

Hope and Resilience in the Anthropocene

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Perhaps over 11,000 words is a little long. For those whose time (and maybe interest) is shorter, I have italicised in bold the key points.

Introduction

Resilience has rapidly spread throughout the policy world over the last two decades, driven by the desire to use systems theories and process understandings to develop adaptive approaches to the world. However, this paper argues that under the auspices of the Anthropocene, the assumptions and goals of resilience have become problematized. In modernity, supporting and enabling vulnerable communities and ecosystems can help resolve crises but in the Anthropocene resilience approaches can easily appear to be spreading rather than containing any problem. Attempts to resolve problems through focusing upon redistributing resources to enable capacity-building can be seen to speed up the process of resource depletion and the arrival at the Earth's 'Planetary Boundaries' rather than slowing it down (Stockholm Resilience Centre, 2017). In the place of 'linear', infrastructural, engineering or 'top-down' approaches to resilience, alternative approaches have been advocated, based upon more responsive cybernetic framings of automated or 'algorithmic' real-time adaptation. This paper highlights the limits of these two approaches to resilience so as to draw out the distinctive nature of the demand to 'become indigenous', ***in the context of our workshop, it is this third approach which is most associated with discourses of hope*** and often articulated as an agential and futural alternative relying upon speculative or indigenous analytics to enable or 'work with' so-called 'natural' processes.

In the new context of global warming, extreme weather events, environmental disasters and the Anthropocene, indigenous ways of being and knowing are increasingly being integrated into governance (see, for example, the UNESCO reports Nakashima *et al*, 2012; Hiwasaki *et al*, 2014). Indigenous knowledge as a set of speculative analytics is increasingly central to discourses of resilience because it is constructed as a different and better way of knowing and engaging with change. Modern knowledge focuses on causal understandings with a linear temporality, while indigenous analytics, we are told, lacks both the causal 'reductionism' and the linear temporality of modernity. In the past, when the world was seen as amenable

to 'command-and-control', through the direction of modernist scientific and technical knowledge, indigenous modes of understanding were considered to be limiting. Today, Anthropocene discourses suggest that new approaches to adaptation and resilience are necessary.

This paper is structured around the analysis of three differing approaches to resilience, the linear (or autopoietic), the cybernetic (or homeostatic) and the speculative (or sympoietic). The following section provides an overview of the problematic of resilience in the Anthropocene, where linear 'top-down' or 'engineering' approaches to resilience are considered to be artificial or 'coercive'. The second section considers alternative cybernetic or 'equilibrium' approaches that often rely on the rolling out of ubiquitous computational technologies, like the Internet of Things. The following section brings in a third resilience approach formulated around hope or indigenous analytics and draws out the contradistinction between these futural imaginaries and attempts to modulate around equilibrium.

It can seem, today, that there is no alternative to hope – analysed here in terms of indigenous approaches - focused not upon modernist imaginaries of perpetual progress and development but of futural sensitivity and care. Key to this paper is the role of imaginaries of indigeneity as taking us beyond the limits of high tech promises of resilience, reliant upon Big Data correlation and ubiquitous sensing technologies. There is no space here for background regarding the ways in which discourses of indigenous, pluriversal, forms of knowing and responsivity drew largely on earlier cybernetic imaginaries of system feedback, now part of dominant resilience discourses. In contemporary framings, dominant appropriations of indigeneity have followed trends within cybernetic thought, moving from 'first order' understandings of homeostatic control to 'second order' or 'new' approaches which emphasise subjective agency, where feedback is much more mediated and speculative interpretations are key.

As I draw out in the final section, the shift towards the power and potential of speculative imaginaries of hope can be seen to narrow rather than expand alternative possibilities. Subjective agency and imagination are no longer then to be directed towards future transformative goals but to making the present appear more intensely for us. Thus the world becomes richer and more present for us, suborning the subject to dwelling within it rather than seeking to instrumentalise it. ***Rather than projecting ourselves into a future, radically different from the present, in discourses of hope the future is speculatively brought into the present itself.*** I suggest that this is a radical foreclosing of the possibilities of transformative change, one that is particularly problematic as its promise of futural agency is one that traps us even further within the constraints of the present than earlier imaginaries of governance and resilience.

Rethinking Adaptation in the Anthropocene

Resilience approaches discursively frame policy problems, and their resolution, through the focus on enabling and capacity-building communities and systems - held

to be 'vulnerable', 'at risk' or 'failing' (Walker and Cooper, 2011; Evans and Reid, 2014; Chandler, 2014; Joseph, 2013). These potential imaginaries of resilience - as a policy-making 'magic bullet' for problems as diverse as underdevelopment, conflict and environmental crises - have come under challenge in the Anthropocene. Anthropocene thinkers argue that the Anthropocene is not just another problem or crisis to be 'solved' or 'bounced-back' from or 'recouped' but rather a sign that modernity itself was a false promise of salvation, one that has brought us to the brink of destruction, and from which no recovery is possible (Latour, 2013; Stengers, 2015; Tsing, 2015). While resilience-thinking has recently achieved nearly universal success in the policy-making world - suggesting new sensitivities to problems and rejecting 'high-modernist' technocratic approaches, which depended upon universal 'one-size-fits-all' solutions from on high - **resilience is still a 'modern' construction which assumes that problems are 'external' and that we need to develop 'internal' policy solutions to maintain and to enable our existing modes of being in the face of shocks and perturbations.** 'We' need to be sensitive to minor changes and to 'tipping points'. In short, that 'we' are not the problem, but that 'we' need to develop new approaches of adaptive recovery to preserve our modernist imaginaries of development and progress.

The problems which the Anthropocene posits for resilience advocacy have been little recognised in contemporary academic discussions in the humanities and social sciences. In fact, for the Stockholm Resilience Alliance - which is, in the view of many commentators, the leading research and advisory body for resilience-thinking - the conceptualisations of resilience and of the Anthropocene are closely interconnected. Particularly in the language of systems ecology, both concepts appear to share understandings of complex adaptive systems, 'tipping points' and 'phase transitions' and to be sensitive to the limits of 'top-down' or 'linear' approaches to problem-solving. A glance at the Resilience Alliance webpages reveals the clear interconnections between leading natural and social scientists, whose shared work in systems theory and adaptive systems has shaped thinking in both these areas: including Will Steffen, Paul Crutzen, Frank Biermann, Carl Folke, Johan Rockström and Jan Zalasiewicz among others (see also Biermann *et al*, 2012; Steffen *et al*, 2011).

Yet, even at the 'heart of the beast' not all is well. One example of the limits of resilience-thinking, we'd like to highlight here, comes from a group of Swedish ecology scientists linked with the Resilience Alliance (Stockholm Resilience Centre, 2014) and published in *Ecosphere*, the journal of the Ecological Society of America (Rist *et al*, 2014). These scientists argue that resilience-thinking has been slow to think through the implications of the Anthropocene and the hidden costs of 'anthropogenic impacts on the environment'. The problem of ignoring these hidden costs is highlighted in their conceptualisation of 'coerced resilience', which they define as:

Resilience that is created as a result of anthropogenic inputs such as labour, energy and technology, rather than supplied by the ecological system itself.

In the context of production systems, coercion of resilience enables the maintenance of high levels of production. (Rist *et al*, 2014: 3)

Rist *et al* define 'anthropogenic inputs' as the external 'replacement of specific ecosystem processes by inputs of labor and manufactured capital (e.g., fossil fuel, technology, nutrients, pesticides and antibiotics)' (2014: 73). Thus sustaining or maintaining growth depends upon the taking of resources, technologies and materials from elsewhere, merely intensifying and redistributing or spreading the problems. This is firstly, because the process is held to weaken and undermine 'natural processes' of resilience and, secondly, because importing resources weakens other, external, ecosystems.

Anthropogenic inputs make the problem worse by weakening rather than strengthening natural ecosystem sources of resilience. For Rist *et al*, this can be clearly seen in the shift to anthropogenic dependencies: with the development of intensive agriculture techniques over a thousand years ago; in forestry, which has moved to the industrial scale over the last few hundred years; and in fisheries, which became industrial after the Second World War (2014: 4). In modernity, the problem was understood to be the ability to sustain these vulnerable systems, particularly with concerns over falling productivity. But in Anthropocene-thinking resilience itself becomes the enemy as the addition of anthropogenic inputs begins to shift the system regime state, moving further and further away from reliance on the natural ecological processes - and, in fact, causing permanent damage to them - until a new regime state is reached without the possibility of any return to 'nature' (Rist *et al*, 2014: 5). Thus vulnerabilities are cascaded through the larger system.

Rist *et al* argue that one of the key problems with coerced resilience is that it 'masks' the real costs of production through the import of external capital, namely in the form of technology and fossil fuel based energy (2014: 3). Thus the problem of modernist resilience policy interventions to enable sustainable development and human progress is thereby their 'artifice' or falsity. For some authors, this is akin to rearranging the deckchairs on a sinking ship as this merely takes materials from other ecosystems and contributes to spreading the problem rather than resolving it. ***In fact, coercive resilience is a kind of globalisation in reverse, where the ability to import goods from around the globe no longer adds to productivity but rather spreads the sickness of undermining natural processes by over extraction in unsustainable ways. For Rist et al this 'falsity' is itself a key problem of coercive resilience, as it undermines the very feedback processes that complex adaptive systems require.*** In order to be productive, these systems:

...rely on the maintenance of local ecological processes to retain a wider range of options for unforeseen future requirements, and thereby provide clearer feedbacks regarding proximity to ecological thresholds than do production systems... which require significant anthropogenic inputs. (Rist *et al*, 2014: 4)

Thus increasing resilience through ‘coercion’ merely enables tipping points to be reached sooner. The addition of anthropogenic inputs ‘masks’ the growing loss of natural ecological system resilience, maintaining systems in ‘artificial’ states, entirely dependent upon more and more external inputs:

This raises an apparent paradox, whereby highly modified production systems can, through anthropogenic efforts rather than ecological processes, mimic the response of resilient natural systems to a specified disturbance, in their capacity to return to pre-disturbance system states. (Rist *et al*, 2014: 6)

This is a dangerous situation as ‘coerced’ resilience hides the capacities of these systems to draw upon natural ecological processes (highlighted in discussions of recent declines of wild and domestic pollinators and the plants and other species which rely upon them) (Rist *et al*, 2014: 6). A striking example of the limits of coerced resilience is provided by anthropologist Michael Taussig, in his recent work, *Palma Africana*, on the mass production of palm oil in Colombia (2018). One of the unintended and ironic consequences of increasing reliance on anthropogenic inputs, for example, the development of mono-crops, such as the ‘Hope of America’ palm, is that although artificially designed to prevent the spread of insect predation it needs additional anthropogenic interventions to artificially inseminate it. Thus production becomes increasingly artificial, requiring more and more inputs, despite being sold as a wonderful technical solution for raising productivity:

I see these women inseminators hard at it in the lustrous photographs provided by the Colombian Palm Growers Association. One woman is kneeling by an adult palm with a plastic tube in her mouth blowing sperm into the tiny flowers. In another photo a dark-skinned young woman wearing bright pink jeans and a coal black jacket and cap guides the inseminating tool in her right hand while with her left she pushes back the palm branches studded with fierce thorns. With a look of equally fierce concentration she guides her instrument into its target all because “Hope of America” can’t get it up. One would hope for more from “Hope of America”. (Taussig, 2018: 74)

In language, which very much follows the lines of Rist *et al*, Taussig writes that:

Once triggered, assemblages tend to proliferate and somersault, one leading to the next... Another assemblage concerns the larger framework of relevant political cliché and self-awareness as to such – namely, third world women of color ministering to the sexual requirements of an impotent masculine “Hope of America” designed to stall the plagues brought by the very act of mono-cropping. We could continue. Thus does the assemblage principle provoke movement, speed, and metamorphosis. This is the way of things as much as a way of thinking with things. (Taussig, 2018: 75)

Thus resilience, in traditional policy approaches, rather than halting or slowing down the process of environmental destruction and exhaustion, can in fact be seen

as the very vector of its becoming. What is then to stop resilience from being retrospectively read into precisely the history of modernist developmentalism that it set out to produce an alternative to?

For Rist *et al*, coerced resilience cascades system effects of resource depletion through increasing 'cross-boundary interactions' spreading the problem globally. One example they provide is that of livestock production, initially dependent upon farm-based resources and recycling waste products. In today's globalised interdependent world there is a decoupling of these processes, farm waste leaches into the environment rather than being recycled and intensive food production elsewhere (like soybean or palm oil) depends on ever higher inputs of synthetic mineral fertilizers, while global transportation merely adds to the consumption and waste of resources (Rist *et al*, 2014: 6-7). ***Thus – in a world in relation - vulnerabilities cascade through systems of positive-feedbacks, magnifying and extending the crisis of sustainability.***

In the Anthropocene, it appears that any attempts to start from resilience 'problem-solving' assumptions merely make the initial problem worse. Modernity - now recast as the development of anthropogenic forms of 'cheating' nature - reaches its closure at a global scale, making coercive resilience not just the last gasp of modernity but actually the driver for its demise: 'because continued inputs are largely dependent upon, and ultimately limited by globally finite resources, such as fossil-fuel energy and phosphorous' (Rist *et al*, 2014: 7). ***The Anthropocene thereby spells the death knell for 'coerced' resilience precisely through revealing the problem of 'masking' the environmental implications, which the distances of time and space had previously concealed. High levels of production and the speed of 'bounce-back' through resilience approaches were not enabling adaptation to new conditions but quite the opposite: merely working to 'mask or camouflage the ecological signals of resilience losses and thus the true underlying constraints to production'*** (ibid.: 8).

Resilience, understood in modernist ways, is thereby part of the problem not part of the solution. You don't have to be a scientist of system ecology (the original home of resilience-thinking) to realise that the whole discourse of resilience is potentially put at risk. Resilience-thinking rather than being constructed as a challenge to modernist aspirations of 'command-and-control' is more likely to be seen as the last redoubt of eco-modernisers and of modernist dreams of technological and technocratic approaches which attempt to short-cut problems rather than to tackle them at source (for example, Schmidt, 2013; Tierney, 2015; Yarina, 2018). But what would non-coerced or non-anthropogenic approaches to resilience look like? The scientists linked to the Resilience Alliance do not make a very convincing case of what it would mean to 'attempt to use natural processes to enhance system resilience' and argue themselves that often 'techno-fixes' may be required in the short-term as part of the process of using and manipulating 'natural processes' (Rist *et al*, 2014: 8):

In such cases where coerced resilience is desired, the impacts on supporting and recipient system resilience must be considered. We argue that the *ultimate goal* is to retain or enhance the provision of *global production*

system resilience through bolstering natural supporting processes rather than an increased reliance on anthropogenic inputs. (Rist et al, 2014: 9; emphasis added)

The game is rather given away here. The problems vitiating this approach are clear in the quote above. Firstly, there is a clearly instrumental approach to ‘natural processes’, which are to be harnessed to support the existing status quo, thus ‘the ultimate goal’ is to support ‘global production system resilience’. This has come to the fore particularly in experiments in ‘rewilding’ and new forms of environmental conservation, seeking to enhance and expand ‘ecosystem services’, geo- and bio-engineering nature to be more efficient (see, for example, Lorimer, 2015). As Anna Tsing notes, these resilience imaginaries are all part of an ‘ecomodernist’ fantasy of the ‘good Anthropocene’ (2017: 16). Even if this could be achieved, ‘natural processes’ would be further modified by anthropogenic manipulation: the mere need to intervene to ‘bolster’ these allegedly ‘natural processes’ would inevitably produce other unintended stresses and strains according to the logic of the authors’ own arguments.

Thus the problems of ‘coerced’ resilience become clear, and we can see a growing consensus that resilience is far from unproblematic as a set of governing interventions. However, it is clear from the criticisms of resilience that there is hope for an alternative: resilience can be done better in other more responsive and less ‘ecomodernist’ ways. The first approach, considered immediately below, is that of applying new technological advances to sense and modulate feedback effects obscured by reductionist or modernist linear thinking. The second, is the advocacy of indigenous analytics – the analytics of hope - which share the cybernetic imaginary but go beyond this to suggest that resilience can be seen as a way of bringing ‘future worlds’ into being rather than merely limiting responsivity to maintaining the status quo. I argue that the counterposition between homeostatic and the latter, autopoietic, more agential approaches informed by speculative appropriations of indigenous knowledge is key for grasping contemporary discussions and debates on resilience in the Anthropocene.

Feedback through Technological Resilience

One alternative to ‘top-down’ approaches to resilience focuses upon how new technological advances in algorithmic computation and distributive sensory capacities can enable local communities to be more self-sustaining. The use of technology, not as a ‘techno-fix’ that artificially hides feedback effects but rather as one that enables them to be seen and responded to, is now central to many internationally financed resilience imaginaries in the battle against the effects of climate change. The rolling out of Big Data and the Internet of Things approaches to local communities promises a level of responsiveness and sensitivity to environmental changes that was previously unimaginable. For its boosters, in the international development agencies and corporations, these approaches will transform small-scale agricultural production. Even palm oil production receives a critical makeover. Rather than environmentally destructive industrial mono-

cropping, small plot alternatives can be made economically viable if farmers sign up to digitally enhanced 'cloud-based' management systems, where farmers enable large scale data collection and sensory monitoring systems to be installed and so can monitor and minimise the use of chemicals and other anthropogenic resources as well as rapidly respond to drought, pests and disease - detecting problems even down to the level of specific trees and plots. Just as with Google and Amazon, sensitivities to feedbacks increases the more data is shared and drawn upon. As the founder of one agri-tech start-up states:

"We specifically use... cloud storage (to store raw and processed imagery), cloud compute (to process huge amounts of data and extract insights), database storage and to serve our applications... to help farmers grow healthier crops is a perfect example of the way in which technology transforms traditional industries, leading to better livelihood conditions. Africa can be a harsh environment for farming. Crops are constantly under threat from problems such as disease, pests, and drought. Using the... cloud, we are bringing computation, data analytics, and other advanced technologies to help farmers grow healthier crops, despite the harsh conditions." (Cline, 2018)

Thus there is a clear cybernetic dynamic behind some Big Data approaches. It is for this reason that Big Data discourses often concern patterns and correlations rather than knowledge of causal processes (McKenna, 2016; Amoore and Piotukh, 2016; Morozov, 2013; Mayer-Schonberger and Cukier, 2013; Kitchin, 2014; Chandler, 2015). Big Data approaches seek to derive data from variable sources, linked through coding or datafication, thus information no longer links to universal meaning in a modernist representational sense. Katherine Hayles, in her study of the development of informatics, notes that the ability to find patterns was key to moving beyond mechanical or reductionist approaches based on essence and enabled the field of cybernetics, merely concerned with effects not with the content of information (Hayles, 1999: 98).

The promise is that, with high levels of data generation and developments in computational analysis, the world (coded through datafication) can begin to speak for itself, moving beyond the limits of 'phenomenology-of' projections of fallible instrumental reason (Steadman, 2013). According to a much-cited article by former *Wired* editor, Chris Anderson (2008), Big Data promises a world without the need for abstract theoretical models: 'Correlation supersedes causation, and science can advance even without coherent models, unified theories, or really any mechanistic explanation at all'. In these accounts, theories of causation can be dispensed with and massive and real-time data trails can stand in as reliable knowledge of the concrete relations on which policy and business decisions can be based.

According to the Rockefeller Foundation research group: 'Large data collection and analysis may support communities by providing them with timely feedback loops on their immediate environment.' (Crawford *et al*, 2013: 1) Rather than centralising data produced through everyday interactions and applying algorithms that produce

linear and reductive understandings, the aspiration of some Big Data approaches is that multiple data sources can enable individuals, households and societies to practice responsive and reflexive self-management in ways which were considered impossible before (for example, Marres, 2012; Halpern, 2014: 242-3). In fields such as disaster risk reduction and disaster management the shift is already clear (de Coning, 2016; Ramalingam, 2013). Big Data is alleged to help empower precisely those that are most marginal and vulnerable at the moments of highest risk. Open information flows are thus held to contribute to the building of resilience by making communities aware of the risks and hazards they may encounter so that they can mobilize to protect themselves (Ahrens and Rudolph, 2006: 217). This process is captured well by Patrick Meier (2013):

Thanks to [Information and Communication Technologies] ICTs, social media and Big Data... we can better measure our own resilience. Think of it as the Quantified Self movement applied to an entirely different scale, that of societies and cities. The point is that Big Data can provide us with more real-time feedback loops than ever before. And as scholars of complex systems know, feedback loops are critical for adaptation and change.

On this basis, international agencies, such as the World Bank, argue that it is possible for technological aids to enable us to be more attentive to feedback effects and for resilience to have more of a positive impact for the UN's Sustainable Development Goals (World Bank, 2018; Chandler, 2016). One thing is clear, however, in this increasingly dominant perspective for dealing with risk, the world becomes much less amenable to transformative practices and experimentation. This limitation of possible alternatives is highlighted in Giorgio Agamben's (2014) critique of the cybernetic 'governance of effects'. He argues that whilst the governing of causes is the essence of politics, the governance of effects reverses the political process:

We should not neglect the philosophical implications of this reversal. It means an epoch-making transformation in the very idea of government, which overturns the traditional hierarchical relation between causes and effects. Since governing the causes is difficult and expensive, it is more safe and useful to try to govern the effects. (Agamben, 2014)

If societies or communities were able to govern effects, tackling problems in their emergence through rapid or real-time adaptation, then, in the Big Data imaginary, they would become resilient or effective complex adaptive systems, able to cope autonomously with risks and threats without the need for external support or assistance. Big Data thus becomes the 'Holy Grail' of neoliberal disaster management. This view of self-governing systems relies on cybernetic thinking on the basis of homeostatic feedback loops. The more responses are automatic, the more the detection of signs and signals are all that is required. As Orit Halpern notes, thus what is lacking in contemporary cybernetic imaginary is 'any sense of historical contingency or possibility' (2014: 244). No knowledge is necessary any more than a thermostat needs to know why temperature changes occur. The correlation between the sign or signal and the emergent problem is all that is necessary. The

learning and adjustment of these correlations is the ‘bouncing forward’ aspect of society understood as a complex adaptive system; progress thus becomes reinterpreted as a process of managing stability better in the wake of additional potential risks and threats (for example, Rodin, 2015).

It is this cybernetic understanding of risk-management that has driven the concern with information rather than with knowledge. Maurizio Lazzarato has usefully highlighted that governance through signs displaces modernist views of subjectivity founded on universal linguistic, communicational and cognitive models: he correctly (in my view) understands this as ‘non-cognitive’ capitalism:

Instead of a rational subject who controls information and his choices, *homo economicus* is a mere terminal of asignifying, symbolic, and signifying semiotics and of non-linguistic constituents which for the most part escape his awareness. We are not only well beyond the individualism and rationality of *homo economicus*, we have moved beyond “cognitive capitalism”. (Lazzarato, 2014: 99-100)

In attempting to remove the separation between being and the world, the knowing subject ceases to exist, replaced by the sensing, embedded, relational ‘non-self’ of the Quantified Self, responsive to minor changes and adapting to new information about the self or the environment. The removal of the knowing subject is key to the imaginary of the cybernetic world as one that is conflict-free, providing a cybernetic imaginary of a seamless interrelationship between the human, the machinic and the environment (Hayles, 1999: 288). ***This cybernetic desire to adaptively modulate around the equilibrium thereby erases the potential for human creativity.*** De Sousa Santos calls this ‘epistemicide’, ‘the murder of knowledge’ and the respect for difference (2016: 92-3).

It can also be argued that the cybernetic impulse behind Big Data, as prevalent in disaster risk management as in IBM’s ‘smart city’ infrastructure experiments (Townsend, 2013: 65-9), is problematic in that ‘non-cognitive’ forms of responsivity to changes seek merely to modulate around the imaginary of a stable equilibrium. ***Machinic models of adaptation, even at high speeds or imagined as ‘real time’ forms of responsivity, in maintaining the world in its unsustainable state, can perversely only speed up the process of catastrophic collapse.*** The problematic is well drawn out in Bernard Stiegler’s recent advocacy for a ‘Neganthropocene’ (2018). Drawing on the insights of Jacques Derrida, Alfred North Whitehead and Gilbert Simondon, Stiegler argues that these contemporary forms of automated ‘algorithmic governance’ speed up the processes of disintegration and entropy and limit the imaginary of any transformative alternatives.

Stiegler’s reasoning is very important in terms of grasping the relationship between resilience and hope – understood here in terms of speculative ‘indigenous’ analytics. For Stiegler, the correlationist paradigm of Big Data is entropic: destructive of life in its plural and interactive development. It requires no new knowledge as the task of adaptation replaces human thinking with automated algorithmic processes (2018:

140-43). The key point that Stiegler makes is that living in the Anthropocene requires another alternative: neither modernist dreams of progress nor automated adaptive responsiveness in the present but approaches to resilience that build speculative futures. As against the cybernetic or machinic destruction of 'living knowledge' (ibid.: 208) he counterposes a care for 'noetic différance' (ibid.: 221) which 'can be constituted only within a speculative cosmology, that is, only by conceiving the cosmos as a process within which localities are produced that give rise to various feedback loops or discontinuities' (ibid.: 239) productive of change, understood as a process of individuation or differentiation, multiplying forms of life rather than destroying or nullifying them. **Thus resilience can be seen as the speculative struggle of life against entropy, the struggle of differences to make differences, to unfold and enable processes of becoming.**

Hope: The Indigenous Alternative

In new and alternative approaches to resilience - those of 'hope' - articulated here in terms of indigenous ways of knowing, what is foregrounded is the speculative method: understood as grounded, contextual, and enabling or developmental and transformative practices, rather than as applications of abstract, fixed, deterministic or universal knowledge. The capacity that indigenous communities are imagined to have (and Western societies are imagined to lack) is the ability to speculatively experiment with and to anticipate and respond to feedback effects (for example, Lansing, 2006). Indigenous analytics have increasingly informed governance practices *based on being attentive or sensitive to changes and alert to new possibilities or dangers: learning with or from an interactive or inter-agential environment and seeking to extend, to pluralise or to 'complexify' these 'becomings'* rather than learning about nature as a fixed object of instrumental knowledge. According to First People's Worldwide, this speculative methodology revolves around the capacity to interpret 'signs', enabling indigenous approaches to develop a futural awareness or sensitivity:

Indigenous science and knowledge are based largely on bioindicators, or natural signs. For instance, the timing of the onset of rains in Bolivia can be predicted by how high a certain species of bird builds its nests. Many animals can sense earthquakes and other natural disasters before humans can, and watching their behavior can give us time to get to safety if such an event occurs. Learning from nature in this way is an integral part of the Indigenous worldview that all things are connected, and that nature, when respected, can be a benevolent part of the whole community. (First People's Worldwide, n.d.)

It is thereby on the basis of the importance of alternative speculative ways of knowing and of adapting to change that indigenous knowledge has been brought to the forefront of international policy gatherings, as exemplified in the work of the Intergovernmental Panel on Climate Change (IPCC). Indigenous knowledge was acknowledged in the Fourth Assessment Report as 'an invaluable basis for developing adaptation and natural resource management strategies in response to

environmental and other forms of change' (IPCC, 2007: 15.6.1). This recognition was reaffirmed at IPCC's 32nd Session (IPCC, 2010) and consideration of traditional and indigenous knowledge was included as a guiding principle for the Cancun Adaptation Framework adopted at the 2010 United Nations Framework Convention on Climate Change Conference (UNFCCC, 2010). The IPCC's Working Group II contribution to the Fifth Assessment Report includes local and traditional knowledge as distinct topics within Chapter 12 on human security (Adger *et al*, 2014). As a joint UNESCO and UN report states:

Indigenous [peoples] are not only potential victims of global climate change. Attentiveness to environmental variability, shifts and trends is an integral part of their ways of life. Community-based and local knowledge may offer valuable insights into environmental change due to climate change, and complement broader-scale scientific research with local precision and nuance. Indigenous societies have elaborated coping strategies to deal with unstable environments, and in some cases, are already actively adapting to early climate change impacts. While the transformations due to climate change are expected to be unprecedented, indigenous knowledge and coping strategies provide a crucial foundation for community-based adaptation measures. (Nakashima *et al*, 2012: 6)

The concern with seeing from the point of view of non-human actants and agents, presupposes a close communal relationship of more-than-human being. Anthropologist Laura Rival provides the example of a project to reintroduce salmon to a polluted watershed which had failed when led by modernist science and technology but was a success when initiated by indigenous knowledge: 'This was accomplished through observing the river, to know it and experience it as a salmon would' not seeing the river as a straight line but as a lively series of vortexes and branching fractals (Rival, 2009: 306; see also Chandler and Reid, 2018). Thus indigenous ways of being are performatively constructed on the lines of speculative imaginaries of interactive becoming within more-than-human communities. As Aboriginal research anthropologist Deborah Bird Rose states:

Rather than humans deciding autonomously to act in the world, humans are called into action by the world. The result is that country, or nature, far from being an object to be acted upon, is a self-organising system that brings people and other living things into being, into action, into sentience itself. (cited in Graham *et al*, 2010)

Julie Graham, Katherine Gibson and Gerda Roelvink thereby draw together indigenous, feminist and STS approaches, in arguing that rather than the modernist ideal of human subjects acting upon the world or responding automatically according to pre-set rules, we need to let the world affect us through developing indigenous capacities of 'learning to be affected' (2010). Allowing the country or the land to speak to us, thus enabling the more-than-human communities necessary for life in the Anthropocene (see also Graham, 2008). Here, the speculative impulse is clear in recognising that pluriversal and adaptive knowledge enables non-modern

ways of being and learning vis-a-vis universal and representative knowledge, which hubristically seeks to project its narrow self-interest upon the external environment (see Bateson, 2000: 451). Here, it is clear that ***creative and 'response-able'*** (Haraway, 2016: 2) ***human agency is at the forefront of coping with change as there can be no assumptions of either pre-established knowledge or of orientation towards a static equilibrium.***

Thus resilience, in this 'indigenous' framing of policy interventions to enable adaptive capacities, always necessitates the development of 'attentive' and 'responsive' sensitivities: natural or immanent processes cannot be 'enabled' by being left alone. Similarly, the speculative processes of attunement and of differentiation require active agential engagement and cannot be left to automated algorithms. The starting assumption for resilience discourses is that we are now 'after Nature' (Purdy, 2015; Lorimer, 2015) or 'after ecology' (Morton, 2009; 2013; Latour, 2004). As Gleb Raygorodetsky argues, even if we set aside half the planet as nature, as the Harvard biologist E O Wilson (2016) suggests:

This strict stance, however, does little to help get to the root of our destructive behaviour. Allowing development to destroy habitat in one area with a promise of "offsetting" this destruction by conserving another place actually perpetuates humankind's assault on the environment. It creates an illusion that as long as a portion of nature is put away and locked up in some sort of a park, we can rape and pillage the rest of the planet. (Raygorodetsky, 2017: 180)

More importantly, as Paulo Tavares argues, the Western idea of a pristine 'nature' that can be preserved or kept away from human interaction has always been mythical (Tavares, 2013: 234). Even the Amazonian rainforests have been cultivated in sustainable ways by indigenous communities, thus 'Amazonia's deep history is not natural, but human' (ibid.): 'And this is perhaps the crucial paradox that the Anthropocene has brought to light: different regimes of power will produce different natures, for nature is not natural; it is the product of cultivation, and more frequently, of conflict.' (ibid.: 236) Tavares argues that the biodiversity of the Amazonian rainforests is not a product of nature, they are 'cultural forests' (2017: 146) and cultured ones. Indigenous resilience is thereby not about letting nature guide understanding but drawing out the potential becomings immanent within it:

These biodiversity-enhancing designs are very much alive in the memory and everyday practices of forest peoples. The protection of their land rights thus also means the design of a more resilient planetary ecological system in face of ruinous anthropogenic climate change. (Tavares, 2017: 150)

This is very different to the adaptive responsiveness of equilibrium management. ***Rather than waiting for 'nature' to inform forms of adaptation, speculative approaches seek to creatively engage with new opportunities, 'becoming with' others rather than passively reacting to them.*** As Elizabeth Povinelli cautions, 'learning to be affected' or 'to listen to the land' should be understood as a different

way of being responsive - quite unlike that of algorithmic or cybernetic forms of adaptation – in that the human agent is forced to do the work themselves (2016a: 142). In attempting to reduce emergent effects to signals for us to read-off and automatically respond to, the actual world is never really ‘given its due’, never appreciated in all its multiplicity and potentiality but instead flattened and reduced to networked relations. As Donna Haraway famously notes, there is no choice but to ‘stay with the trouble’ (2016). ‘Nothing is connected to everything; [but] everything is connected to something.’ (2016: 31) Relations are concrete and fluid sets of shifting and contingent interconnections, not amenable to easy intervention or datafication. Relational entanglements and interconnections are not a ready-made or ‘natural’ solution: they do not provide new forms of problem-solving or an additional prop for acquiring more modernist ways of knowing.

Speculative approaches view our entanglement with nature and non-human beings as an invitation to explore alternative possibilities rather than to resolve problems of governance by maintaining the existing modes of being. As botanist Robin Wall Kimmerer argues, in her work *Braiding Sweetgrass* (2013), ‘becoming indigenous’ means ‘to take care of the land as if our lives, both material and spiritual, depended upon it’ through restoration as ‘re-story-ation’ a process of speculative storytelling with the aid of nonhumans (2013: 9). Because ‘the stories we choose to shape our behaviors have adaptive consequences’ (ibid.: 30). Her emphasis is very much on the ethos of care as a reciprocal and speculative becoming with others, rather than a view that nature is separate. The real artifice is the tearing of modern society away from this reciprocity, creating a ‘Potemkin village of an ecosystem where we perpetrate the illusion that the things we consume have just fallen off the back of Santa’s sleigh, not been ripped from the earth’ (ibid.: 199). In a world of liveliness, flux and change, speculative approaches affirm the entangled potentials, which the previous paradigms of resilience are held to close off from us. Anna Tsing captures the process well:

Making worlds is not limited to humans. We know that beavers reshape streams as they make dams, canals and lodges; in fact, all organisms make ecological living places, altering earth, air, and water... In the process, each organism changes everyone’s world. Bacteria made our oxygen atmosphere, and plants help maintain it. Plants live on land because fungi made soil by digesting rocks. As these examples suggest, world-making projects can overlap, allowing room for more than one species. (Tsing, 2015: 22)

Anna Tsing calls this open-ended process, of collective and connective experimentation, ‘ways of being’, understood as ‘emergent effects of encounters’: the possibilities inherent in fluid assemblages with others (2015: 23). In life after modernist dreams of progress, disturbances and perturbations are not threats to the status quo but interactive invitations to creativity, seen as positive opportunities to make ‘life in capitalist ruins’. Tsing, for example, tells the story of woodland revitalization groups: ‘who hope that small-scale disturbances might draw both people and forests out of alienation, building a world of overlapping lifeways in which mutualistic transformation, the mode of mycorrhiza, might yet be possible.’

(2015: 258) She states: 'They hope their actions might stimulate a latent commons, that is, an eruption of shared assembly, even as they know they can't actually *make* a commons.' (ibid.; emphasis in original) Here, we can see speculative analytics as a set of techniques not really 'making' something but rather acting as a stimulus, exploring, probing, facilitating, repurposing what already exists but which can only come into being 'with': the new potentialities thus do not lie latent within a pre-existing entity but lie in the speculative creation of a new 'commons'.

Donna Haraway powerfully reinforces the importance of this approach, arguing that ongoing processes cannot be grasped through homeostatic or autopoietic frameworks, which assume too many separations between entities, i.e. that relations are structured and limited. As she states:

The earth... is sympoietic, not autopoietic. Mortal worlds... do not make themselves, no matter how complex and multileveled the systems... Autopoietic systems are hugely interesting – witness the history of cybernetics and information sciences; but they are not good models for living and dying worlds... Poesis is symchthonic, sympoietic, always partnered all the way down, with no starting and subsequently interacting "units." (Haraway, 2016: 33)

Instead of focusing on linear or cybernetic forms of adaptation, seeking to prevent or slow climate change, preserving the status quo, speculative approaches lead to a different set of, much more positive, assumptions and practices engaging with the present in ways which are creative rather than merely adaptively responsive:

Staying with the trouble does not require such a relationship to times called the future. In fact, staying with the trouble requires learning to be truly present, not as a vanishing pivot between awful and edenic pasts and apocalyptic or salvific futures, but as mortal critters entwined in myriad unfinished configurations of places, times, matters, meanings. (Haraway, 2016: 1)

The indigenous or hopeful imaginary constructed here is that of cultivation rather than extraction, an ethico-political duty of futural care that is situated fully in the present. This approach is theorised clearly by María Puig de la Bellacasa; drawing upon her experience of permaculture training, she states:

Obligations of caring in naturecultures cannot be reduced to "stewardship" or "pastoral" care in which humans are *in charge* of natural worlds. Such conceptions continue to separate a human "moral" subject from a naturalized "object" of caring. Nor need we go to the other extreme: diluting the thinking of specific obligations of care in situational relations with nonhumans... These are poor generalizations that avoid engaging with actual situated naturecultures and the speculative efforts demanded from ecological thought and practice. (Puig de la Bellacasa, 2017: 164)

For Puig de la Bellacasa this is speculative ‘alterbiopolitics’, creating different forces of world-making relationalities, capable of cultivating “power with” and “power-from-within” rather than “power-over” (2017: 165). Thus, in critical approaches to resilience, the alternative to mono-crop agriculture, industrialised fisheries, sea walls and river ‘normalisation’ is never to ‘just let nature take its course’. In discursive framings that are little different to neoliberal constructions of governance interventions that are ‘for the market’ – designed to enable or to ‘free’ the productive and organisational capacities of market forces, ***‘nature’ (like market forces) is never assumed to be ‘natural’*** (see Chandler, 2014; Chandler and Reid, 2016). Nature, no longer separate to human systems, requires wise and active stewardship, rather than instrumental control, like any other complex adaptive system. ***Speculative – or hopeful - approaches to resilience are thereby not necessarily against technological applications and understandings but seek to apply them differently: unlike Big Data and ‘algorithmic governance’ approaches, to work ‘with’ rather than ‘against’ immanent productive processes, sensitive to feedbacks and unintended effects. Techniques such as ‘bricolage, tinkering, the hack, the crack, the exploit’ enable technology to be put to speculative use*** (Viveiros de Castro and Danowski, 2018: 187).

The indigenous are imagined as productive of resilient and self-sustaining communities, capable of coping, adapting to and ‘bouncing back’ from regular disturbances and disruptions but also, as importantly, of speculatively bringing into being alternative futures. The speculative imaginary of indigenous peoples is centred on the empowering agency increasingly associated with the active and contextual interpretation of signs. This is a form of knowledge work said to be excluded from modernist attempts to capture the ‘one world’ world. As Pedro Neves Marques notes, this form of speculative interpretation goes beyond modernist distinctions of self and other as ‘there is no illusion of transcendence or transparency’ (2017: 34), in counterposition to a computerized or algorithmic reading of signs or images which constrains the world to what already exists, indigenous analytics enables us to:

... rupture the hegemonic gaze which sees objectivity everywhere. To think images as the embodiment of worlds means not only thinking the ontology of images but also thinking images ontologically, that is, not as representations but as *representatives*:... images through which we see other images. (Neves Marques, 2017: 37)

Thus signs or signals are held to enlarge the world of possibilities and of potentials rather than subtracting from or limiting it. Deborah Bird Rose uses the conceptualization of ‘shimmer’, as aboriginal aesthetic, to discuss the ways that signs and signals ‘appeal to the senses, things that evoke or capture feelings and responses... lures that both entice one’s attention and offer rewards’ (2017: G53). For de Sousa Santos, key to the power of indigenous knowledge as futural knowledge is the capacity to continually speculate with and upon the past, ‘reinventing the past in such a way as to make it recapture the capacity for the fulguration, irruption and redemption... to construct new, powerful interrogations and passionate stands capable of inexhaustible meanings’ (2106; 88-89; see also

Sissons, 2005: 11). Rather than a universal, abstract or linear theory of progress, where the past was always a necessary moment, fixing the determination of the present, for speculative indigenous analytics, the past is an 'inexhaustible' resource for holding open transformative hope in the present.

De Sousa Santos draws upon the critical theorist Ernst Bloch to elaborate upon the speculative and futural analytics required in making the future an object of care as indigenous approaches 'to call attention to emergencies [processes of emergence] is by nature speculative and requires some philosophical elaboration' (2016: 182). He summarises the contemporary imaginary of indigenous thought well in terms of constructions of resilience that fit the catastrophic imaginary of the Anthropocene in the importance of paying attention to change to bring the future into the present:

The Not Yet [Bloch's category of immanent potential] inscribes in the present a possibility that is uncertain but never neutral; it could be the possibility of utopia or salvation or the possibility of catastrophe or damnation. Such uncertainty brings an element of chance or danger to every change. Thus uncertainty is what, to my mind, expands the present while at the same time contracting the future and rendering it an object of care. At every moment, there is a limited horizon of possibilities, and that is why it is important not to waste the unique opportunity of a specific change offered by the present: carpe diem (seize the day). (de Sousa Santos, 2016: 183; emphasis added)

Unlike machinic real-time responses to adaptation which assume beforehand the correlations and changes to be modulated to maintain equilibrium, indigenous analytics makes no assumptions about the meaning or consequences of signs. Thus the process of attentivity, attunement or 'affectedness' is much greater and more intense. It is this process of speculative attention which 'expands the present' and cares for the future, literally bringing the future into being through responding through speculative analytics. Every sign or signal or change in the state of being thus provides an 'opportunity' to bring new futures into being and demands to be 'seized' rather than 'wasted'.

De Sousa Santos provides an informative philosophical framing, to interpret or 'translate' indigenous analytics for Western consumption, with his two conceptions of a 'sociology of absences' and a 'sociology of emergences' which become a simple 'how-to-guide' for speculative thought. The 'sociology of absences' is designed to make the everyday unusual so that we can pay attention to it, thus 'expanding our available realm of experiences'. We can then see and speculate upon more 'signs or clues' as our world becomes stranger to us. The 'sociology of emergences' expands this speculative moment 'decelerating the present, giving it a denser, more substantive content', enabling 'ethical vigilance over the unfolding of possibilities' aided by such emotions as (negative) anxiety or (positive) hope. Together this speculative method provides what de Sousa Santos calls 'symbolic amplification' (2016: 186).

For speculative analytics – the analytics of hope - the world is always necessarily more than its surface appearance. This is why ‘symbolic amplification’ is necessary to see beyond the limits of traditional modes of thought. What does not appear to exist or is not readily apparent is always more important and more rich in potential. This is what gives speculative analytics its agential and futural appeal. As Bird Rose argues: ‘Part of what makes our common Earth condition so interesting is that that which may yet be is infinitely more extravagant than that which already has been.’ (2011: 114) Uncertainty or unknowability do not close down our world but open it up as ‘the possibilities of the living world always are greater than the mind or knowledge system that wants to understand’ them (ibid.). The ‘not yet’ and the ‘may yet be’ are here and not here at the same time and thus the purpose is not to reproduce or conserve the present but ‘to enable’, ‘to engender’, ‘to cultivate’, or ‘to care’ futurally.

While linear modernist/ autopoietic and cybernetic/ homeostatic approaches to resilience pay attention to systemic interaction, feedback effects and to tipping points – in a world in relation - but they are inevitably productionist, consumptionist and extractivist. They are always inevitably focused on saving or on prolonging or making more efficient what already exists. In the Anthropocene, these approaches stand accused of refusing to see that these contemporary forms of being are exactly the problem themselves. The only approach to resilience which promises change and transformation is that of hope - the speculative approach - which, we are told, can be learned from the coping strategies of indigenous peoples. This approach trains us in a quasi-paranoiac attentivity to the world around us, enabling us to develop speculative skills giving ‘symbolic amplification’ to the clues and signs all around us. This attentiveness, we are told, can be as transformatory for us as it has been for indigenous peoples, expanding our reality beyond modernist constrictions and making available infinitely more possible, concrete futures (de Sousa Santos, 2016: 186).

The Limits of the Speculative

Speculative thought draws the future out of the present through attentiveness to changes, however momentary. It is not difficult to see how important speculation might be for a subsistence society, in which there is no choice but to seize every opportunity available. In societies where the vast proportion of resources is necessarily devoted to survival, attentivity or sensitivity to the world is vital, as is speculatively learning to interpret the actions and habits of other species, because a lack of attention can quickly lead to death. In this world of limited options, humans are not so clever or so distinct and clearly are forced to live in a relation of interdependency with plants and animal beings, which share in a condition of constant exposure to risk of death. Speculative thought is a vital aspect of being curious and interested in the world and something that should be valued and encouraged, regardless of the context of economic and social development.

Where I disagree with discursive framings of resilience in the analytics of hope is in the counterpositioning of speculative thought with instrumental applications of

science and technology. I dispute the idea that speculative approaches of drawing out new futures from the present can address the challenges we face in the Anthropocene. Unlike earlier societies, dependent on their immediate environments and open to contingency, I think that attentiveness to our immediate relations takes away and obscures necessary concerns with the 'bigger picture' of political, social and economic relations, from which transformative political projects take their cue. The precondition for speculative approaches is the closure of time and space – the acceptance of the end of the world - making the present moment necessarily contain the entirety of the potentiality of the future. ***Everything has therefore to be always and already given as virtual potential to be actualised. This would constitute a fundamental closure for both thought and political practice.***

It is precisely this closure that resilience advocates desire in their critique of the hubris of the productionism and consumerism of the modern world. As Robin Wall Kimmerer argues, it is possible for modern/ colonial man to become indigenous but only by coming down to earth, by appreciating this closure, and accepting that its finitude is equal in measure to every other living system. To become indigenous modern/ colonial man needs to understand: 'that all the knowledge he needed in order to live was present in the land. His role was not to control or change the world as a human, but to learn from the world how to be human' (2013: 208). To not appreciate that everything is always and already contained in the present time and space would be to act like our lives did not depend on the land, to take it for granted or exploit it for short-term gain. Thus, to become indigenous would not be understood as a limitation but as an affirmation of our entangled and radically endangered being. ***The reduction of the world and removal of modern extensions of being through material global time and space becomes affirmatively transvalued as a speculative immersion in plural becomings in a world of infinite dangers.***

In which case, we may well be able to share romantic poet William Blake's vision of being able to see 'the world in a grain of sand' or 'heaven in a wild flower' and to have a sense of wonder and awe for a world so much richer and larger than our understandings. If we were to do so we would doubtless realise the power of speculative thought in taking us beyond our quotidian and everyday routines and experiences. For Leanne Betasamosake Simpson, the practice of indigenous freedom is a practice that enables the 'unfolding of a different present' (2017: 18); a way of being in the world that enables 'the present as an agent of change – a presencing of the present' (2017: 20). ***This form of speculative analytics enables the emergence of 'an elsewhere that is already here, if hidden from view'*** (2017: 213). This power of speculative sight enables a different seeing of the world, or rather the seeing of another world: 'The land itself is a coded representation of Nishnaabewin that is visible to those who live within Nishnaabewin but is opaque to those who do not.' (2017: 215) Thus alternative worlds are already here once we can speculatively bring them into being. But there are limitations to the speculative bringing into being of infinite alternative worlds.

Speculative approaches promise infinite future possibilities but coerce us into a life which is lived only in the present, by being 'attentive' to the immediate present only

and in exclusion of other possible temporalities: i.e. they may be speculative but only in relation to what already exists in experience rather than enabling any speculation about the future itself. Any kind of thinking about, imagining or desire for experience of the future becomes diagnosed as dangerous in this indigenous governmentalization of human time. As we have seen, to claim that outside or 'anthropogenic inputs' of non-indigenous or external resources and technology remove our resilience, rather than enhance it, is thus to posit dependency and humility as a goal in itself rather than as a means of survival. The problem is that the history of global human development and of cultural interconnection makes this speculative restriction of the external potential in the world hard to accept. What if we want more? What if we decide that all we need is not immediately available to us? What if we do not feel gratitude for what we already have and think there is more out there to be had? What if we disagree with indigenous wisdom that tells us that: 'Scarcity and plenty are as much qualities of the mind and spirit as they are of the economy?' (Kimmerer, 2013: 376) ***What if even indigenous communities would refuse to 'become indigenous'? Jonathan Lear tells one such story in his well-cited book Radical Hope (2006).***

Lear tells the story of Plenty Coups, the last great chief of the Crow Nation, confronting cultural catastrophe, the end of the Crow's traditional nomadic-hunting way of life and confinement to the reservation. For Lear, the comparison with the 'end of the world' of the Crow Nation and the current coming to terms with the Anthropocene is clear and prescient (2006: 7). What would it mean to witness the end of a way of life 'from inside that way of life' and yet still to take responsibility for a responsible and ethical way of being in the world (ibid.)? Survival, in this case, meant to live a life where, in Plenty Coups' words 'nothing happened': nothing that was meaningful in terms of the Crow's 'reality', shaped through their traditional cultural practices (2006: 2-3). According to Lear, the devastation of the Crow was ontological (2006: 50), leaving them without a world in which they could have a point of view, 'having lost the concepts with which they could construct a narrative' of self (2006: 32). Left with nothing to orient around to create a new framework of meaning, Plenty Coups practiced resilience through radical hope, which enabled the Crow's survival. Radical hope, for Lear, is the speculative belief that beyond the limits of our understanding radically different futures are possible (2006: 93-4). Rather than speculatively thinking about 'the world in a grain of sand', Plenty Coups speculated about the world through the eyes of the chickadee in order to see 'great power in little things' (2006: 81) and to speculate about adaptation.

The key message of Lear's work of 'philosophical anthropology' (2006: 7) is that radical hope requires a leap of faith in the rejection of a former subjectivity (2006: 104). Plenty Coups survived through accepting 'the end of the world' without despair, understanding that new frameworks of meaning needed to be speculatively generated (2006: 152). Lear counterposes Plenty Coups' speculative pragmatism with Sitting Bull, the last great chief of the Sioux Nation, who is held to have lacked resilience in his refusal to cooperate with the US government and to adapt to changing conditions even without any assurance as to what the future might bring (ibid: 106). Sitting Bull refused the speculative pragmatism of resilience approaches

and instead favoured religious messianism in the ungrounded or 'wishful' hope that the whites would be wiped out and the previous way of life revived (2006: 135). Sitting Bull it turns out, chose not to 'become indigenous', whereas Plenty Coups opted to use speculative analytics to enable his tribe to survive and to adapt while still keeping their traditional heritage. Lear's lesson for 'ontologically vulnerable' humanity is clear: that we need to 'become indigenous'. ***Our catastrophic times call neither for rejection nor passive resignation but for affirmation and a speculative faith in the world beyond our understanding.***

We summarise Lear's story here to illustrate the dangers of Western academics and commentators imposing the benefits of speculative analytics for resilience with little regard for the real suffering or the real moral choices of indigenous peoples whose indigeneity does not fit Western preconceptions. Although often well intentioned, it is difficult for Western advocates and activists to escape accusations that they are essentialising and romanticising the life-styles and coping strategies of the marginalised communities they are offering up as role models for adaptive approaches. ***Speculative imaginaries, through the Western gaze, always become adaptive to change in ways that are accepting, open and affirmative, neither resigned nor resisting.*** To 'become indigenous' is to refuse the subject position of separation or autonomy: rather than starting from the self, starting from the new context, the trouble, or entanglement. Thus indigeneity is increasingly seen as a mode of being rather than a fixed ethnic identity. As Jeffrey Sissons states, the imbrication of indigenous peoples within a certain policy imaginary has had deleterious effects:

Over the last decade or so, as marginalized Third World peoples have joined the UN Working Group on Indigenous Populations, there has been a broadening of the definition of indigenous at the United Nations, so that it has now become widely equated with having subsistence economies and being close to 'Mother Earth'. This is eco-indigenism and... primitivizes indigenous peoples living in settler states who have adopted urban lifestyles or it calls into question their authenticity; [and] opens up the possibility for almost any people with a subsistence-based culture to claim membership in international indigenous forums. (Sissons, 2005: 16-17)

The imagining of indigeneity as a mode of being has rapidly expanded those included under the classifications of the UN to around 370 million people (larger than the combined population of the US and Canada) but also fed into the binary construction of 'indigenous' and 'modern' that we have so far problematized in this book. For many Western theorists and policymakers the climate catastrophe of the Anthropocene posits the political choice of either keeping modernist subjectivities, based upon the divide between culture and nature, or choosing to put the needs of the environment first, learning to become resilient or to 'become indigenous'. Thus the 'Gaia War' constructs a binary (Viveiros de Castro and Danowski, 2018), neither based on traditional colonial tropes of race or ethnicity nor modernist ones of class or nation, but the choice of two alternative modes of being in the world.

The enrolling of indigenous peoples into Western critical projects and their feting as 'saviours' of the world and bearers of specific forms of knowledge (Altamirano-Jiménez and Kermoal, 2016: 6) creates a gap between the Western construction of indigeneity and the struggles of real peoples. This gap regularly undermines some of the claims made by critical theorists and environmental campaigners, who insist that indigenous communities be enrolled as 'traditional custodians' in support of the latest Intergovernmental Panel on Climate Change (IPCC) reports (for example, Forest Peoples Programme, 2018). It is also apparent in the degrading imaginaries of environmentalists wherein indigenous communities are pictured as "testing grounds" and "laboratories" (Raygorodetsky, 2017: 258) for climate change. These essentialist and exploitative framings, which seek to 'support' indigenous communities in maintaining biodiversity on 'our' behalf, often lead to oppressive forms of regulation and categorisation where indigenous rights become dependent on community members pledging to maintain their ancestral beliefs and practices (Andersen, 2014; Sissons, 2005; Simpson, 2014; Tallbear, 2013). As Sissons suggests, 'indigenous authenticity is racism and primitivism in disguise' (2005: 37). These views are merely a Western revaluation of 'primitivism and tribalism in relation to destructive western rationality and individualism'. Rather than a discourse of indigeneity, Sissons suggests these views be understood as 'eco-ethnicity', where ecological threats are 'ethnicized' and ethnic subordination 'ecologized' (ibid.: 23).

Apart from being romanticising and essentialising, a lot of the claims made on behalf of these marginalised communities do not stand up to close examination. In many ways it is ironic that although the interlocutors from indigenous and subsistence communities that Western advocates draw upon, repeatedly state that they can no longer adapt in traditional ways – for example, to changes in a river's path and momentum (Yarina, 2018; Chandler, 2017: 121) - or that the climactic and seasonal signs that used to provide a guide to everyday life are now much more erratic and unreliable (Raygorodetsky, 2017: 59) - the 'voices' of the people themselves are rarely heard in the rush to instrumentalise these survival strategies as 'critical' and futuristic alternatives.

What is being drawn from these communities would appear to say much more about the desires of Western advocates and activists than about these communities themselves, many of which are adapting to change (including the impacts of climate change) in ways which have increasingly less and less relation to traditional or local knowledge-based practices (Raygorodetsky, 2017: 52; 193; 243). Even reparations or indigenous repossession cannot return speculative analytics to real indigenous peoples, where the return of lands is often synonymous with capitalist development and the growth of tribal corporations or a resource for tourist ventures, forestry and other capitalist enterprises (Sissons, 2005: 146). It seems clear that the imaginaries of speculative indigenous modes of resilience are for Western audiences rather than oriented to assisting indigenous communities themselves. ***As Arun Agrawal argues, it would appear that the crisis of Western modernity means that we are faced with a paradox of speculative thought being wrenched from any meaningful context: 'Indigenous knowledge is here to stay, even if what it represents is forever and always disappearing.'*** (2009: 158)

Conclusion

Resilience has certainly been problematized in the Anthropocene. Few contemporary advocates of resilience would forward eco-modernising claims of problem-solving, seeking to increase productivity as an end in itself. Similarly, many commentators critique the homeostatic imaginaries of Big Data and algorithmic governance, seeking to enable resilience through warding off change and modulating around equilibrium. However, there are few critiques of hope – analysed here in terms of indigenous imaginaries of resilience - and the speculative or futural analytics, claimed to be derived from indigenous peoples, appear to escape many of the problems of modernist framings of resilience. In speculatively entangling human agency with the appearances of the world, these approaches no longer assume that problems are somehow ‘external’ and that existing modes of being, producing and consuming need to be defended.

Where indigenous approaches diverge from a Big Data or algorithmic imaginary is in no longer imaging the world as a harmonious cybernetic system. Homeostasis is no longer an option in the Anthropocene. However, the fact that ways of knowing are pluralized rather than universalised does little to open up ‘alternative worlds’, but merely enforces the reification or essentialisation of what exists as the horizon of the possible, determined by forces beyond human direction and control. The ‘pluriversalisation’ of knowledge is correctly understood in pluriversal discourses as neither modernist universalism nor postmodernist relativism (Rojas, 2016: 380). ***The imaginary of hope – of speculative forms of resilience - is neither that of a liberal telos of universal progress nor that of incapacity in the face of uncertainty but precisely the pluriversal one of a process of permanent adaptation, whereby being is a process of knowing required by life itself.***

Taken to its extreme, in the cognate ontology of speculative realism, we would aspire to enable plural worlds to ‘knowledge’ us rather than we as autonomous subjects aspire to know an ‘objective’ or universal world (for example, Morton, 2013: 48). The fact that in these speculative approaches there can only be flux and flows, which actors are always and already within, does not mean that alternative worlds can be speculatively brought into being. As Druscilla Cornell and Stephen Seely note in their recent book, ***the irony of these speculative perspectives of hope, which problematise representational or instrumental knowledge is that ‘everything must ultimately remain exactly as it is’*** (2016: 12). ***The post-cybernetic promise of knowing as pluriversal being, without ontological or epistemological hierarchies reifies reality or ‘life itself’ as the normative horizon of being, making existence itself the only possible goal.***