

## Social Ecological Transformation, Whether You Like It or Not!

One thing is certain in this life, and that is death. Whether you like it or not you will die. Death is one form of inevitable irreversible change all humans must face, a fundamental transformation. No less certain is substantive change due to modern human activity – extracting, processing and dissipating Earth's minerals and irreversibly transforming energy from useful to useless, low to high entropy, forms. Add to this the appropriation of resources from other species and the creation and combination of substances that would otherwise not exist, and you have ecological transformation. Humanity's role in substantive ecological change was evident on regional scales millennia ago, e.g., fire ecology of aboriginal Australians, irrigation of North Africa by the Romans. In the last century the organisation of society around capital accumulation and technological advance – stimulated by two (hot) world wars and one cold war – has empowered 'developed' nations to the position of causing ecological change regionally, internationally and globally.

On a planetary level, the potential for harm by a minority of humanity, due to the scale of intensive energy and material use, is combined with destructive military technology and material, chemical and biological interventions. In popular consciousness, the power of a few to cause planetary destruction became evident with the creation of nuclear weapons. In a world where 'competition' in all forms is made a virtue, the potential for nuclear war is an ever-present threat. Yet, the apparently harmless ongoing everyday use of materials and energy is an equally, if not more, pressing problem. Since the rise of industrial modernity and the capital accumulating economy the rate, scale and qualities of change have been transformed and accelerated.

Major, irreversible, planetary change for the worse has become increasingly likely through the unintentional by-products of industrial society. This potential was recognised with the discovery that coal burning was affecting the upper atmosphere via carbon dioxide (Callendar 1938). Eighty years later, the human enhancement of the Greenhouse Effect, via the exponential growth in carbon dioxide and other greenhouse gas emissions, ultimately leading to global warming, has become the dominant environmental concern. Yet, this is just one of many post-World War II international environmental problems – nuclear fallout, DDT, acidic deposition, ozone holes, ocean acidification, hormones, micro-plastics – that have arisen due to technological advances since the 1940s, with multiple new ones appearing every decade. The global scale of phenomena has many connected causes, including the expansion of industrialised society, commitment to ever changing technology, material greed and waste in consumer society, population growth, corporate capitalism, nationalism/colonialism/imperialism, and divorce from Nature. The last point is, of course, a core concern of *Environmental Values*, and directs us to seriously

reflect upon the content, meaning and implications of our changing relationships with nature.

Strangely enough, at a time of unprecedented species loss and ecological crises, there are those who would have us worry more about our poor relationships of care with toasters, bridges and shopping centres (see Holy-Łuczaj and Blok). Some, in postmodern spirit, would have us question the very existence of nature and try to dissolve the non-human universe into society (e.g. Latour as discussed by Pollini 2013). Human hubris extends to people claiming 'we' are now Gods and can recreate the world in our own image. Such positions come together under an elitist technocratic banner claiming 'the Anthropocene' as a new era for ecological modernisation and geoengineering (see discussion of positions by Baskin 2015). In responding to social ecological crises, a specific elite aspire not just to maintain but actually to expand the growth society and capital accumulating economy (GCEC 2014). The ability of interest groups to popularise such a position exposes an underlying problem in modernity: namely the denial of nature due to the massive psychological investment many people have made in a materialist way of life promoted under capitalism and mediated by technology (Vetlesen 2015). Countering this are those concerned that humans should stop destroying more of the non-human world than they have already managed to do, and to decelerate and stop the rate of industrialisation and its specific form of technologically driven change (e.g. degrowth: Demaria et al. 2013; Asara, Demaria, and Corbera 2015). Motives vary, ranging from crude consequential survival to preventing loss/regaining psychological relations with nature, and living more meaningful lives. Whatever the position taken, social ecological transformation involves relations of ethical commitment to others, whether made implicitly or explicitly.

In this respect, promotion of the Anthropocene as zeitgeist encapsulates a conflict that goes back to the modern origins of environmental ethics (e.g., Routley 2009 [1973]). Environmental ethics, at its core, concerns the ability of humans to think and act on the basis of connecting with the interests of others, and specifically the non-human world. It asks some foundational questions: what is the meaning of the non-human world and what moral relationship(s) do humans have with the non-human? The contention of the Anthropocene discourse is that previously understood concepts of nature and society, artefact and natural, and possibly even human and non-human, could all be up for grabs or at least questionable. Responses to the highlighted threat posed to human existence on the Earth have revived other debates, about the role of science in society, experts as dangerous top-down technocrats and the fragility of democracy. The adequacy of existing democratic institutions is brought into question when dealing with strong uncertainty, catastrophic potential outcomes and inter-generational and international harm. In trying to answer the question of how to handle the type of change expected under social ecological transformation, all these issues become related. These discourses around

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transformation and change, the controversial concept of the Anthropocene and responses to social ecological crises, are the themes running through the papers in this issue of *Environmental Values*.

At the ecosystem level change is an ongoing reality. Desjardins, Donhauser and Barker note that landscape modification, climate change and/or social developments all disturb ecosystem structure and function. In their analysis, there appears to be no option for avoiding management of ecosystems or some form of deliberate intervention by humans. The issue is what type and how irreversible? They use the term 'hybrid ecosystems' in reference to those that could still be restored to their historical form, e.g. by invasive species removal. However, their main concern is the rise of novel ecosystems that are different from and irreversible to historic ones. Novel ecosystems arise in two ways: (i) unintentional change, such as from attempts at ecological restoration that in effect fail due to human inability and result in something else; (ii) planned creation. The second seems to be taking on a variety of forms including attempts to establish specific ecological functions for human ends (from productivism to survival); to maintain old species or specific aesthetics; and to compensate for loss. This last category is evident in state and corporate promises to create new lakes with water recreation and fishing opportunities at open-cast brown coal mining sites, which have destroyed ancient forest and farmland ecosystems (not to mention entire communities), in Germany.

Reducing ecosystems to service providers facilitates regarding all change as good, because they result in novelty, summarised as supplying new ecosystem services. Desjardins, Donhauser and Barker assess the threats posed by this 'anything goes' approach. The use of arguments to justify ecosystem destruction and re-creation is pervasive in the development of economic instruments for offsetting deliberately created damages, such as emissions trading, biodiversity offsetting, and species and ecosystem banking (Spash 2015). Corporations and their financial backers, engaged internationally in resource extraction, have been particularly keen on seeing an 'anything goes' policy, justified by commensuration of loss and gain. This has been supported by arguments that the worth of ecosystems can be converted into monetary values based on individual preferences.

An alternative is to focus on ecosystems functions, but again this can hide commensuration and value judgements. Facing change that threatens human ends, if not human survival, the 'engineering' of novel ecosystems is on the agenda, with the aim of creating new functions to counter lost and damaged ones. A particular problem is where functional goals take priority over historical and compositional ones in ecosystem management. The contention is that ecosystem functions should be changed in novel ways to meet ecological crises, and traditional preservation goals should be dropped because they will prevent adaptation. Such logic is found in promotion of the bioeconomy, mainstream climate change mitigation and geoengineering. Desjardins, Donhauser

and Barker identify a mechanistic approach to natural processes in such policy proposals, which also adopt a central aim of maintaining economic growth and industrial ‘development’.

In contrast, Desjardins, Donhauser and Barker argue that a ‘geofunctional’ perspective offers the potential to protect diverse values and achieve resilience. Ecological integrity and value of place must be assessed through complex, multi-dimensional, ‘functioning indices’ rather than simple proxies. They believe novel ecosystems might then be justifiable, and fears of dramatic change might be mitigated due to the path dependency of ecosystem change (i.e., certain extended series of events, occurring in given order and timing, are necessary) limiting the possibilities for change. That complex multidimensional evaluation severely restricts commensurability is not noted – and that would mean challenging head-on those seeking to run their everyday business on the basis of bulldozing biodiversity and erasing ecosystems for economic gain.

Desjardins, Donhauser and Barker do recognise that such planned systems change requires choices as to functionality and this means value judgements. The authors argue in favour of a virtue ethics approach in facilitating access to ‘ecological goods’; where good is understood as achieving a worthwhile and meaningful life of human flourishing. Explicit discussion of operationalising the role of judgement is absent, but would seem essential to any such process. Ecosystem management would then be aimed at ‘maintaining a certain degree of historical continuity in our own lives and in our social-ecological relationships, and in finding harmonious ways to integrate our lives with the rest of nature’.

One reason why such historical continuity plays an important role, in the face of social ecological transformation, is nostalgia. Howell, Kitson and Clowney explore the role of nostalgia in environmental policy, e.g., ecosystem preservation, rewilding. Nostalgia might be a causal mechanism helping to explain why, despite the commonly referenced importance of ‘the economic’, policy processes appear subject to great variability, improvisation and apparent randomness that defies economic logic. Nostalgia is defined as the longing for a lost, idealised or wholly imagined past. Modernity – colonisation, industrialisation and urbanisation – creates change and the conditions for nostalgia because of its ‘existential homelessness’. In the face of change, positive feelings about the past function as a coping strategy against existential psychological threats (e.g., anxiety, stress, loneliness, loss). At the same time nostalgia may be an ‘affective force’ in human cognition, inspiring and motivating the pursuit of goals. As such it is associated with care for old and neglected objects, homes and habitats – care that is materialised and practised through sense of place, landscape or environment.

Reflection upon the role of nostalgia offers some interesting perspectives on social ecological transformation. Environmental degradation – from local species disappearance and loss of local habitat due to urban sprawl and in-filling

through to biodiversity loss and ecosystem degradation due to climate change – creates the desire for restoration and reversal of change to regain something of the past. This may also be forward-looking in terms of creating novel ecosystems that include values associated with a past age when humans and nature were more in harmony, as, for example, in the rewilding movement (Gammon 2018). In terms of nostalgia the relation then appears to be to an idealised, rather than historical, past. As Drenthen (2018) notes, in a recent special issue of *Environmental Values*, one aspect of rewilding is a radical non-anthropocentric stance. This demands a reinterpretation of landscape and history, as well as the relations between humans and their environment, and thus challenges identities that are historically based.

Disputes over divergent environmental and cultural values are clear in the moves to rewild landscapes (e.g., Brook 2018; Drenthen 2018; Renes 2018; Wynne-Jones, Strouts, and Holmes 2018), which is consistent with nostalgia for different things. What people are nostalgic about can come into conflict in other ways. In contrast to environmental nostalgia, there may also be nostalgia for degraded ecosystems (e.g. the overgrazed Scottish treeless highlands), industrial landscapes and gas-guzzling cars. Nostalgia then appears to be connecting to the diverse values and practices that humans incorporate into their personal identities, including those that are unsustainable (e.g., as explored by Groves et al. 2016). Howell, Kitson and Clowney argue that nostalgia is not a value in itself, but a potential motivator and agenda setter in policy processes. How nostalgia might then operate in the context of environmental policy and governance is an open question, which they propose to investigate empirically.

Nostalgia is indicative of human sensitivity over characteristics of the past that are being lost, and as a policy motivator it implies human ability to direct, if not prevent, social ecological transformation. However, what is humanly possible is a bone of contention. For example, in the Anthropocene discourse there is a basic contradiction between highlighting ultimate planetary boundaries, beyond human influence or control, and simultaneously claiming that anything is possible through human technology and ingenuity. Ultimate constraints exist because humans remain physical, chemical and biological entities, subject to all the law-like structural properties entailed by that. Science and technology pushes against those constraints in numerous ways: creation of novel ecosystems, attempts to maintain human ‘carrying capacity’ (e.g., geoengineering), and bio-genetic engineering to produce genetically modified organisms. In this process, Holy-Luczaj and Blok argue that the difference between natural objects and artefacts becomes blurred so the ontological meanings of nature and technology are challenged, and this then requires a new vocabulary to discuss ‘hybrids’ of nature and technology.

Holy-Luczaj and Blok take on the challenge of clarifying types of hybrid. Hybrid should not be seen as the replacement of nature by technology or society. As Pollini (2013) has noted, with reference to the concept of hybrid

nature, the concept of a hybrid makes no sense without there being distinct concepts (nature and society) from which the hybrid comes and of which it is constituted. Hoły-Łuczaj and Blok discuss current advances in technology and innovation leading in two directions: technologising (artificialising) nature, and naturalising technology. The artificial, of human construction for human ends, is mixed with the natural, of non-human origin and autonomous. The authors proceed to classify the range of resulting things (e.g., bio-replacements, biomimetic entities) on the basis of their characteristics. However, the moral considerability of hybrids remains unclear. The indication is that ongoing change will make distinguishing specific relational characteristics increasingly more important. For example, rewilding an ecosystem appears artificial, but if it results in establishing an autonomous ecosystem then it re-establishes something natural, i.e. distinct from human control and ends. This highlights the importance of distinguishing between influence and control.

More fundamentally, working within natural structure, subject to nature's causal mechanism and law-like conditions, is in essence why humans face limits. What the Anthropocene discourse recognises, like limits to growth before it (Meadows et al. 1972), is that the change that comes from crossing thresholds is potentially catastrophic. In addressing imminent catastrophes, the need to face up to our limitations, and avoid crossing crucial thresholds or boundaries, becomes a matter of political urgency. This has led to the concern that authoritarian control and technocracy will override democracy: the closer society comes to disaster, the argument goes, the less time there is for democratic debate and the more urgent is the need for authoritative action.

However, Machin argues, from an 'agonist' perspective, that the challenges of social ecological change facing humanity under the guise of the Anthropocene should be regarded as potentially invigorating for democracy. She contests that science has any authority to direct human affairs. In a tradition of postmodern critique, the point is made that scientific knowledge is contextual, politicised and value laden. She believes scientific truth claims should be countered by 'a plethora' of different narratives, imaginaries, cosmologies and types of knowledge. In her view of 'political plurality and pluralisation', everything is open to being questioned and reimagined. Time is seen as open to debate, as in the contrast between indigenous and capitalist-industrial conceptualisations. All 'boundaries', or conceptual distinctions, are open for dispute, and Machin regards challenges to distinguishing nature from human as a positive aspect of boundary breaking. 'Collective identifications are up for grabs in the Anthropocene. Climate refugees, indigenous people and future generations may be constructed and othered [sic], or they may be incorporated as an integral part of 'us', an 'us' that may be radically different to previous political collectives.' The challenge to Machin's open call for revision of so much – knowledge, concepts, conventions, norms and ultimately practices – is that social organisation would break down if all were 'up for grabs' simultaneously.

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There is also the issue of confronting current social and political reality. The hope of Machin for ‘irreducible tension’ and ‘ongoing disagreement’ enlivening democracy contrasts with a reality of increased securitisation, monitoring of populations and closing of borders. Irreducible tension has led to fear and the stoking of hatred and racism – division, not inclusion. From Brazil to Austria national elections have seen ascendancy of the extreme right. There has been a return of the unholy alliance of the conservatives with fascists/Nazis that occurred prior to World War II. In proposing that the social ecological crises might improve democracy the unanswered question is, how? There is no explanation as to the necessary institutions or process required for their empowerment. While Machin states that ‘agonists’ are ‘careful to assert the importance of respect between agonistic opponents’, the same is not true in political reality. Intolerance, exclusion and violent oppression are rife: from the regular assassination of environmentalists and dispossession of indigenous peoples opposing ‘development’ to the impossibility of questioning growth in mainstream politics; from land grabbing in Africa and forced removal of farming communities in India and China to the demolition of the ZAD community in France and violence against the Keystone pipeline protestors in the USA. As Machin notes, the value of consensus is heavily overplayed in Western democracies, and that means no place for valuing dissensus or refusing to compromise principles. How then to change that system?

The creation of new meanings and practices is affected by the fact that different groups have very different cognitive, linguistic and material resources with which to engage. Power is unequally distributed in society, and most social institutions in Western style democracies are not open to having their ideas or practices challenged; exactly the opposite. As Sayer (1992: 26) remarks: ‘Even in supposedly liberal, open and self-critical institutions such as universities, the definitions of what is to count as education are predominantly imposed and only open to negotiation in a marginal, piecemeal, fashion and then on unequal terms’. To challenge powerful institutions is to engage in political struggle, and the more that is challenged the greater the disruption. This may be frightening, but fear of social struggle cannot legitimate the undemocratic practices of reproduction and transformation of actual societies.

The mechanisms by which social ecological crises might improve democracy are, then, far from clear. The irony of the Anthropocene discourse is that a techno-scientific expert approach that is culpable in creating the crisis is now proposed to save humanity. This irony is noted by both Machin and Tait, but the latter believes there is a real threat to democracy – via technocratic, top-down, ‘Earth management’. Machin seems to believe crises will undermine science because scientific truth is an overrated concept open to postmodernist critique. In contrast, Tait regards valid natural science information as essential for addressing the challenges of sustainability. As Tait points out, debates surrounding the Anthropocene are reminiscent of the ‘Science Wars’ of the

1990s – where social scientists from science and technology studies used post-modern arguments to attack naïve objectivism in natural science. Indeed, his concern is to clarify the epistemic grounds for scientific knowledge claims and the distinctions between natural and social sciences. This raises some interesting issues in terms of ontology and epistemology that affect our understanding of the science–policy interface.

Tait defines his approach as appealing to scientific practice, though his criteria for a good natural science are borrowed from Kuhn's list of 'theoretical virtues'. The list covers such things as empirical adequacy, prediction based on experimentation, consistency and coherence, explanation via general causal mechanisms, and stimulating new research. He holds that the means of gaining knowledge (epistemology) produces belief in what exists (ontology). This is problematic. Placing epistemology in the position of determining ontology has been termed the epistemic fallacy: that is, reducing ontological questions about what there is to epistemic questions about what humans can know (Collier 1994: 76–85). Instead, there are good reasons for attending to the ontological difference between the social and natural sciences. For example, a part of being human is interpreting the world around us. Natural scientists mostly study objects that do not engage in such self interpretation. In contrast, social scientists study humans and must both interpret them and how they conceptualise the world (termed the double hermeneutic, see Sayer 1992). The distinction between social and natural science then focuses on the qualities of their objects of study rather than how they make knowledge claims.

In fact, Tait does not hold to prioritising the epistemic but appeals to the distinct qualities of humans that he regards as mitigating and possibly preventing generalisation, replication and prediction. Consistent with this ontological argument, Tait proposes that the epistemology of natural science would need to change in order to understand the complex of social and natural phenomena and causal processes that constitute the reality of the social ecological crisis – termed the Anthropocene. 'To extend the ontology to include social processes such as power, ideology, and agency would require a corresponding expansion of the epistemology of natural scientific research, one capable of treating human beings not merely as objects in an ecology, but as agentic subjects.'

Tait goes on to argue that social sciences cannot meet the same epistemic criteria as the natural sciences, and they therefore have a different role to play. This is based on the idea that naturalisation of the social sciences would require them to adopt a narrow approach inappropriate to their object of study. For example, neoclassical economics fails because it has adopted an epistemology (deductive mathematical formalism) that prevents it from doing basic social science research, i.e. addressing the human, political and social aspects of its object of study. The blanket application of an epistemology that is inappropriate for the object of study has created a dogmatic disciplinary field of practice (Lawson 1997). However, the impossibility of naturalisation argued



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by Tait is based on a narrow approach to epistemic criteria that neglects natural science practice which goes beyond the Kuhnian epistemic qualities founded on empiricism and experimental methodology. If, instead of physics and laboratory experiments, natural sciences such as evolutionary biology, ecology, geology, palaeontology and psychology are considered, then the result is to recognise pluralist epistemology in natural science practice. Indeed, Tait's discussion of Darwinian evolutionary theory exemplifies elements of what would otherwise have to be regarded as social science epistemology. Darwin's theory was not based on the experimental laboratory, but it is no less scientific for that. Once the experimental empiricist epistemology is dropped as defining the requirements for good science, there seems less basis for drawing epistemic boundaries between the natural and social sciences. The issue is not that social scientists are unable to practice natural science epistemology, but rather that natural scientist use approaches found in the social sciences, and are not limited to classically defined experimental empiricism.

In relation to the validity of the Anthropocene as a conceptualisation of the current human predicament, the problem is its failure to address the complex reality it claims to explain. Scientists of the Anthropocene may be just as deluded as neoclassical economists, and equally ideologically committed, because their claims are not founded in social ecological economic reality. While their natural science may be strong, the lack of social science means their claims of causation are totally lacking and inadequate. As Tait notes, the social sciences cannot be squeezed into an inappropriate epistemology for these scientists to add into their models. Engaging in the epistemic fallacy, attempting to impose an epistemology, means they cannot understand social science nor social phenomena.

Ecological crises involve causal mechanisms that are related to the structures of both the social and the natural world. What is wrong with describing a set of social ecological economic crises as a geological event is that this almost totally misinterprets and misrepresents the phenomena involved and their causal mechanisms, and as a result leads to the wrong conclusions about social ecological transformation. At the heart of our problems is an economic system consuming resources and energy and creating waste on an ever-accelerating scale, while funnelling material gains to a minority of the planet's population and ignoring the non-human completely. More 'Green' growth, more hybrids, more technologically driven change do not even start to address the systemic problem. Technology has become a force in itself that forecloses any notion of ends that would challenge what technology itself favours. As a hegemonic discourse it has real impacts on the world, motivating practices that eradicate human-independent entities from the surface of the Earth (Vetlesen 2015: 161–162).

In the final analysis, humans are organisms existing in nature, who are themselves of nature. Human society can no more avoid structural limits of

biophysical reality than individual humans can avoid death, but together we humans can restructure our societies and economies and live our lives differently. The current system will change: its material and energy throughput and its biophysical consequences are widely accepted to be unsustainable over a relatively short time horizon. Will it change for the better? Increasing social divisions, inequity and exploitation create the conditions for civil rebellion and interstate war. Will humanity respond by addressing the structural systemic causes or trying continually to adjust to and control for the consequences? Social ecological transformation is an ongoing process, but in which direction it goes is not predestined. The question is not whether change will come, but what form it will take.

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