where I was raised, which has always been the most significant and sacred site for Noongahburrah, Murriburrah, Ngunnaburrah, and all the other peoples of the nation that spoke the U'Alayi language as well as several other nations of Aboriginal people within bordering countries (Immiboagurramilbun in Somerville, 2013, p. 45).

In U'Alayi knowledge Mulgury is a core ontological concept through which one takes on the being of another creature and all of the life worlds that surround that creature. Chrissiejoy describes the meaning of this concept through a painting she calls "Me, myself and I".

At the beginning all was Mulgury. Only creative power and intent. Through the intent and power of our Creator, Mulgury reproduces into form to carve the beings and shapes of the world where the water meets the sky and earth sings the world to life. The pattern of life is Mulgury and Mulgury is traced in the Niddrie [the framework of the ancient laws within Niddeerie] of Mudri [person]. Every tracing, every rock, tree, plant, landform, the water, fish, reptile, bird, animal, and Mudri is in the sacred relationship, through Niddeerie. The pattern, shape and form of Mulgury is life, and all is a continuing tracing of Mulgury (Ticalarnabrewillaring 1961 translated by Immiboagurramilbun in Somerville, 2013, p. 49).

Four black swans are represented as the first image in the painting. The first two swans are for her mother, and the second two represent the collective of water people, the Noongahburrah, her grandfather's people. The swans are Mulgury, signalling their collective meaning as mythical creatures of the Niddeerie, as well as representing an individual's connection to a particular creature and its place. Immiboagurramilbun's mother is swan, Noongahburrah people are collectively swan. Swan belongs to the time and place of the creation of the land and people of Terewah, the home of the black swan, in the past, the present, and the future. Those who carry that identity are both swan and place. Country, swan, and person are together an ontological reality.

Chrissiejoy explains that if your Mulgury was the Kangaroo, you would learn that you are related to the trees, the insects, the birds, the grass, the wind, the rain, and all the things that occur and surround a kangaroo's life. You would spend years observing and learning about the life of your Mulgury – what it needs to survive and how it assists in the survival of other species. Most importantly, you would learn how all those things connect to yourself – how they all become your brothers and sisters, part of your family and about the responsibility that goes with that. In a similar way to posthuman thought, the knowledge framework of thinking through Country does not erase the human but embeds human subjectivity inseparably from the more-than-human world of which they are a part.

This methodology of 'thinking through Country' was enacted in a project that followed the waterways of the Murray-Darling Basin, gathering artists and cultural knowledge holders from Gamoroi, Paakantji, and Yorta Yorta language groups. In this project we asked: How can places teach us about water? How can we incorporate their pedagogical possibilities into educational systems in order to ensure the protection of people and their places? The project continued for 8 years producing a series of exhibitions of artworks and stories for the artist knowledge holder to represent their knowledge in visual form. In the final year I wrote a book, which represented my own creative outcome as a writer from the many years of research. In the final chapter I wrote about the 'mutual entanglement' of all of the collaborators of this project in Country. It was Chrissiejoy's bringing us together and telling the story of the lake as sleeping that was pivotal in the long slow process of learning to sing the waterways back to life. We came together in each other's country at East Mullane near the Narran Lake; at Swan Hill on the Murray River; and in Wilcannia on the Darling River. In each of these places we talked about our work together as a group and shared being in those places. There was much trauma to be dealt with and integrate into our continuing work together.

We were six people from different countries and crossing the boundaries of those countries into the territory of the other is the hardest thing to do. When I remember this time I think of the solace of the place of East Mullane. The lengthening shadows on the red earth with no grass, the desert trees, the luminous night sky, Badger's dark hands floured white with kneading johnny cakes, the flapping of flyscreens in the deserted homestead that sits so lightly on the land. I think too of Badger's story of the Paakantji people in Wilcannia locating water when the town ran out during the long years of drought, "Where the Ngatyi is, water will be". It was Chrissiejoy's bringing us together and telling the story of the lake as sleeping that began the long slow process of learning to sing the waterways back to life (Somerville, 2013, p. 172).

Thinking through Country involved all of the participants in an undoing and remaking of self in respect of each other and our immersion in each of the different Countries of our research. This process was a fraught and challenging remaking of self through the coming together of our different positions in relation to each other and traumatic colonial histories. Through this deep interrogation of self, Place became Country for me, a move that was recognised in the foreword of the book led by Chrissiejoy in describing me as sister. Country however, remains as a possibility for all, "a gift without entitlement, it is a gift that is always coming, every moment is a gift, the food we eat, the water we drink and every breath of life, it is all a gift" (Rose, 2014).

Conclusion

In considering three specific examples of the application of core concepts that radically disrupt the nature/culture binary I have moved between the global framing of the Anthropocene and Advanced Capitalism and very local actions that start where

we are. The research that I have described, and the onto-epistemological moves I have made are contextualised as a miniscule part of the vast collective gathering of scholarship around the concept of the Anthropocene. These theoretical and empirical moves follow similar desirelines to Braidotti's (2014) recommended strategies for transformation. They are seldom spectacular, they reinvigorate a politics of the local and they involve a reconceptualisation of desire from the lack of endless consumption to the plenitude of frogs, the pleasure of sand, water and a tin, and the gift of Country to offer a new imagining for precarious times.

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