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Inhabiting the Anthropocene back loop

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ABSTRACT

Working across earth and social sciences, this article reevaluates resilience's conceptual framework, drawing out alternative pathways for understanding and responding to the dislocations of the Anthropocene. Via a critical reading of the Anthropocene with the help of resilience's adaptive cycle heuristic, I locate the possibility of new forms of life in its phase of release and reorganisation: the back loop. More than a brief, negative phase to govern or navigate, I argue that the back loop offers the possibility for a practical orientation to the Anthropocene based on experimentation with new uses, release of old frameworks, and allowance for the unknown. Inhabiting the back loop, as I call it, articulates an ethos couched not in fear or survival but rather creative and technical audacity in unsafe operating space, as embodied already in a variegated landscape of practitioners.

KEYWORDS

Anthropocene; resilience; back loop; adaptive cycle; experimentation

> The back loop is the time of the 'Long Now,' when each of us must become aware that he or she is a participant.
>
> (C. S. Holling, 2004, p. 5)

While the term has not yet been accepted into the official geological time scale, writers, scientists and artists alike have taken up the Anthropocene in diverse registers to name a time of boundary crossing and profound dislocation (Clark & Yusoff, 2017; Hamilton, Gemenne, & Bonneuil, 2015; Klingan, Sepahvand, Rosol, & Scherer, 2015; Kolbert, 2013). Literally the 'new Epoch of Man' (Crutzen & Stoermer, 2000), the Anthropocene indicates a new regime with 'humanity's effect on the Earth cross[ing] a tipping point' (Gaffney, 2015, n.p.) and the earth's shifting into a new domain of operation. For some critical thinkers, the Anthropocene is depicted as a catastrophic time of climate change and volatility, for others an 'apocalyptic' 'end time,' either literally or in its temporality (Wakefield & Braun, in press). Others now celebrate the end of Man and the 'life of things' (Bennett, 2007) or the 'world without us' (Weisman, 2012), offering new antihumanisms appropriate to a moment in which our potential extinction is much discussed. In contrast, another perspective sees the planet as having many worlds and the 'end' of this one synonymous with the beginning of others (Danowski & Viveiros de Castro, 2016; Wakefield, 2017). Finally, the Anthropocene is strange and disturbing at other levels: a bypassing, scrambling or breaking down of modernity's unified categories of Human or Nature (Latour, 2017), leading new or transfigured forms of

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human being to emerge (Weinstein & Colebrook, 2017). While interpretations are diverse, it is clear is that in the Anthropocene the grounds, parameters and imaginaries for thought and life are being upended and shook loose from their moorings. How to think this situation? And how to respond?

In the face of the Anthropocene's displacements, resilience has emerged as the most popular methodology and discourse under which myriad technologies, designs and visions are being gathered in hopes of managing urban and global systems in their 'safe operating space.' A large literature critical of resilience qua government has recently emerged, responding to its role in furthering neoliberal security, degrading forms of subjectivity, and existing power dynamics (Chandler, 2014; Evans & Reid, 2014; Joseph, 2013; Neocleous, 2013). While not disagreeing with critical assessments, in this article I seek instead to make 'use' of resilience, to contribute to a broad shift from critique to construction or experimentation (Last, 2012). Rather than a critical stance that 'unmasks,' I argue that what is needed today are alternative ways of imagining and inhabiting the Anthropocene and conceptual frameworks to help us do so. As such, this article explores the possibilities inherent in resilience's conceptual framework and design modalities (Grove, in press; Nelson, 2014). In particular, I will claim legitimacy for the heuristic of the back loop and its experimental methodology. A critical engagement with these concepts, I argue, offers a way to see the Anthropocene as neither a crisis to avoid or manage nor a world of ruins, but rather as a time of dislocation and possibility that calls to be inhabited via creative, situated experimentation.

The article works across earth and social science and is organised as follows. First, I lay out the concept of the adaptive cycle, the ecological architecture underlying resilience thought and practice, locating the possibility of transformation in its back loop, when the elements of systems are released and reorganised. I then outline a reading of the Anthropocene as having a front loop and back loop phase, with resilience primarily geared towards managing threats manifesting in the second phase but generated in the first. Next, I argue that the back loop constitutes more than just a brief, negative phase to govern or navigate, offering instead the possibility for better understanding the dislocations of the Anthropocene. Finally, I argue that inhabiting the Anthropocene back loop requires a new practical orientation, a letting go of old frameworks, experimentation with new uses, and an allowance for the unknown. These are of course large claims, and the paper only aims to broach them, to put them on the table for discussion and debate.

The adaptive cycle and the back loop

The back loop is a relatively new and little-studied concept. Until the 1970s, ecologists viewed ecosystems through a teleological model of succession, seen as progressing from an initial 'growth' or 'exploitation' phase, represented by '*r*', to a second and final phase of 'conservation' or 'stability' represented as 'K' (Gunderson & Holling, 2002). To take the classic forest example, the first phase is dominated by fast-reproducing pioneer species that colonise and exploit a fresh base of abundant resources (Fath, Dean, & Katzmair, 2015). Over time, they are replaced by larger, more specialised organisms, which annex the system's niches and nutrients. The result is a mature forest, a stable, tightly connected 'climax' community where everything – sunlight, water, biomass – is 'in its place' (Gunderson & Holling, 2002, p. 33). The climax phase was viewed as the ideal end point, where a system's 'steady state' was made up of the organisms best adapted to its environment. For most of ecology's history,

environmental management was geared towards conserving and managing ecosystems in this stage. They thought, in other words, the front loop was all there was to life.

This model would undergo revision in the 1970s when Canadian ecologist C. S. 'Buzz' Holling (1973) made his now-well-known interventions that led to the new field of resilience theory. Systems, Holling argued, do not remain in a single steady state. Rather, they regularly experience phases of release and reorganisation, times of collapse, creative destruction and renewal. By comparing myriad case studies of diverse ecosystems, Holling and colleagues argued that it was necessary to add another 'loop', a so-called 'back loop'. For ecologists, back loops usually occur due to a sudden crisis event: forest fire, flood or pest outbreak (Holling, 2001). In the release phase – represented by 'Ω' – energies and elements previously captured in the conservation stage are set free. In a post-fire forest, organised carbon and nitrogen, decomposers and producers, feedbacks of sun and water, nutrients and biomass, previously bound up in certain configurations to feed the mature forest, are scattered and released (Gunderson, Holling, & Light, 1995). 'Now suddenly,' writes Holling (2004), '[is] the time where unexpected events happen. The accumulated resources are disassembled, broken down, left uncontrolled' (p. 3). This is the 'reorganization' phase, represented by 'α', where potential, previously bound up, is freed up for new, unexpected combinations. As illustrated by environmental political scientist and ecologist Thomas Homer-Dixon (2006), 'it's as if somebody threw the forest's remaining plants, animals, nutrients, energy flows, and genetic information into a gigantic mixing bowl and stirred' (p. 228). Space is opened for new species to colonise the area. Pioneer species sprout from stumps of burned trees. Birds nest in their charred branches. Genetic mutations prove useful. Undergrowth is cleared, making way for the floor receive sunlight. Ash settles in, returning previously locked-in nutrients to the soil. Surviving species are freed from long-standing relationships, available and open to new combinations, exploring the new zone using seeds in the soil, debris and existing vegetation – 'biotic legacies' (Holling, 2001, p. 398) – left behind by the disturbance and creating new combinations and feedbacks, testing out new predator-prey relations. The back loop, in short, is a time of great possibility, where the previous forest may be reestablished via existing seedbanks, but novel 'unexpected synergies' between invasive and native species may equally give rise to one or many other new arrangements (Holling, 2011, n.p.).

Holling summarised these ideas in a heuristic model he called the 'adaptive cycle' (see Figure 1). In the now iconic image – it has graced the cover of Holling's recent book *Panarchy* and was even represented in a sculpture – the adaptive cycle is depicted as a horizontal figure-eight, with a front loop of growth (*r*) and stability (K), and a back loop of release (Ω) and reconfiguration (α) (Gunderson & Holling, 2002). While the idea emerged in Holling's work on insect predation in forests, he and others compared a series of case studies over time – New Brunswick forests, the Columbia River Basin, British Columbia fisheries, Chesapeake Bay's watershed, Austrian alpine villages, south Florida's Everglades – and concluded this cycle could be used to describe the life of each of them (Holling, 2004). Holling (2004) even came to understand his own life through this lens, describing it as following '7–10 year cycles of unplanned intellectual growth, frustration, and renewal' (p. 4). Today the heuristic has been adopted by most resilience thinkers, who bring to it their own uses and emphases (Berkes, Colding, & Folke, 2003; Fath et al., 2015; Walker & Salt, 2012), and the heuristic expanded to multi-scalar nested adaptive cycles or 'panarchies' (Gunderson & Holling, 2002). But across these different emphases the basis concept remains: all systems

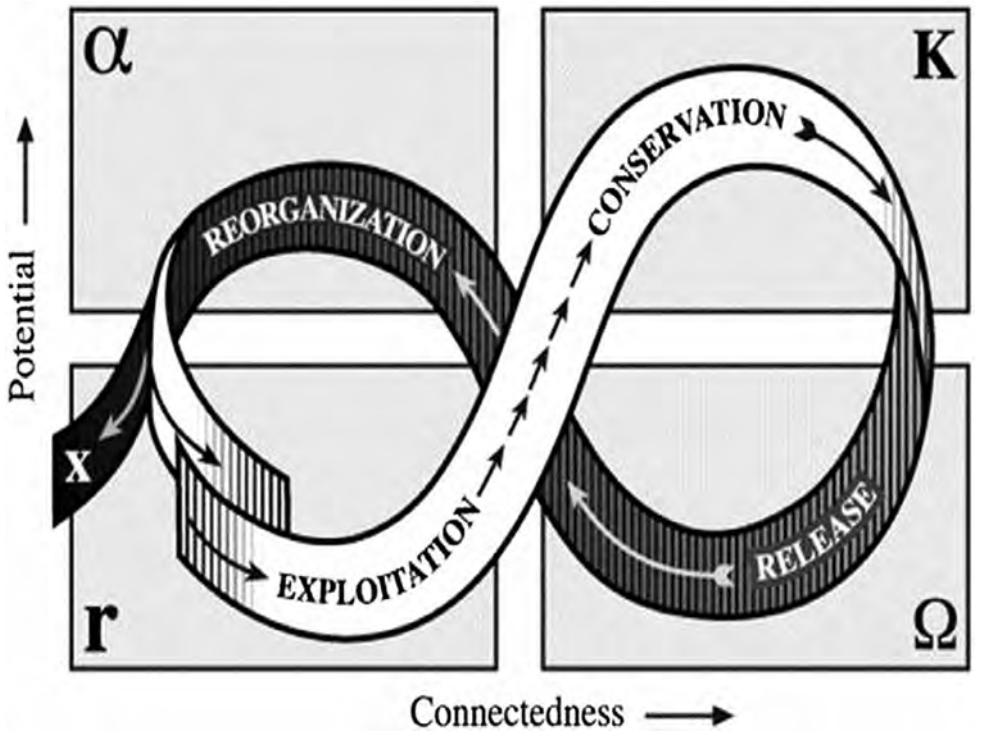

Figure 1. The adaptive cycle. Exploitation (*r*) to conservation (K) represent the 'front loop,' while release (Ω) to reorganisation (α) depict the 'back loop.'
Copyright: Gunderson & Holling, 2002.

– human beings, swamps, forests, companies – cycle through a front loop of growth and stability and a back loop of release and reorganisation (Holling, 2001).

The back loop is the least studied aspect of systems (Walker & Salt, 2012, p. 13). But I would argue it is also the most fecund. While, as I will discuss shortly, resilience proponents generally advocate for the governance of the back loop so as to prevent the loss of a system's identity – to keep systems cycling through the adaptive cycle as in an infinity loop – it is clear that, within each system's course, there is the possibility for a vast opening of fundamental reorganisation or, in a less teleological sense, a period in which new arrangements and possibilities can be worked out and countless bifurcations launched (Olsson, Galaz, & Boonstra, 2014).

In spite of their stated goals to maintain system functionality, resilience thinkers have grasped this potential. While nearly all studies that dealt with the adaptive cycle and back loop were at the regional scale, in a 2004 paper published in *Ecology and Society*, Holling asked himself whether the adaptive cycle could describe

> not just regional change, but global and international? … Are we in a 'deep back loop' that presents the same opportunities and crises as the regional back-loop studies that we have described? (2004, p. 5)

Holling's remarks were off the cuff, suggestive and non-empirical, but what if we pick up his thread and take it further, using the adaptive cycle as a lens with which to see the Anthropocene?

The Anthropocene back loop

Within geology, the Anthropocene has generated a lively debate concerning its status and chronology, with early efforts dating it to around 1800 with the rise of industrialisation and the combustion of fossil fuels in England (Crutzen, 2002). Others have proposed that it began in 1610 with the genocide of Native peoples in the Americas (Lewis & Maslin, 2015) while more recently, the 'Great Acceleration' has taken precedence, with the Anthropocene Working Group (2016) calling for the beginning of the formalisation process. Each of these Anthropocene periodisations is important in their own right, and such attempts to measure and demarcate humanity's stratigraphic impact birthed the important study of technofossils (Zalasiewicz, Williams, Waters, Barnosky, & Haff, 2014), implicating a wide variety of phenomenon, including the Columbian cataclysm, the first atomic bombs, the proliferation of plastiglomerates, and the settling of soot in some of the world's most pristine environments. Yet insofar as these proposed dates seek an origin, asking when it began, how long it may last, and outline appropriate metrics, they do not fully capture the strangeness, disruption and temporal transformation of the Anthropocene as phenomenon. As cultural theorist Daniel Hartley (2015) has noted in an insightful essay, 'the temporality of the Anthropocene as a periodising category is bizarre … shifting as it does between the present, a retroactively posited past and an imagined future' (n.p.). What if this 'bizarre' temporality –the bizarre temporality of our present – is what makes the Anthropocene so powerful both as a conceptual lens and as a historical moment?

To preserve rather than eliminate this strangeness, perhaps the Anthropocene is better thought as having a front loop and back loop phase.[1] Its front loop is marked by the rise and spread of the modern liberal subject, a politics and metaphysics carved in steel and brick, blood and rebar. While rendered differently across the globe, the front loop posited a world split in two, with nature on one side and humans on the other. Its infrastructures and artefacts, along with the architects who built them, were once hailed as triumphant evidence of Mankind's power to order and shape an external nature because of their ability not only to seemingly subjugate formidable natural forces but also to transform said forces into usable flows (Gandy, 2003; Smith, 1996).[2] With Man as ground, in the front loop the literal ground – earth – could be forgotten, at best the backdrop to the human drama. However, this 'just right' Holocene interglacial (Zalasiewicz, 2013) – ice caps at the poles, oceans at just the right pH teeming with life, fresh water rolling from aquifers and watersheds worldwide, clean air to breathe, a planet rich in diverse life inside a protective stratosphere – though often invisible, was the basis of the front loop's short-lived, but stable and linear world.

As Kevin Grove and David Chandler (2016) write, 'today the Anthropocene destabilises the very ground on which the fragile façade of modernity rests' (p. 2). Such destabilisation, I argue, marks the Anthropocene's back loop. The claims to human mastery over the world are being literally washed away by rising seas and unprecedentedly powerful storms, while terminal diagnoses of western civilisation proliferate as quickly as fantasies of the end (Danowski & Viveiros de Castro, 2016; Scranton, 2015). Not only are we in an era of the 'post-human,' as some call it (Braidotti, 2013), we are perhaps now in the era of the posthumous (Weinstein & Colebrook, 2017): a 'state of disturbance' far less easy – or human – to pin down: 'a disturbance and a vibration orienting around the chaotic intensities that swirl in the absence of a concept of life as a controllable, containable, nameable force attributed to humans …' (p. xxiii). According to many accounts, today's human is dominated by uncertainty

in the face of an inhuman earth, which, neither friend nor ground for human activities, though once forgotten now reappears as a volatile, irrepressible force (Latour, 2017; Stengers, 2015). The list of anthropogenic-induced tipping points crossed or neared grows: fisheries collapse; biodiversity loss; the melting of the ice caps and rising seas; 350 ppm and now 400 ppm CO_2; anthropogenic nitrogen inputs; ocean acidification and coral reef bleaching; deforestation … (Steffen et al., 2015). Meanwhile infrastructure is today a key 'matter of concern' not for the glorious order it represents but due to the threats it poses (cascading network failures, release of greenhouse gasses, toxic waste, target of terrorism) (Aradau, 2010). But equally and together with these processes, since 2011 we are also in an era of riots, revolutions, local experiments and social movements from left to right that, to the front loop mind, may look insane, but that are very real (Castells, 2015; Nagle, 2017).

In short one thing would seem clear: we are not in the front loop anymore. The ties that bound – the feedbacks that wove? – the Anthropocene stability domain are coming undone. If the front loop was the 'safe operating space' of the Anthropocene – here understood not only as a 'geo' but also a 'geosocial formation' built on a transcendent terra firma of thought and action, however illusory that may have been – this complex, nonlinear 'post-truth' world of fragmentation, fracture, dissolution, and transfiguration is what I propose we call the Anthropocene back loop.[3] The back loop is our present, the moment of the naming of the Anthropocene (as a failure), in which the past (front loop) has not disappeared, like points trailing behind on a line, but is erupting in unpredictable ways in the present.

Viewing the Anthropocene through the adaptive cycle lens, and in particular our threshold 'now' of scrambled grounds, discombobulated modes of knowing and being as a back loop, has a number of benefits. Chief amongst these is the ability to see the Anthropocene not as a tragic End or world of ruins, but a scrambling where possibility is present and the future more open than typically imagined. But using the back loop to view our time also requires we push resilience thinking's own boundaries, especially as pertains the deep potential for transformation at the heart of its foundational heuristic.

Resilience: managing safe operating space

Developed by Holling as a mode of managing the adaptive ecosystems described in his research, resilience has become the dominant response to what I have called the Anthropocene back loop, in the form of *delaying or governing it* (Wakefield & Braun, in press). In contrast to front loop modes of management that sought to maintain a single stability state, resilience, we might say, is a form of back loop management that seeks to create and define 'safe operating spaces' able to absorb and manage, rather than eliminate, disturbance (Chandler, 2014). At the global scale, one finds the efforts led by Stockholm Resilience Centre executive director Johan Rockström and host of earth and social scientists to identify and govern the 'planetary boundaries' of the Holocene's safe operating space (Rockström et al., 2009). In a 2010 TED talk indicative of resilience's attitude towards the back loop, Rockström compared our situation, of being close to or beyond the thresholds of the stable Holocene, to a photograph of a man standing at the edge of Victoria Falls, a massive 350-foot-high waterfall in Zambia (see Figure 2). 'You don't want to stand there!' he warned. 'In fact,' he continued, 'you're not even *allowed* to stand where this gentleman is standing, at the foaming, slippery waters at the threshold. In fact there's a *fence*, upstream of this threshold, beyond which you are in a danger zone.' In response to what they perceive as a world on the brink,

Figure 2. Photograph of Victoria Falls, Zambia used by Johan Rockström in 2010 TED presentation on planetary boundaries.
Copyright: Annie Griffiths Belt.

Rockström and an international team of scientists have proposed the identification of the Holocene's key earth processes, and management of 'a planetary boundary – a fence – within which we have a safe operating space for humanity' (Rockström, 2017; see Figure 3). For Rockström and colleagues, the ultimate goal is global institutional collaboration to manage thresholds and maintain the safe operating space that undergirds 'our way of life … and how we have organized society, technology, and economies around them' (Rockström et al., 2009, p. 2). This safe space is for Rockström the only known earth system capable of supporting the modern way of life and thus must be preserved.

Rockström's response to the back loop, though colourful, is not unusual, but rather exemplary of the broader spirit of resilience found at diverse scales, perhaps most ubiquitously in design efforts underway in coastal cities to maintain systems and prevent the crossing of thresholds. In this vein, cities like New York and Miami are now seen as 'first responder' laboratories for resiliency infrastructures and strategies for climate change, rising seas and natural disasters (City of New York, 2013). Take, for example, Bjarke Ingels Group's $540 million 'BIG U' sea wall now under construction around lower Manhattan (BIG Bjarke Ingels Group, 2014), or the recently approved $400 million 'Miami Forever' bond for sea level rise and flood prevention infrastructure across Miami (Smiley, 2017), part of Mayor Tomás Regalado's vow against already-occurring sunny day flooding: 'we cannot allow this to become the new normal' (Regalado, 2017).

Resilience designs of this nature do not deny the disruptions of the back loop. They attend directly to them, albeit in a very particular way. Though resilience recognises deep-seated problems, its key tenet and goal is to attenuate and govern disruption in order to maintain the identity of the system. It is therefore possible to read resilience in its global and urban manifestations as representing one possible orientation to the back loop: you don't want to stand here! You are not even allowed to stand here, at the foaming, slippery waters at the threshold. Indeed, most resilience literature portrays the back loop in the negative. Illustrations of the back loop conjure images of disturbed, post-catastrophe landscapes, torn apart by forest fire devastation or societal collapse. In other cases, it is the other side to the deadly tipping points that threaten human civilisation. Echoing Rockström's reaction, Walker

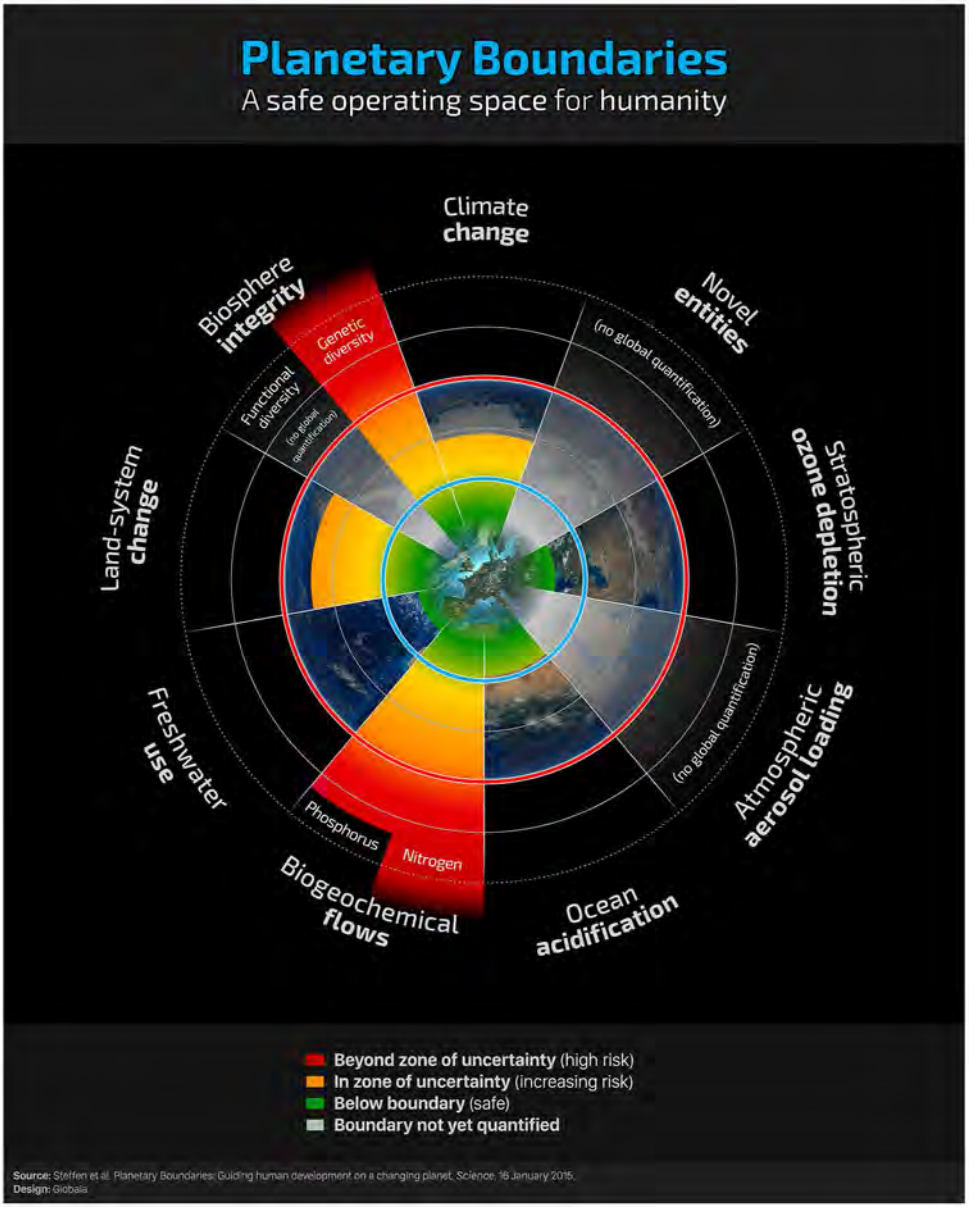

Figure 3. Planetary boundaries.
Notes: Green is the safe operating space, with the thick line representing the planetary boundary; yellow is a zone of uncertainty (increasing risk); and red is beyond zone of uncertainty (high risk). The processes that researchers have not yet quantified are in grey. Currently four of the nine planetary boundaries are thought to have been crossed (climate change, biosphere integrity, land-system change, and biogeochemical flows). Copyright Stockholm Resilience Centre.

and Salt (2012) write, 'given how unpleasant release and renewal can be, it's comforting to know that most systems spend most of their time in the fore loop, which is generally slow compared with the back loop' (p. 13). Likewise, in most accounts movement into a back loop is caused by a crisis event: wildfire, hurricane, or financial crisis, sending systems into the back loop 'freefall' (Fath et al., 2015, p. 3). Like Rockström (2017), who seeks to ward off the

Anthropocene and welcomes us to it in the same breath, Holling (2004) shifts between a coming and an already-present back loop, with the world both 'on the brink' (p. 7) and 'in' a big back loop (p. 1). In all cases, resilience practice follows with its techniques to 'navigate' or safely 'pass through' such times, the latter portrayed as something to endure, a crisis to prepare for, a disaster to stay afloat during, bounce back from, or pass through (Fath et al., 2015).

In its dedication to staying out of the back loop, resilience forwards a disabling fiction whereby human survival in the Anthropocene is tethered to the maintenance of existing economic, social and political relations. Alongside the charming polish promoting these projects – often featuring presentations with bouncing inflatable earth balloons and slick architectural renderings – at their heart is a deep nihilism: in the designs for the BIG U Manhattan seawall, one will find plans for a 'Reverse Aquarium', the project's signature building featuring a massive transparent wall facing onto the Hudson River, where residents are to watch the sea levels rise in real time from behind plated glass (BIG Bjarke Ingels Group, 2014, p. 180). In place of the front loop's hubristic human, resilience forwards a degraded, anxious subject that must endure crisis as condition for existence (Evans & Reid, 2014), a victim or hostage whose only agency is as 'stewards' to earth processes, conceived either as life support systems or living infrastructure. The world seems to change, events are allowed to happen, but all are absorbed, reorganised around existing social and political order, threaded back into the infinity loop of the adaptive cycle (Braun & Wakefield, in press). In the vision forwarded by resilience as such, there is no better or other future to come, only the endless management of a world falling apart and receding.

Reinventing and redefining the back loop

Resilience practice of these kinds shrink the possibilities of the back loop to a bad time to be 'navigated' or 'endured' (Walker & Salt, 2006, p. 87), continually – and sometimes rightfully – invoking its danger**,** subsequently offering our stewardship of existing social relations in perpetuity. But the back loop is also a time of great agency, where small events or actions are seen as producing unpredictable future trajectories (Holling, 2004, pp. 4–5), and as depicted in ecological systems, it is the phase of life in which organisms and individuals interact across previously unbridgeable divides and in doing so create new or transformed arrangements. Instead of accepting the end of human agency except that of managing crisis – and rather than imagining ourselves as victims or managers of the back loop – I argue that another possibility exists: deciding for ourselves, locally and in diverse ways, where and how to inhabit the back loop.

To 'inhabit' the back loop implies existing and being situated in it as well as understanding our epoch through it. But inhabit is also an active verb: rather than a fate or crisis happening to us, to inhabit the back loop is to dwell in and populate it, to take hold of and perhaps even take over as one does a host. Finally, to paraphrase Martin Heidegger (1971), to inhabit the back loop can mean to belong to it, to have one's own place within it, to be familiar, comfortable, and involved with it, rather than fighting against or living in fear of it. A habitual, everyday act of free creation and building: a peace within shifting terrain. Such an ethos is in great contrast to received treatments of the back loop, such as resilience practice described previously, yet is precisely what resilience ecology's own framework implies. Reprising the forest metaphor, could it be that we are also the matter and energy released, amidst other

matter and energy also in freefall? In this 'blender,' what will we make of the pieces of ourselves and the world? What will be made of us?

Adopting such an orientation is both a political choice and empirical necessity. With regard to earth processes, many scientists (Gaffney & Steffen, 2017) – including Rockström himself who in the same breath also agrees that we are already leaving the Holocene and entering the strange new world of the Anthropocene – believe we have *already* left the safe operating space of the Anthropocene. As is well documented in resilience literature, shifts across a stability domain's thresholds may also be the result of gradual changes in feedbacks, rather than a single crisis event (Folke, 2006). Faced with the unfeasibility of the modern 'technosphere' (Zalasiewicz et al., 2017) and attendant infrastructures that prop up a highly variegated and unequal modern life, humans today need to ask how else might we feed ourselves, obtain clean drinking water, protect ourselves from the elements? Where will we live and how? What other arrangements make sense? In short, being in the back loop puts the parameters of modern liberal life in question, up for grabs and on the table for rethinking and recreation. Life and future are open in many ways, but we find ourselves in an unsafe operating space. This is because, as ecologist Lance Gunderson (2009) puts it, 'we can't analyze our way out; the only way is to probe uncertainty' (n.p.).

As work on the adaptive cycle suggests, inhabiting the back loop will require us 'to recognize that we're moving into regimes of the unknown – of the *literally* unknown. Not just unexpected, not just uncertain, but fundamentally unknown' (Holling, 2008, n.p.). As many resilience theorists argue, we are unprepared to face this new world because we are still using modes of thinking and acting from the fore loop. In the back loop, outdated infrastructures and relations are as equally suspect as political ideologies or once solid philosophical grounds. What the back loop suggests to us is that the Anthropocene is now a time to explore, to let go – of foundations for thinking and acting – and open ourselves to the possibilities offered to us here and now. This is an 'unsafe' operating space because we have passed thresholds already, but also because there are no blueprints, no transcendents, no guarantees, and no assurances: the only thing to do is become creators of new values and new answers.

Fortunately, from post-disaster scenarios to drastic environmental change, humans have much experience with threshold times (Clark, 2016). As sociologist Stephen Zavestoski (2014) notes, humans have long 'tinkered' or 'muddled through'–experimented with fire, water, shelter and food – to adapt. When our ancestors migrated from savannahs to tundra, they tested out news tools for food, shelter, warmth, waste disposal, medicine, hunting according to the new environments. Such practices, as well as the back loop methodology proclaimed by Holling, resonate with the philosophical concept of 'use' found across the works of Martin Heidegger (1962), Michel Foucault (1990), and Giorgio Agamben (2016). For Heidegger, we are 'thrown' into a world of people, geographies, climates, plants and histories. This world is not of our choosing, but it is full of potential. We can become free in it not by following and repeating the order as is, but by 'projecting' ourselves within, over, and against its factical conditions. Similarly, in Foucault's (1990) discussion of the Greek conception of use (*chresis*), 'use' is determined not by moral interdiction or code, but by a number of strategic considerations of the user's specific situation – the time of year, the weather, one's social standing and age, in addition to one's training and ability. Equally, 'use' in Agamben's recent treatment is neither prescribed nor simply arbitrary: it is determined by what is possible, and what is not, as well as when, how, and with whom.[4] Today inhabitants of coastal cities such as Miami

are asking if they will live in a flooded city. What happens when the housing bubble bursts again? How will they obtain clean water or deal with sewage if salt water intrusion disrupts existing infrastructure? In the back loop there is no predetermined answer to such questions, and no single human species to answer it. What is required rather is a situated and experimental method that begins from and makes 'use' of inhabited conditions. As Isabelle Stengers (2015) notes, such experimentation is neither impartial, objective, nor universal, but always a situated 'event' (p. 70).

While many accounts of the Anthropocene celebrate the life of things or even a world without us, the present moment is just as equally one of great experimentation in human capacities and more than human futures. Faced with a society in the back loop – understanding we are leaving western civilisation's safe operating space – the powerful are experimenting: from the Rockefeller Foundation (2017) experimenting with eco, soft and smart infrastructures to Elon Musk's SpaceX (2017) 'Mars One' dreams of another space. Forecasters at Shell are reading science fiction to anticipate climate futures (Funk, 2014), while engineers and government alike seek to manage New York City's rising seas and storm surge with artificial oyster reefs (New York State, 2017). These experiments may be governmental or even malevolent, but they are also daring, often so much so that they believe they can transform the very cities we live in and the solar system around us into large-scale laboratories for their trials. One might equally consider other scales of experimentation: the creators of Pleistocene Park in Russia are trying to bring back woolly mammoths to rebuild permafrost (Andersen, 2017). Missouri group Open Source Ecology and similar groups are trying to re-create essential technologies for a new civilisation, putting them back in the hands of common people by designing them to be more easily produced and repaired (Eakin, 2013). Or nonhumans in the back loop as well: consider mangroves in Florida moving north with warming climates (Cavanaugh, 2014). From one angle these may seem like random, disconnected practices; through the lens of the back loop, however, they can be seen as 'back loop experiments' diversely attuned to shifting parameters for thought and action.

The back loop beyond survival

One of resilience government's most devastating effects is the way it reduces human and nonhuman aspirations to survival and safety (with the latter seen as guaranteed by resilience alone; for an important critique of the ontology of vulnerability, see Evans & Reid, 2014). In the face of this reduction, it is vital to recall that there are many other valences to existence. Here it is worth noting that, in reality, Victoria Falls, used by Rockström to illustrate the danger of inhabiting a threshold time, is not only a wonder viewed from afar via telephoto lens but a popular extreme recreation destination. During certain times of the year locals and international tourists alike crawl or cannonball in and let the currents carry them to the edge. There they bathe under a violent spray of rainbow-coloured rain amidst a thunderous precipice of a 350-foot drop (see e.g. @victoria_falls Instagram account). The point is not to glorify extremophilia: people have died. But they also know when and how to go, the time of year when the water is low etc. The waterfall rather raises a crucial point: from living and playing in extreme or changing environments, to improvising post-disaster, we humans are not unexperienced, nor even always averse, to thresholds or 'edge' situations, and, most importantly, our experience in thresholds is not only survival-oriented.

Consider popular phenomena emerging in the last decade within the domain of health and fitness such as CrossFit, natural movement or mindfulness. In each of these, people of diverse backgrounds seek to hone the human body and mind, in the process both discovering what are considered inherent capabilities and redefining the limits of their potential. As Crossfit founder Greg Glassman (2017) describes it, through the looting of practical and theoretical stores across fitness and sport, a new fitness movement is being created with experimental bodily regimens amidst repurposed, formerly disused industrial architectures. In a more cultural register, consider contemporary Jamaican reggae artist and Adidas Spezial spokesman Chronixx. Though hailed as the leader of Jamaica's 'roots revival' movement, Chronixx sees ours as an 'unprecendented situation in human history' requiring not a revival of the past but the generation of new cultures and aesthetics. Weaving together diverse natures and motifs –the Jamaican palm trees and discarded Guinness bottles he once used as a child for microphones, British football casual culture style – with post-colonial traditions of reggae and Rastafarianism, and 'literally … experiment[ing] with our soul' (Dreisinger, 2017), Chronixx is making what he calls 'black experimental music,' an ethically and aesthetically powerful form of life emerging from the landscapes and legacies of the Anthropocene. From one angle, such practices and projects could seem not up to the task of large-scale change. Yet viewed through the lens of the back loop, I argue, they too must be seen alongside aforementioned 'technical' designs as the experiments of a civilisation in a back loop, which do not seek the latter's management, but are part of a widespread movement to reclaim and redefine human being on earth. These experiments are not inferior to another, somehow more real process of change: they form the real substance of existence, the fabric of worlds being woven.[5]

Through the 'use' of environment, music, aesthetics, historical legacies and one's own body, amidst a world in freefall such 'back loop experiments' create their own forms for life, articulating a powerful alternative to the contemporary discourse of limits, survival and ruins. These diverse practices freely and confidently take hold of the pieces of a fragmenting civilisation and put them to new use, not to survive, not out of fear, but in self-assured and creative efforts to remake and redefine life's texture in powerful ways. In contrast to the utilitarian sound of 'use', then, it is important to recall that Foucault's research on this matter was on the Greeks' art of making use of the *pleasures* (*chresis aphrodisiōn*): sensual and sexual, carnal, desiring, loving 'acts, gestures, and contacts' (1990, p. 40). This work was related to his larger interest in the techniques and uses of the self, to make one's existence as a 'work of art', achievement of beauty and brilliance. The use of bodies between bodies may be enriched with writer Elizabeth Grosz's (2008) view of art as the way living beings respond to the 'forces of the earth' (p. 2): how we select and organise its rhythms, tones, colours, weights, textures into diverse forms, not in view of a predetermined end but to create 'sensation,' to 'intensify,' 'become expressive' and 'become more' (2008, p. 2). For all the talk of survival, inhabiting the back loop, I argue, also means discovering creative forms of pleasure in and with the earth.

Wild experimentation

I have thus far argued that the back loop presents an opportunity to reclaim and redefine human agency in the Anthropocene. But doing so entails recognising that the back loop also promises reconfigurations and agencies outside of our control. While the Anthropocene

thesis attributes so much destruction and domination to human action, as geographer Nigel Clark (2011) writes repeatedly, so much of the earth is still beyond us. This is because the earth's forces exceed our understanding, but also because, as in the earth's molten interior or much of the ocean, we've never even been there. On one hand, Clark's work suggests great possibility: for all the human domination referenced by the Anthropocene, he reminds us 'there remain a great many bio-geophysical avenues as yet unexplored or incompletely realized' (in press, n.p.). On the other hand, it suggests a fundamental unknown quality to engagements with the earth's processes. They have desires and aims completely unrelated to ours. Inhabiting the back loop thus entails not only that we allow ourselves to see our environments as open to rearranging, but also as rich in their own right and capable of rearranging us, too.

Drawing a final resonance with geographers Jamie Lorimer and Clemens Driessen's (2013) work on 'rewilding' may add additional depth to the notion of back loop practice. In contrast to most conservation efforts, which try to plan and manage nature, the pair note that rewilding, though discursively reliant on images of untouched, pre-human nature, is in practice more like a 'wild experiment' involving 'open-ended, uncertain and political negotiations between people and wildlife … in inhabited places and involve[ing] multiple forms of expertise, not all of which are human' (p. 169). As such, rewilding experiments do not reproduce or save a previously existing version of nature. Rather, they produce new and unexpected configurations, generated through the interaction of multiple forms of life. The 'labs' in which these configurations are generated are neither pristine nature nor a perfectly controlled space of a typical scientific laboratory. Rather rewilding's laboratories are the 'inhabited and thus political landscapes and ecologies of the Anthropocene' (Lorimer et al., 2015, p. 48). A lab in which nothing is certain nor 'neat and clean'. What is required is often making life live in environments that may be functionally extinct, transforming, very hot or underwater.

Fundamentally experimental in nature because operating without safe transcendent ground, inhabiting the back loop is a 'wild experiment' that occurs in the world in which the past is still present. Engaging across space and time, back loop practice generates new encounters within 'earthly muddles' (Stengers, 2015), and in so doing generates new forms of life. One does not know if experiments will succeed, or exactly what kind of 'life' – human or otherwise – will emerge, in part because of the inherited contexts and conditions that are involved. In short inhabiting the back loop will be a wild but also 'speculative' experiment (Savransky, 2016), recreating and belonging intimately to the world.

Conclusion

In this article, I have proposed that we consider thinking and acting in the Anthropocene through the adaptive cycle heuristic. In particular, the cycle's back loop carries within it alternative possibilities than those generally forwarded under the rubric of the resilience qua government, which scholars have rightfully criticised. I have also outlined a provisionary method for inhabiting the back loop, though I claim in no way to have told the whole story. In keeping with the speculative and experimental spirit I have outlined, my goal here has been simply to put this idea on the table, so that it may be discussed, debated, explored or rejected. Embracing experimentation in the back loop could lead us to unpredictable, provisional collaborations in which the outcome cannot be known or predicted in advance. Much remains to be explored, including multiscalar relations and 'panarchies' chief among

them. While I have not focused on the catastrophic side of this unsafe operating space, I do not mean to downplay the gravity of the challenges we as people face. 'This is really happening,' as one NASA scientist put it (Gillis & Chang, 2014), and it is because of this seriousness that I propose being present for it.

The back loop will be a battlefield: a war over words, ideas of life, and the future, as well as our ability to imagine or build anything else. The resilience regime takes the imaginativeness called for by a back loop and channels it towards management, dimming down the horizon of possibility and extinguishing our ability to imagine alternatives. For this reason, it is easy to see how an uncritical use of resilience's conceptual model would risk importing this ethos and closing down, rather than opening, potential for experimentation and imagination. My argument however is that, just as during a back loop soil and plants in a forest represent material for possible new configurations, so too are concepts such as the adaptive cycle available for new use, reconfiguration, and perhaps abandonment when they become un-useful. As back loop inhabitants, we have to fight for our ability to imagine, to dream and to create other worlds, but also to define their terms. Not just food, shelter, water, but how might we reimagine life, beauty, excellence, peace, security? What will the human, posthuman, or posthumous be? Inhabiting the back loop will be about figuring out what kind of life we want to make live, what kind of life is worth living. Perhaps, instead of trying to come up with 'what's next' or manage our end, we should stay here in the back loop and explore the possibilities already present.

Big picture concepts such as the Anthropocene often have a homogenising effect, as if there could be a single 'we' of humanity, as if 'we' would all be equal in formation of the Anthropocene, or the experience and participation in its back loop. However, my aim has been to show that the back loop is a heuristic which helps us see that what is happening now is the formation of innumerable worlds and 'we's, the plurality of life which only the front loop ever thought to cover over. Contemporary experiments reveal a variegated landscape of practitioners already inhabiting the back loop: malevolent back loop practices that seek to capitalise on its disruption, efforts to discipline it, but also less overdetermined ways of dwelling and creating in it. Inhabiting the back loop, as I have proposed, will neither be experienced equally by people across place and time, nor lead to a cycling back into the previous infinity loop. The back loop is not a single path for a single humanity, but innumerable forms of both.

Notes

1. To be clear, what I'm proposing is not a timeline, alternate periodisation, or golden spike. The adaptive cycle is rather a heuristic, a vision device that helps us see contemporary situations and practices in a different light and open new imaginaries.
2. Scholars have gone to great lengths to counter homogenising grand narratives of a single 'we' equally responsible for the Anthropocene's formation. For example, Bonneuil and Fressoz (2016) highlight the key role of industrial capitalism and colonialism and suggest terms such as Anglocene more appropriately capture the 'who' of the Anthropocene.
3. https://www.theguardian.com/books/2016/nov/15/post-truth-named-word-of-the-year-by-oxford-dictionaries
4. This section elaborates ideas developed in Braun and Wakefield (in press).
5. Such back loop practices, I argue, occur within and reclaim the 'implicated,' multiple rhythms of everyday time, which Sébastian Norbert (2017) argue are entrapped by resilience's homogenous, future-oriented temporality.

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