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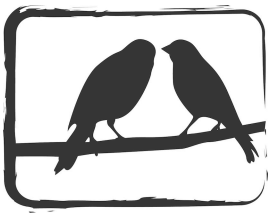

The Anthropocene and the Environmental Humanities: Extending the Conversation

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ABSTRACT "The Anthropocene" is now a buzzword in international geoscience circles and commanding the attention of various social scientists and humanists. Once a trickle, I review what is now a growing stream of publications authored by humanists about the Holocene's proclaimed end. I argue that these publications evidence environmental humanists as playing two roles with respect to the geoscientific claims they are reacting to: the roles of "inventor-discloser" or "deconstructor-critic." Despite their importance and their differences, as currently performed these roles hold environmental humanists at a distance from those geoscientists currently trying to popularise the Anthropocene proposition and a set of related grand ideas (like "planetary boundaries"). This is unfortunate because geoscience—like other branches of science—tends to enjoy a higher profile in key decision-making arenas than do humanities subjects. The same can be said of particular social science fields, such as environmental economics. By surveying the wider, febrile geoscience landscape in which the Anthropocene proposition is situated, I reveal opportunities for "engaged-analysis." This involves simultaneously working on and with geoscientists, so too their kindred spirits in the social sciences. "The Anthropocene" concept may soon be among the key signifiers that frame the thinking of societal decision-makers. Environmental humanists can, if so minded, shape its meaning and implications directly. But this will involve more practitioners interested in global environmental change operating outside the "usual" arenas, such as established disciplinary conferences and journals. Engaged analysis offers a way to play the inventor-discloser and deconstructor-critic roles in places where knowledge aspires to inform environmental policy and practice. Though challenging and risky, the potential rewards are considerable.

Introduction

Just two years old, *Environmental Humanities* was launched in order "to support and further a wide range of conversations on environmental issues in this time of growing awareness of the … challenges facing all life on Earth."[1] As the editors explain in issue one, the journal aspires to foster new dialogues not only within the humanities but also beyond them.[2] The

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[1] Deborah Bird Rose *et al*., "Thinking Through the Environment, Unsettling the Humanities," *Environmental Humanities* 1 (2012): 1-5.

[2] See also the online journal *Resilience* which, despite its title, has a similar mission statement to *Environmental Humanities*: (http://www.resiliencejournal.org). *Environmental Values,* like both of these

second of these is especially important. The scale, scope and magnitude of human impacts on the biophysical world are such that we need a wide and deep public debate about our planetary future. The term "climate change," now part of the global *lingua franca*, only gestures towards the enormity of these impacts and the profound response they surely demand. Whether technological, organisational or behavioural, any present or future response that brackets the signature concerns of the environmental humanities will necessarily be inadequate.[3] After all, "… fundamental questions of meaning, value, responsibility and purpose" arise with particular urgency at a time when humans are unwittingly altering not one but *several* key components of the global environment.[4]

In this context, I want to consider how environmental humanists of various stripes are currently responding to a "hot concept" with the potential to engender the sorts of wider conversations journals like this one aspire to facilitate. I will explain why below, but first a word about the concept. "The Anthropocene," once a little-known neologism coined by two senior geoscientists (Paul Crutzen and Eugene Stoermer[5]), has become something of a buzzword as it enters its mid-teens. It describes an Earth's surface so transformed by human activities that the biophysical conditions of the Holocene epoch (roughly the last 11,000 years) have been compromised. In Mark Levene's apt assessment, "[t]he term … has yet to become standard currency, though there has been sufficient acclamation from a wide range of scientific

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multi-disciplinary journals, precedes them by some years and is one of several that try to marry environmental philosophy to issues of environmental policy, activism and public concern.

[3] In this essay, as will become clear, I operate with a fairly expansive definition of what constitutes the "environmental humanities." This definition is very fuzzy at the edges, but includes scholarship and practice that—regardless of the discipline—deals with some of the following aspects of the human relationship with the non-human world: forms of perception, cultural framings, modes and measures of value, imaginative and creative works, and emotional and affective responses. As Ursula Heise notes, "The environmental humanities are currently emerging from the convergence of research areas that have followed distinct disciplinary trajectories to date: ecocriticism, environmental philosophy, environmental history, biological and cultural anthropology, cultural geography, political ecology, communication studies and gender studies, among others" (http://stateofthediscipline.acla.org/entry/comparative-literature-and-environmental-humanities, accessed 20 July 2014). It is complicated academic terrain but there's a definite 'structure of feeling' that distinguishes it from other sorts of environmental inquiry. The environmental humanities often have an overt normative dimension, being in some way critical of present-day human engagements with what we call 'nature.' Moreover, as Rich Hutchings ("Understanding of, and Vision for, the Environmental Humanities," *Environmental Humanities* 4 (2014): 213-20) argues, there is a concern to translate (re)thinking into *action*. Though the term has caught on only quite recently (especially in Australian universities), the environmental humanities can be traced back decades—strands of it first enjoying a certain public prominence in the early 1970s when several academic philosophers (among others) help to change public debates about how we treat animals and other living entities. To get a sense of the diversity of the environmental humanities today, consult the contributor list of *Keywords for Environmental Studies,* edited by (Joy Adamson *et al*., (New York: NY University Press, 2015)—minus the few scientists writing therein.

[4] Rose *et al*., "Thinking through," 1.

[5] Paul Crutzen and Eugene Stoermer, "The Anthropocene," *Global Change Newsletter* 41 (2000): 17-18.

and non-scientific disciplines to suggest its durability."[6] We might add that it has enjoyed a certain degree of media attention too, and was also used by environmental researchers to frame the high-profile "Planet Under Pressure" conference held prior to the 2012 UN Conference on Sustainable Development (Rio+20). The concept's wide visibility within and beyond the academic word from whence it originates is not hard to explain. Its literal meaning—the "age of humans"—is either shocking or hugely flattering, depending on one's perspective. Furthermore, the fact that it was invented and has been elaborated by geoscientists has given it a certain credibility—this despite its "incredible" suggestion that modern humans have altered Earth's natural history, such is their collective power over the non-human world.

Clearly, the Anthropocene concept possesses an uncommon grandeur or capaciousness. Its manifold implications invite weighty discussions between people who might otherwise not communicate often or at all—for instance, CEOs and deep ecologists, nature poets and environmental lawyers, ethicists and celebrity environmentalists. As Levene intimates, it may in time graduate from being a buzzword to something like a keyword; that is, one of those terms that animates quotidian discourse in the academic, political, commercial and public domains alike.[7] By examining how certain environmental humanists have so far sought to shape "Anthropocene discourse," I hope to give readers food for thought about what their field might become. If, as this journal's editors suggest, one aim is to "draw … the humanities and the natural and social sciences into dialogue in new and exciting ways,"[8] then we may have something to learn for the future. For, as I will show, the environmental humanists whose writings I consider here perform roles in places that seem unlikely to make much of a dent in wider discussions of the Anthropocene in the near future.[9]

These roles are venerable and worthy ones in humanistic scholarship—I will call them the "inventor-discloser" and "deconstructor-critic" roles. But they are symptomatic of something many environmental humanists wish to rectify. I'm talking about the oft-lamented "gap" between what humanistic scholars do and what is thought, said and enacted in the "real world" of politics, business, and civil society. The humanities have long had an "image problem" insofar as many people outside (even within) universities deem them "useless" or "impractical." Though arguably unwarranted (even more so today than in decades past), the problem persists and has been recently evidenced by humanists feeling compelled to make the case for their subjects relative to STEM disciplines in a time of fiscal austerity. The scientific proposition that the Holocene has ended arguably provides them with a special opportunity to advance their case because it makes asking the "big questions" an obvious necessity not some kind of "cerebral pastime" (as per one enduring caricature of humanistic inquiry). It also promises to dispel some scientist's partial (or mis-) perceptions of what the humanities can offer.[10] To-date, I will suggest, certain environmental humanists have not made enough of this

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[6] Mark Levene, "Climate Blues," *Environmental Humanities* 2 (2013): 151.

[7] On keywords see Raymond Williams' well-known book of the same name (London: Fontana, 1976).

[8] Rose *et al*., "Thinking through," 4.

[9] As will become clear, I refrain from offering a view on the Anthropocene concept here. Instead, I use its currency as an occasion to reflect on the sort of cross-disciplinary exchanges its considerable semantic reach invites.

[10] For an egregious example of such misperception see Marcel Kuntz' essay "The Postmodern Assault on Science," *EMBO Reports* 13, no. 10 (2012): 885-9.

opportunity. I will argue that if they enrich their understanding of the complicated "science story" of which the Anthropocene concept is a striking product, they may find other paths to follow in seeking to make their arguments count in the wider academic (and non-academic) world. The broader point will be that, if serious about their own claims and the distinctive value of their voices, environmental humanists may need to partially unlearn some professional habits and occupy new roles unfamiliar to many (though by no means all) practitioners.

The essay is structured as follows. I begin with a summary of how the Anthropocene concept has been defined and received in the geoscience circles from whence it originates.[11] Based on a survey of how an assortment of environmental humanists have reacted to the concept, I then characterise the roles these authors imagine they can play in "the conversation of humankind" the concept incites. Pointing to a key absence in these imaginaries, the second half of the essay takes a second look at the Anthropocene concept and the opportunity it and related ideas offer environmental humanists to occupy the space of simultaneous analysis and action. It does so by highlighting recent calls in the geoscience community for "transformative thinking," and by itemising opportunities for what I call "engaged analysis" on and with geoscience. If environmental humanists pay close attention to these calls, and enter new and existing fora where geoscientists are seeking to engage with others, their contributions could matter more quickly and directly in the wider world. This is not at all to say that the ultimate criteria of academic success lies in humanists shaping global change science and thereby global environmental policy.[12] Less contentiously, I am suggesting that fulsomely engaging geoscientists—like those advancing the Anthropocene concept—stands to significantly enrich the policy and public discourse about an Earth whose long-term future we are now making day-by-day.

The claims I make about "Anthropocene discourse" arise from a close reading of the published writings of environmental humanists and an array of geoscientists. To that extent, this essay's normative arguments are anchored in evidence about how these humanists today position themselves in a wider landscape of thought (and policy).[13] This is why the diagnosis and prescriptions offered here should be read as constituting an informed and constructive intervention by someone who considers themselves part of the environmental humanities

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[11] I use the term "geoscience" to refer to the discipline of geology (earth science) and the several fields covering environmental science (e.g. geoarchaeology, geomorphology, marine biology, biogeography, and climatology). Several environmental scientists prefer the label "Earth System Science" to describe their endeavours. The broader term "biophysical science" refers to the whole family of natural sciences, be they field-, laboratory- and computation-based.

[12] Nor will I be implying that environmental humanists engaging with geoscientists will *necessarily* have positive effects on various non-academic constituencies tasked with governing human responses to Earth surface change. There are many impediments faced even by the most esteemed geoscientists, never mind humanists, in getting the ear of key societal decision-makers.

[13] Of course, I realise that published contributions are only one source of evidence for what environmental humanists are currently up to. Today, others include the websites of these humanists, their blogs, their podcasts (in some cases), the websites of certain journals (which contain content beyond that found in the journals proper), and various workshops and symposia. However, the published contributions focused on here are nonetheless a reasonably robust evidential source.

community. I hope it fosters some useful reflection and possibly a little debate about how the environmental humanities can change the world.

The Early Career of a Grand Scientific Concept

For a period of years after it was coined, "the Anthropocene" neologism attracted little attention from the wider community of geoscientists to which atmospheric chemist Paul Crutzen and freshwater biologist Eugene Stoermer belonged. However, since the turn of the millennium the term has been used and debated by a number of environmental scientists—who study contemporary, or historically recent, biophysical processes and forms—and a number of earth scientists (aka geologists) —who study very long-term biophysical changes evident in the mineral and fossil record. Why the upswing in interest? There are, it seems to me, three key reasons.

First, Crutzen—Stoermer choosing not to write about the Anthropocene beyond the short article he co-authored in 2000—continued to publish pieces on "the age of humans." His high profile as a Nobel Prize winner and his extensive scientific networks, not least those linked with his participation in the International Geosphere-Biosphere Program (IGBP), ensured that the Anthropocene concept enjoyed a certain visibility beyond the moment of its invention. Second, though the Anthropocene refers to ongoing global biophysical changes, it caught the attention of geologists from 2007. This is remarkable because earth science is typically concerned with the deep past, not the present (let alone the future). In 2007 Leicester University's Jan Zalasiewicz was chair of the Stratigraphy Commission of The Geological Society (located in London). He noticed Crutzen and others' use of the Anthropocene idea.[14] He proposed to the other 20 Commission members that this idea should and could be tested using formal geological criteria for the identification of an epoch. The result was a co-authored article that appeared in *GSA Today*, the house periodical of the Geological Society of America. Entitled "Are We Now Living in the Anthropocene?" it detailed the measures necessary to establish if and when the Holocene had ended. To quote from it at some length,

> Earth has endured changes sufficient to leave a global stratigraphic signature distinct from that of the Holocene or previous Pleistocene inter-glacial phases, encompassing novel biotic, sedimentary, and geochemical change. These changes, though likely only in their initial phases, are sufficiently distinct and robustly established for suggestions of a Holocene-Anthropocene boundary in the recent historical past to be geologically reasonable.[15]

As a result of this paper and subsequent discussions among the academic networks of Commission members, the International Commission on Stratigraphy (ICS)—which is ultimately responsible for identifying geological epochs—established an Anthropocene Working Group and made Zalasiewicz its chairman. At the same time, Zalasiewicz and his Leicester colleague Mark Williams joined with Crutzen and Steffen to present the question of formally establishing the Anthropocene's epochal status to non-geologists (Zalasiewicz *et al.,* 2010). A set of 2011

[14]For instance, Will Steffen *et al*., "The Anthropocene: From Global Change to Planetary Stewardship," *Ambio* 40, no. 4 (2011a): 739-61.

[15] Jan Zalasiewicz, *et al*., "Are We Now Living in the Anthropocene?" *GSA Today* 18, no. 2 (2008): 4-8.

papers in the *Philosophical Transactions of the Royal Society A* were intended to do the same.[16] As a consequence of these interventions, and various conference presentations by their authors, the broader environmental science community has been drawn into a geological discussion of epochal markers normally confined to earth science/geology and normally focused on the distant past. As a result, a number of possible indicators that might, in thousands of years, constitute clear evidence of the Holocene's end, are being discussed in the geoscience literature.[17] Relatedly, there are now keen debates over when the Anthropocene can be said to have begun—was it 60 years ago, 200 or a millennium?[18] Meanwhile, the ICS—drawing on these publications—continues its work.

Third, the epochal meaning of the Anthropocene is consistent with a number of "meta-concepts" that many geoscientists have been taking increasingly seriously in recent years. In other words, it is not considered scientifically far-fetched in the way—to take a notable example—that Lovelock and Margulis' "Gaia hypothesis" arguably was for a long time after it was first ventured.[19] These days, notions like "tipping points"[20] and "planetary boundaries"[21] mean that a grand idea like the Anthropocene is considered scientifically plausible rather than an outlier.

None of this is to suggest that the concept has escaped fundamental criticism from scientists. For instance, American geologists Whitney Autin and John Holbrook "acknowledge a distinct allure for the term Anthropocene and recognise merit in the concept," but consider it best used "as a focal point in the culture wars over the recognition and interpretation of

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[16] Erle Ellis, "Anthropogenic Transformation of the Terrestrial Biosphere," *Philosophical Transactions of the Royal Society* A 369 (2011): 1010-35; Will Steffen *et al*., "The Anthropocene: Conceptual and Historical Perspectives," *Philosophical Transactions of the Royal Society* A 369 (2011b): 842-67; Jan Zalasiewicz *et al*., "Stratigraphy of the Anthropocene," *Philosophical Transactions of the Royal Society* A 369 (2011): 1036-55.

[17] For instance, see Anthony Brown *et al*., "The Anthropocene: Is There a Geomorphological Case?" *Earth Surface Processes and Landforms* 38, no. 3 (2012): 431-4; Stephen Gale & Peter Hoare, "The Stratigraphic Status of the Anthropocene," *The Holocene* 22, no. 12 (2012): 1491-4; John Lewin and Mark Macklin, "Marking Time in Geomorphology: Should We Try to Formalize an Anthropocene Definition?" *Earth Surface Processes and Landforms* 39, no. 1 (2014): 133-37; Valenti Rull, "A Futurist Perspective on the Anthropocene," *The Holocene* 23, no. 8 (2013): 1198-1201; Jan Zalasiewicz *et al*., "The Mineral Signature of the Anthropocene in its Deep Time Context," in *A Stratigraphical Basis for the Anthropocene,* ed. C. N. Waters *et al*. (Geological Society, London, 2013) np.; Jan Zalasiewicz *et al*., "The Techno-Fossil Record of Humans," *The Anthropocene Review* 1, 1 (2014).

[18] See Bill Ruddiman for a summary: "The Anthropocene," *Annual Review of Earth & Planetary Science* (2013).

[19] James Lovelock and Lynn Margulis, "Atmospheric Homeostasis by and for the Biosphere: The Gaia Hypothesis," *Tellus*, series A 26 (1974): 1–10.

[20] Tim Lenton *et al*., "Tipping Elements in the Earth's Climate System," *PNAS* 105, no. 6 (2008): 1786-1793.

[21] Johan Rockström *et al*., "A Safe Operating Space for Humanity," *Nature* 461, 24 September (2009a): 472-5.

environmental processes."[22] However, so far objections like these have not been numerous or terse enough to diminish geoscientific interest in the Anthropocene concept.[23]

The Reception of an Idea: the Anthropocene and the Environmental Humanists

Around the time the Anthropocene became a buzzword in geoscience, it began to catch the attention of several social scientists and humanities scholars. I focus here on the latter.[24] Dipesh Chakrabary's now well-known essay in *Critical Inquiry* and Eileen Crist's rather less widely cited *Telos* paper (entitled "Beyond the Climate Crisis") marked the beginning of a growing humanities engagement with the Anthropocene concept.[25] Though both articles began with a focus on atmospheric change, they each ended with a discussion of the (then very novel) Anthropocene concept. A number of subsequent essays and books by other authors have engaged more fulsomely with the idea that the Holocene might be ending. I will survey these below, but first we can ask: what explains this growing engagement? I can only speculate, but would point to the following reasons—all of which seem to me to be plausible ones.

First, the Anthropocene concept apparently had (and increasingly has) the imprimatur not only of one notable scientist (Crutzen) but a whole group of respected scientists (including American-Australian Will Steffen, a long-time believer in anthropogenic climate change and key player in the IGBP). Second, the fact that the idea was (and continues to be) reported in leading media outlets post-2010—such as *The Economist, Time* and *The New York Times*—arguably suggested its strong potential to speak to the "human" concerns that are the humanities' stock-in-trade.[26] Clearly, this was more than a "pure" science concept—unlike, say, "black holes" or "quarks;" just as clearly, it significantly amplified the socio-economic, cultural and political implications of the climate change idea. Third, many environmental humanists were already exploring some of the big issues the Anthropocene concept speaks to —whether with reference to climate change or other things (e.g. "wilderness," "invasive species," "post-naturalism" or "post-humanism"). The concept's growing visibility outside the humanities has

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[22] W. Autin and J. Holbrook, "Is the Anthropocene an Issue of Stratigraphy or Pop Culture?" *GSA Today* 22, no. 7 (2012): 60-61.

[23] For a fuller account of the invention and development of the "Anthropocene proposition" see Noel Castree, "Geography and the Anthropocene 1: The Backstory," *Geography Compass* 8, no. 7 (2014): 436-39.

[24] Further to my comments in footnote 3, distinguishing between "social science" and "the humanities" is not easy and I've had to use my judgement. For example, consider the kind of approach to understanding people and how they might respond to the Anthropocene presented in the work of Frank Biermann and co-authors (Biermann *et al*., "Navigating the Anthropocene," *Science* 335, March (2012): 13067). I regard this as an example of "social science." I do so because, to my mind at least, it does not broach those "… fundamental questions of meaning, value, responsibility and purpose" that, to repeat my earlier citation, arise with some urgency "in a time of rapid, and escalating, change" (Rose *et al*., "Thinking through," 1). Instead, it rather presumes to know "the problem" and focuses on institutional "solutions" at the global scale.

[25] Dipesh Chakrabarty, "The Climate of History," *Critical Inquiry* 35 (2009): 197-222; Eileen Crist "Beyond the Climate Crisis," *Telos* 141, Winter (2007): 29-55.

[26] I will not itemise the various media outlets that have discussed the Anthropocene concept in recent years, nor list the journalists and science writers who have discussed the idea in detail. Suffice to say there has been a progressive upswing of interest.

thus afforded some scholars the chance to pursue their existing inquiries in a new, encompassing and ostensibly sympathetic frame hailing from the geosciences. Together, these reasons may account for the sharp rise in humanists' interest in the Anthropocene since 2007 and why it is likely to persist for some years to come.

Humanists' reactions to "the Anthropocene." Let me offer a brief chronology of this recent interest, before saying more about the particular forms it has taken. The Chakrabarty and Crist essays referred to above offered very different takes on what "the Anthropocene" could mean for humanists. Chakrabarty "assume[d] the science to be right in its broad outlines"[27] and proceeded to argue that history—his own field of professional endeavour—would experience irrevocable change if the "environmental crisis" were to be fully acknowledged by practitioners. For instance, one of his "four theses" was that the venerable distinction between "natural" and "human" history collapses. For him it is increasingly implausible to bracket-out biophysical phenomena in the stories historians tell about humankind. What, then, should history's *modus operandi* now be? By contrast, Crist—though sharing Chakrabarty's belief that planetary life is under threat—suggested her readers should be "against the Anthropocene." In her view, "The linguistic ushering in of the Anthropocene conceptually hardens modern humanity's perceived entitlements, thereby reinforcing how humans act within the biosphere … [I]t should be unmasked for what it is: enshrining humanity's domination over the planet or, at best, capitulating to fatalism." What we need, Crist suggested, are concepts and narratives that engender "deep questioning" of the status quo (scientific, economic etc.) and the "discussion of revolutionary action."[28]

Since these inaugural contributions, a number of environmental humanists have used the Anthropocene concept as a provocation to think about humanity's present condition and future prospects. In 2009, Australian Kate Rigby cited the Anthropocene as a framing concept alongside the older notion of "ecocide." For her, both terms designate actualities that require a critical and felt response, part of which should be "writing … in the mode of prophetic witness." Though recognising the possibility that "all our fine-sounding words might amount to little more than 'idle chatter,'" she nonetheless urged other literary scholars to "raise our voices … to that of biting and stinging eco-prophetic witnesses."[29] Geographers Julie Graham, Kathy Gibson and Gerda Roelvink independently echoed Rigby's call to action.[30] Citing their long-standing scholar-activist work with communities who operate outside the societal mainstream, these authors use the Anthropocene concept to frame a call for concerned academics to be the change they would like to see. They argue that alternatives to the unthinking and uncaring practices of capitalist modernity already exist aplenty and are there to

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[27] Chakrabarty, "The Climate," 200.

[28] The three quotations come from Crist, "Beyond," pages 51, 53 & 55 respectively.

[29] Kate Rigby, "Writing in the Anthropocene," *Australian Humanities Review* 42, November (2009); quotations from pages 173, 174 and 184.

[30] Julie Graham, Kathy Gibson and Gerda Roelvink, "An Economic Ethics for the Anthropocene," *Antipode* 41, S1 (2009): 320-46.

be cultivated and shared with others looking for options beyond both techno-managerialism and ecocidal fatalism.[31]

Writing in the same journal as Rigby (the Ecological Humanities section of the *Australian Humanities Review*, the predecessor of this journal), Ben Dibley has more recently explored the implications of the Anthropocene for thought and politics today.[32] Among his "seven theses" (echoes here of Chakrabarty) is the suggestion that our era necessitates—or will be used by elites to justify—certain restrictions on those practices attending one of modernity's organising ideas, that of individual and group freedom. His other theses speak to equally far-reaching and destabilising implications of the Holocene's proclaimed end. Overall, he balances Gibson-Graham's "can do" optimism against a sober appreciation that the future, for non-humans and people, might be a grim one. Writing in a philosophical register, Paul Alberts also highlights the ambivalent implications of the Holocene's proclaimed end.[33] Juxtaposing Hans Jonas's writings about an ethics of responsibility and Michel Foucault's later writings on biopolitics, Alberts enquires into whether a post-anthropocentric ethic will arise by choice or through the force of future biophysical events.

The same year as these two essays were published, *The Oxford Literary Review* (*OLR*) put out a special issue on the Anthropocene and Derridean deconstruction which gathered together humanistic scholars from several intellectual fields. In it the authors explore a range of themes and demands arising from the announcement of a new geological epoch. For instance, Louise Squire examines the idea of human extinction via an analysis of Cormac McCarthy's 2006 novel *The Road*,[34] while geographer Nigel Clark considers the Anthropocene a timely reminder of the "inhuman nature" (i.e. systems and events beyond our control) that living species have always had to reckon with[35]—a nature modern Westerners have largely screened-out through geological good fortune and technology (the other *OLR* essays are by Cohen, Colebrook, Morton, Szerszynski, Solnick and Trexler—all 2012). By contrast, Jamie Lorimer focuses on these living species rather than the inhuman nature that is the sometimes threatening theatre where the drama of existence is played-out.[36] According to him the worldwide ontological mixing of humans with non-humans is creating "emergent geographies" that are spatially and temporally varied, and often surprising. The implication is that we can no longer talk about a singular, asocial "nature" to justify various management/conservation/remediation/preservation/restoration measures (be they large or small). He commends an "experimental ethos" that is open-minded and reflective, challenging Westerners to make considered, revisable decisions about how we and non-humans might live together in a thoroughly syncretic world whose vitality we have a big role in determining.[37]

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[31] See also Gibson-Graham, "A Feminist Project of Belonging for the Anthropocene," *Gender, Place & Culture* 18, no. 1 (2011): 1-21.

[32] Ben Dibley, "'The Shape of Things to Come': Seven Theses on the Anthropocene and Attachment,'" *Australian Humanities Review*, no. 52 (2012): 164-83.

[33] Paul Alberts, "Responsibility Towards Life in the Early Anthropocene," *Angelaki* 16, no. 4 (2012): 5-17.

[34] Louise Squire, "Death and the Anthropocene," *The Oxford Literary Review* 34, no. 2 (2012): 211-28.

[35] Nigel Clark, "Rock, Life, Fire," *The Oxford Literary Review* 34, no. 2 (2012): 259-77.

[36] Jamie Lorimer, "Multinatural Geographies for the Anthropocene," *Progress in Human Geography* 36, no. 5 (2012): 593-612.

[37] See also Jamie Lorimer and Clements Driessen, "Wild Experiments at the Oostvaardersplassen," *Transactions of the Institute of British Geographers* 39, no. 2 (2014): 169-81.

More recently, political geographer Simon Dalby points to the emergent discourses outside academia that may soon be using the "fact" of the Anthropocene to justify questionable national security and surveillance policies (cf. Dibley above).[38] Pointing to leading governmental, quasi-government and non-governmental actors, he asks what alternative, motivational concepts and aims might be offered to them by social researchers and others in the name of a more democratic, just Anthropocenic future. Meanwhile, more in the spirit of the *OLR* special mentioned above, another geographer has explored the "new understandings of time, matter and agency" that, as she sees it, the Anthropocene is axiomatic of.[39] Kathryn Yusoff takes seriously one key implication of Anthropocene science: namely, that we rethink "the human"—now as an extra-biological phenomena whose "corporeal" existence reaches into the very *fabric* of the Earth.[40] James Proctor explores another key implication—that we might have to let go of the idea of "nature" as signifying a distinct ontological domain and serving as a normative guide for action.[41] In a less philosophical vein, Levene revisits Chakrabarty's question of how historians might respond to the Anthropocene idea so as to render their enterprise both ethical to the marrow (cf. Alberts' concern) and contributory to new public narratives of past and future (cf. Rigby's argument about literary studies and practice).[42] Libby Robin works over similar ground.[43]

Finally, writing in this journal, Crist has just reprised her earlier arguments in a searing indictment of the Anthropocene discourse emanating from scientists like Paul Crutzen and Will Steffen. Unlike most of the authors mentioned above, Crist sees no value in the discourse and wishes to "blockade the word Anthropocene" from use because "the vocabulary of neutrality" accompanying it "is a surreptitious purveyor … of the human supremacy complex."[44] More recently still, some other environmental humanists have also cautioned against uncritical acceptance of scientific representations of our "new age"— though in a far more temperate tone than Crist. For instance, in the new interdisciplinary journal *The Anthropocene Review*, Andreas Malm and Alf Hornborg worry that the blanket prefix "Anthropo" illicitly glosses uneven histories and geographies of environmental change that make the modern capitalist West the principal villain in the drama of the Holocene's eclipse.[45]

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[38] Simon Dalby, "Biopolitics and Climate Security in the Anthropocene," *Geoforum* 49, no. 1 (2013): 184-92.

[39] Kathryn Yusoff, "Geologic Life: Prehistory, Climate, and Futures in the Anthropocene," *Society & Space* 31, no. 5 (2013): 779-95.

[40] See also E. Ellsworth and J. Kruse, eds., *Making the Geologic Now* (New York: Punctum Books, 2012).

[41] Jim Proctor, "Saving Nature in the Anthropocene," *Journal of Environmental Studies and Sciences* 3 (2013): 83-92.

[42] Levene, "Climate Blues."

[43] Libby Robin, "Histories for Changing Times: Entering the Anthropocene," *Australian Historical Studies* 44, no. 3 (2013): 329-40.

[44] Eileen Crist, "The Poverty of our Nomenclature," *Environmental Humanities* 3 (2013): 129-46. The quotes are from 141 and 133 respectively.

[45] Andreas Malm and Alf Hornborg, "The Geology of Mankind? A Critique of the Anthropocene Narrative," *The Anthropocene Review* 1, no. 1 (2014): 1-8. See also Lesley Head for a set of related health-warnings about what she calls "the Anthropocene narrative": "Contingencies of the Anthropocene," *The Anthropocene Review* 1, no. 1 (2014): 1-13.

The environmental humanities in "Anthropocene discourse:" what roles are being played, and where? The chronology of contributions above is, I hope, relatively complete (though it is certainly not exhaustive). In a few short years a trickle of writings by environmental humanists about the Anthropocene has grown into a small stream, with the promise of much more to come. These writings replay and extend themes previously explored by these and many other writers in relation to global warming, "the end of nature" and related subjects. When scrutinised closely, the publications offer clear evidence of how their authors are reacting to the scientific "announcement" that we are now entering a thoroughly different epoch. But they also say something about how many of today's humanistic scholars—even when believing we are in a "game changing" moment for global humanity—continue to tread well-worn paths beaten by their professional predecessors. For my purposes, the publications are interesting not so for their particular content but because they evidence roles—both institutional and intellectual—long thought to be characteristic of the humanities by practitioners and many others. Let me explain what I mean, and why it might matter.

As we discovered above, most humanists writing about the Anthropocene have taken the epistemic claims being made by various geoscientists at face value. They have regarded these claims as incitements to further the arguments of the environmental humanities. These arguments, we have seen, pertain to one or more of four things (depending on the author): namely, reaching out beyond the academy to engender alternative sentiments and goals in society (e.g. Rigby and Gibson-Graham); tracking and contesting things to be done in the name of the Anthropocene by governments and others (e.g. Dalby); rethinking disciplinary self-understanding in the humanities (e.g. Chakrabarty and Levene); and rethinking key Western concepts and offering new answers to the "big questions" of life (e.g. the *OLR* special issue and Yusoff). By contrast, other environmental humanists (thus far a minority, with Crist in the vanguard) have expressed skepticism about the scientific claims inspiring the work of their peers—not because of the scientists' suggestion that the Earth is being profoundly altered, but because of the particular terminology comprising their current discourse. The Anthropocene concept is thus regarded as a resource or a threat, depending— and in non-trivial ways.

These contrasting reactions position most of the authors mentioned above in the roles of either "inventor-discloser" or "deconstructor-critic." These roles are old ones in the humanities. The former entails scholars using their academic freedom and the time a university career affords to conjure-up new (or revisit old and neglected) concepts, ideas and arguments intended to enrich humanity's understanding of its place in the world. The latter entails scholars challenging existing (or new) patterns of thought in the academy or the world at large. In practice, the roles often bleed into each other and, typically, no environmental humanist performs one exclusively for any length of time. In the present case, most of the *OLR* essays and Crist's brace, respectively, evidence the two roles in their purest forms. In the present case too, they show environmental humanists taking the claims of geoscience with the utmost seriousness (whether in solidarity or opposition).

These roles are indispensable. However, their necessity does not imply their sufficiency in the case of the emerging "Anthropocene discourse." What is currently missing, it seems to me, is a greater willingness to play the role of "engaged-analyst" in respect of the geoscience community that has brought the Holocene's proclaimed end to our attention. The engaged-analyst does not only rely on science to at some level frame their own intellectual endeavors;

nor does s/he only rest content with questioning scientific representations of the world from afar for various ontological, ethical or political reasons, however compelling. Instead, the engaged-analyst—recognising the enduring power of scientists to affect the thoughts and actions of societal decision-makers—tries to get their hands dirty in the places those scientists operate. Serious about both the science and their own skills, the engaged-analyst seeks institutional and epistemological forms of engagement that might alter important conversations occurring outside the humanities. Not a few humanists interested in science have become engaged-analysts (e.g. bioethicists who work at the science-policy-society interface in respect of biotechnology). But not too many exist as yet who engage the increasingly prominent and vocal claims issuing from international geoscience.

As the former climate scientist Mike Hulme has argued,[46] geoscientists are today producing concepts and evidence that virtually *demand* a societal response worldwide. Yet these scientists, he reveals, seem largely deaf to voices on the "other" side of university campuses. For instance, it is dismaying that, in 2014, readers of *Nature* need to be told in an article on adapting to environmental change that GDP is but one, highly suspect measure of national success.[47] Robert Costanza and colleagues' argument is an important one, of course. However, it is an old one too and their reprising it in the world's leading science periodical tells us something about the mindset of its editors and very possibly its readers. Without engaged analysts, the environmental humanities may be destined to perpetuate the sort of "academic" habits some (still) see as virtually definitive of the humanities at large.[48] Reacting to the Anthropocene proposition in journals like the *Oxford Literary Review*, *Society and Space* or *Angelaki* is an effective way for humanists to influence other humanists.[49] It also, importantly, helps them figure-out what it is they might want to say to others. But, lacking a weight of alternative activities, it is an elliptical means of making the environmental humanities count in the wider sense—especially if one takes seriously the radical social implications of current geoscientific evidence.

This notwithstanding, opportunities today exist for willing environmental humanists to engage (some) geoscientists in arenas that might "change the conversation" about present and future biophysical change. Entering these arenas will be challenging for many. However, if we believe the world out there is changing rapidly then surely we ourselves need to change if our voice in that world is to be heard in a timely fashion. Though, as noted above, a number of humanistic scholars *are* engaged-analysts (Kathy Gibson and the late Julie Graham are inspiring examples), relatively few are currently connected to the geoscience community directly. In part this reflects the real barriers to forging connections, but these are not insuperable. I contend that the few should (and could) in time be many. The rest of this essay suggests, in two sections, why and how.

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[46] Mike Hulme, "Meet the Humanities," *Nature Climate Change* 1, no. 2 (2011): 177-79.

[47] Robert Costanza *et al*., "Time to Leave GDP Behind," *Nature* 505, 16 January (2014): 283-5.

[48] For instance, see Steven Pinker, "Science is not your Enemy," *New Republic*, 6 August (2013).

[49] Indeed, this is precisely why I have written this essay and submitted it to *Environmental Humanities*.

Contextualising Scientific Discourse about the Anthropocene

In section 1, I presented a summary account of Anthropocene science, citing key studies by Crutzen, Steffen, Zalasiewicz and others. These studies are precisely those that non-scientists writing about the Anthropocene have tended to rely upon in their own publications. At one level this reliance is entirely appropriate. However, at another it serves to conceal the wider institutional context in which Anthropocene science exists. This is unfortunate because understanding this context reveals why engaged analysis is especially necessary and possible today. We therefore need to paint a richer picture of what is afoot in and around Anthropocene science. The context can best be understood by attending to two things, namely the *global, multi-disciplinary scientific networks* scientists like Crutzen have inserted themselves into and, relatedly, the *novel institutions and programs* structuring a lot of geoscientific inquiry today. This context shows claims about the Anthropocene to be part of a wider effort by geoscientists to help decision-makers and societies respond to global environmental change with a speed and seriousness so far lacking.

Geoscientists as global spokespeople for an Earth in crisis. The earlier mentioned IGBP was one of four international research initiatives into global environmental change created between 20 and 30 years ago.[50] These interdisciplinary programs brought earth and environmental scientists from a wide range of backgrounds together in order to better understand (i) biophysical change on a *planetary* scale and (ii) humans as *causes and subjects* of such change. One of them, the World Climate Research Program, also brought these scientists into high-level policy arenas via the IPCC assessment reports.[51] Another, the International Human Dimensions Programme (IHDP), eschewed a "pure science" approach to understanding global environmental change focused only on "perturbed" natural systems. Through projects like IHOPE (Integrated History and Future of People on Earth, launched in 2005), it has enabled some biophysical scientists to engage with historians, anthropologists and ecological economists (among others).[52] As part of this engagement across the physical-human "divide," the science of global environmental change has sometimes been framed in ways designed to signal clearly the need for significant societal change. For instance, an early IHOPE edited book was entitled *Sustainability or Collapse?*[53] Meanwhile, pre- and post-2000, the successive IPCC reports increasingly indicated humanity's capacity to act as a planetary force, as did the 2005 Millennium Ecosystem Assessment (supported by the UN and the World Bank). Various IGBP projects over the last 20 years have sought to describe and predict this "coupling" of human actions and "Earth System" responses. Using rather "hotter" language, the noted biologists whose concerns about biodiversity loss foreshadowed the creation of the

[50] The IGBP was launched in 1987. It followed the World Climate Research Program, created in 1980. It was followed by the International Human Dimensions Program (1990) and Diversitas (launched in 1991 and focusing on global biodiversity and biogeography).

[51] These reports, and the messages they contained, would in time help persuade several national governments to create commissions, expert panels or whole departments focused on climate change (the UK and Australia being examples).

[52] Three names worth mentioning here are Libby Robin, Carole Crumley and Robert Costanza respectively.

[53] Robert Costanza, Peter Graumlich & Will Steffen eds., *Sustainability or Collapse?* (Cambridge: MIT Press, 2007).

DIVERSITAS program (see footnote 50), have been long-running critics of humanity's careless approach to living species.[54]

As a result of all this (and many other developments I lack the space to detail), leading members of the international geoscience community—extending well beyond proponents of the Anthropocene concept—have been increasingly vocal about four things in recent years. First, some are insistent that ours is a "planet under pressure" and, with others, coauthored a forthright "State of the Planet Declaration" to this effect leading into the UN Rio+20 conference (Brito & Stafford Smith, 2012).[55] Second, many are dismayed that societal decision-makers appear unwilling or unable to grasp the serious implications of their scientific findings. Some are thus enjoining the global change research community to be far more forthright when communicating the key messages.[56] For instance, in May 2013 a multi-disciplinary group of global change scientists authored and promoted a "scientific consensus on maintaining humanity's life support systems in the 21st century" aimed at policy makers.[57] Third, a number of geoscientists are inviting more social scientists and (currently to a lesser extent) humanities scholars to join them in trying to understand how to respond to anthropogenic environmental change.[58] This is occurring against the background of high-level pushes to foster more interdisciplinary global change research.[59] Finally, there are loud calls within the global change research community for it to get better at producing "actionable knowledge" as part of a new "social contract" with the societies it exists to serve.[60] In other words, it is now felt that generating more data and information *per se* is not enough if the lessons lying therein are to make any worldly difference. Clearly, many geoscientists are now keen to be socially "relevant" actors in the drama of future Earth and several see theirs as a "crisis field."[61]

The take-home point here is that key exponents of the Anthropocene proposition—notably Crutzen and Steffen—have long been important players in the networks, institutions

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[54] I am referring to Edward O. Wilson and Thomas Lovejoy in particular: see John Takacs, *The Idea of Biodiversity* (Baltimore: Johns Hopkins University Press, 1996).

[55] This echoes "The Stockholm Declaration" issued a year earlier by Nobel Prize winning scientists. Richard Hamblyn ("The Whistleblower and the Canary," *Journal of Historical Geography* 35, no. 3 (2009): 234) opined that ours is "the first environmental crisis in which experts appear more alarmed than the public," and suggests this is a key reason why geoscientists are now keen to ramp-up their advocacy efforts.

[56] An example is Kevin Anderson & Alice Bows, "A New Paradigm for Climate Change," *Nature Climate Change* 2, September (2012): 639-40.

[57] Anthony Barnosky *et al.*, "Introducing the Scientific Consensus on Maintaining Humanity's Life Support Systems in the 21st Century: Information for Policy Makers," *The Anthropocene Review* 1, no. 1 (2014): 78-109.

[58] See, for instance, Walter Reid *et al.*, "Earth System Science for Global Sustainability: Grand Challenges," *Science* 330, November (2010): 916-7.

[59] See, for instance, European Science Foundation (ESF), "The Future of Knowledge: Mapping Interfaces," (2009), accessed 8 May, 2014, http://www.esf.org/fileadmin/Public_documents/Publications/Future_of_Knowledge.pdf.

[60] An example is Ruth DeFries *et al.*, "Planetary Opportunities," *Bioscience* 62, no. 6: (2012) 603-606.

[61] Compare with conservation biologist Michael Soulé's original account of a "crisis discipline;" "What is Conservation Biology?" *BioScience* 35, no. 5 (1985): 727-34.

and programs described in brief above. Both were involved in the IGBP from its early years and Steffen has been part of the IHOPE initiative.[62] Beyond this, Crutzen has a history of acting as a "concerned scientist," first in his early research into "nuclear winter" and then in his Nobel Prize winning inquiries into atmospheric ozone layer thinning. Similarly, Steffen has for many years tried to connect science to public affairs, notably as a senior science adviser to successive Australian governments. It is not, therefore, surprising that both have lent their name to a very recent attempt to represent the "game changing" character of anthropogenic environmental change: the "planetary boundaries" concept.[63] This is a different way of describing the Holocene's end and a more pointed one too, for it suggests a quantifiable "safe operating space" within which humanity must remain.[64] Crutzen, Steffen and their co-authors are here continuing a tradition stretching back through Paul Ehrlich and Barry Commoner to Rachel Carson and beyond. But they operate as science "insiders" and publish in teams, thus avoiding the charge of being lone mavericks (a charge some critics of James Lovelock used for many years to discredit his Gaia hypothesis). They also (so far) avoid the rhetorical excesses of some of their predecessors and are thus less likely to be seen as what Roger Pielke called "issue advocates"—that is, researchers who try to scientise their political preferences and so risk politicising the science.[65]

In this light, the geologists' ongoing deliberations about whether the Anthropocene can be officially declared a new epoch are potentially misleading. They may inadvertently create the impression among non-scientists that "the Anthropocene" concept is—notwithstanding its epic extra-scientific implications—something advanced by scientists for scientists.[66] Instead, I am suggesting, the idea is better understood as a politically savvy way of presenting to non-scientists the sheer magnitude of global biophysical change.[67] It was invented and has been elaborated in an increasingly febrile geoscience context wherein observed and predicted alterations to the Earth's surface are alarming a great many researchers. These researchers have been using different concepts and media to broadcast their concern in recent years. We might

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[62] The IGBP and IHDP recently (January 2014) held a three day workshop on future research imperatives using the Anthropocene as its framing concept: see http://www.igbp.net/news/news/news/anthropoceneworkshop1719january.5.7815fd3f14373a7f24cea.html

[63] Johan Rockström *et al*., "A Safe Operating Space"; Johan Rockström, *et al*., "Planetary Boundaries: Exploring the Safe Operating Space for Humanity," *Ecology & Society* 14, no. 2 (2009b): 1-24.

[64] Steffen, Crutzen and others formally connected the two ideas in Steffen *et al*., "The Anthropocene: From Global Change." The planetary boundaries idea has already been used in global policy circles, though has also been subject to some scientific criticism too.

[65] Pielke, *The Honest Broker* (Cambridge: Cambridge University Press, 2007). This "issue advocate" role has been prominently performed by American climate scientist James Hansen in recent years. I have no doubt that the likes of Rockström, Steffen and Crutzen *are* issue advocates in their writings about global environmental change, but they are more subtle than the likes of Ehrlich were.

[66] Jan Zalaciewicz is without doubt the one geologist trying hardest to establish the extra-scientific relevance of the Anthropocene idea, thus joining Crutzen and Steffen in the role of "concerned scientist." Unlike the "typical" geologist he has authored several works of popular science, focused on humanity's place in past, present and future Earth history.

[67] A point made by Mike Ellis and Zav Trachtenberg, "Which Anthropocene is it to be? Beyond Geology to a Moral and Public Discourse," *Earth's Future* (2014).

say that Crutzen and Steffen have been successful in their wager that the Anthropocene is an attention-grabbing way of framing their own worries. Both men have been up-front about what follows if the concept is taken seriously. For instance, in a co-authored essay in *Yale Environment 360*, Crutzen has opined that humans "should shift our mission from crusade to management, so we can steer nature's course symbiotically instead of enslaving the formerly natural world."[68] The same year, Steffen and a cast of other scientists (including Crutzen) declared that, "The concept of the Anthropocene … sharpens the focus on an over-arching long-term goal for humanity—keeping the Earth's environment in a state conducive for further human development."[69] Read the literature and it is clear that the need for "planetary stewardship" has become a refrain of those scientists advancing the Anthropocene idea.

Changing global change science: new arenas for representing Earth's present and future. Presently, the networks and institutions out of which the Anthropocene concept emerged are seeking to reconstitute themselves for the future. This is a key moment of opportunity in deciding who, in the international research community, will get to speak for Earth present and future (and how). The IGBP, the IHDP and DIVERSITAS are being dissolved or repurposed, and their successor emerging through the 10 year Future Earth Program (which is presently developing its research plan).[70] The program is set to have a far bigger emphasis on human values, institutions, habits and behaviors than the initiatives preceding it. It also promises to be more focused on anticipatory actions that can be taken soon in order to engender desired Earth futures. One of its three themes is "Transformations towards sustainability" (focused expressly on means-ends issues that speak to big questions about how humans should live and their obligations to non-humans and generations-to-come).[71] The program has institutional support that cross-cuts the natural sciences, the social sciences and, nominally at least, the humanities.[72] Its creation is coincident with Ban Ki-moon, the UN secretary-general, convening

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[68] Paul Crutzen, P. and Christian Schwagerl, "Living in the Anthropocene: Towards a New Global Ethos," *Yale Environment 360*, 24 Jan (2011). Accessed 8 April, 2014, http://e360.yale.edu/feature/living_in_the_anthropocene_toward_a_new_global_ethos/2363.

[69] Will Steffen *et al.*, "The Anthropocene: From Global Change."

[70] The IPCC is set to continue, and has been complemented in the field of biogeography by the Platform on Biodiversity and Ecosystem Services (IPBES—established 2012). Future Earth will run alongside the relatively new Programme on Ecosystem Change and Society, cosponsored by UNESCO and the International Council for Science (see http://www.pecs-science.org/aboutus.4.1a508a66139b5dba5cb5cc6.html).

[71] This theme has a new funding call attached to it coordinated by the International Social Science Council. http://www.worldsocialscience.org/activities/transformations/.

[72] Future Earth is sponsored by the Science and Technology Alliance for Global Sustainability comprising the International Council for Science (ICSU), the International Social Science Council (ISSC), the Belmont Forum of funding agencies, the United Nations Educational, Scientific, and Cultural Organization (UNESCO), the United Nations Environment Programme (UNEP), the United Nations University (UNU), and the World Meteorological Organization as an observer. I say the humanities are, at the least, "nominally represented" because five of the 17 member science committee (http://www.futureearth.info/science-committee) can claim in some or all of their published work to be "environmental humanists" (they are anthropologist Melissa Leach, geographer Karen O'Brien, anthropologist Eduardo Brondizio, philosopher Armin Grunwald, and feminist ecological economist

his first ever science advisory committee (in 2014)—one that includes people from outside the natural science fraternity. Future Earth is also taking shape when the UN Millennium Development Goals (2000-15) are subject to a stock-take, suggesting that profound questions of human inequality will—at the highest political level— be formally connected to questions of how to respond to the Earth's new physical geography.[73]

There are inevitably path dependencies written into Future Earth's attempt to break new ground. My own reading is that the program, as currently constituted, carries forward certain academic biases inherited from its predecessors. Aside from geoscience, a particular style of social science seems to be favoured—one that treats altering "human dimensions" in terms of monetary carrots and sticks (mainstream economics), information deficits/provision or peer group norms (behavioral psychology), and a strategically reoriented governance architecture (political science).[74] Among its conceptual tool-kit are currently *de rigeur* terms like "vulnerability," "resilience," "adaptive capacity" and "sustainability transitions;" among its keynote projects are "ecosystem services" markets and the quest for a "green economy." Unsurprisingly, its epistemological and ontological commitments are consistent with a managerial approach to human-environment interactions. This approach prefers to explore means rather than properly debating ends. Yet "Transformations towards Sustainability" will mean little unless a much wider range of insights and dialogues are taken seriously in the academic networks that will sustain Future Earth over the next decade.

Several close observers of these networks recognise this. Consider a recent special issue of the journal *Environmental Science and Policy* entitled "Responding to the Challenges of an Unstable Earth" (RESCUE). Named after a foresight initiative funded by the European Science Foundation (ESF) and European Cooperation in Science and Technology (COST), the issue's papers explored how paradigm-breaking practices can emerge from within the academic community, working with stakeholders. Among the seven contributions are ones coauthored by individuals whose work does not easily fit the social science mold just mentioned—for instance, Karen O'Brien, Gisli Palsson and Sverker Sörlin.[75] As geographer (and sometime IPCC report writer) O'Brien notes elsewhere, "At a time when the global change research programmes are reorganizing to address sustainability in an integrated, trans-disciplinary

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Bina Agrawal). However, if one looks at the research projects currently listed (see http://www.futureearth.info/projects) few appear to have much humanities content, and are either natural scientific or social scientific in focus.

[73] See David Griggs *et al*., "Sustainable Development Goals for People and Planet," *Nature* 495, 21 March 21(2013): 305-7.

[74] In part, this kind of social science has been able to join the geoscience conversation about global environmental change via the institutional profile achieved by the International Social Science Council (ISSC). The ISSC has been a fairly effective advocate for environmental social science over the last 15 years or so, and has secured for itself a seat at the various "high tables" pertaining to funding and framing human dimensions research. The ISSC aside, the selective kind of environmental social science I am describing has featured significantly in the multi-disciplinary field known as "sustainability science," which American geographer Robert Kates has been a key advocate of (see Kates, "What Kind of Science is Sustainability Science?" *PNAS* 108, no. 49 (2011): 19449-50).

[75] See Karen O'Brien *et al*., "You Say You Want a Revolution?" *Environmental Science and Policy* 28 (2013): 48-59.; Gisli Palsson *et al*., "Reconceptualising the 'Anthropos' in the Anthropocene," *Environmental Science and Policy* 28 (2013): 3-13.

manner under the Future Earth initiative, there is a great risk of maintaining the same assumptions and [yet somehow] expecting different outcomes."[76] She concludes that global change scientists and their stakeholders will need to embrace the idea that to facilitate societal change *their own* existing mindsets may be impediments—notwithstanding the expressed desire of people like Crutzen and Steffen to act as beacons of change in those societies seemingly propelling us away from Holocene norms.

Evidently, several geoscientists agree with her that something like an "axial revolution" in academic thinking is needed.[77] One has even retooled himself as a latter day environmental humanist, having previously been an influential climate scientist (Mike Hulme).[78] Yet these geoscientists currently appear to be a minority. Meanwhile, scientific proponents of the Anthropocene idea are representing the Earth in ways that perpetuate familiar yet loaded epistemic frames that many will object to. For instance, as Crist rightly and acerbically notes, they use an anthropocentric worldview to diagnose planetary maladies this self-same worldview has surely helped to cause.[79] Certain prominent environmental social scientists writing about global change do the same;[80] additionally, they appear oblivious to the possibility that this worldview might be problematic.[81]

This does not invalidate the worldview (here I disagree with Crist). But it does highlight O'Brien's point that other perspectives warrant consideration because together they present options for determining what the "problems" and possible "solutions" are, looking ahead. For example, geoengineering—something Crutzen has cautiously endorsed—is merely one (ethically contentious and operationally fraught) response to impending Anthropocenic change. Many environmental humanists both study and advance alternatives to such techno-managerial schemes, even as others work with the grain of hegemonic thinking. They will no doubt continue to agree to disagree. But the question is: how can these and other humanists more fulsomely engage those geoscientists who today are urgently telling decision-makers that humanity is entering *terra incognita*? Furthermore, what sorts of dialogues might they have, and how might this impact help societies decide what the "best" ways forward are?

In the final section I will focus on the first question because the second, despite its importance, is purely theoretical unless environmental humanists can become "engaged analysts" in reasonable numbers. In so doing I hope to show readers with little direct

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[76] Karen O'Brien, "Global Environmental Change III: Closing the Gap between Knowledge and Action," *Progress in Human Geography* 37, no. 4 (2013): 594.

[77] See Pahl-Wostl *et al*., "Transition towards a New Global Change Science," *Environmental Science and Policy* 28 (2013): 36-47.

[78] Mike Hulme, *Why We Disagree About Climate Change* (Cambridge: Cambridge University Press, 2011b). Hulme's trajectory reminds us that some of the most prominent previous spokespeople in what we now call the environmental humanities have, in fact, been former scientists—think of Aldo Leopold, Lewis Mumford, Rachel Carson, Barry Commoner, and Bert Bolin.

[79] Eileen Crist, "Beyond," "The Poverty."

[80] For instance, the late Elinor Ostrom, "A General Framework for Analyzing Sustainability of Socio-Ecological Systems," *Science* 325, 24 July (2009): 419-22.

[81] For instance, see the remarkably unreflexive argument of Lin Ostrom, Kenneth Arrow and others contained in Kinzig *et al*., "Social Norms and Global Environmental Challenges: The Complex Interaction of Behaviors, Values, and Policy," *BioScience* 63, no. 3 (2013): 164-75.

experience of engaged-analysis that playing another role beside that of "inventor-discloser" or "deconstructor-critic" is not infeasible. This is an important moment to shape the future character of global change research when the international networks and institutions are intentionally morphing into something new.

Engaged-Analysis: Can Environmental Humanists Build Formative Long-Term Relations with Geoscientists?

As explained, many humanists who are wont to respond to the Anthropocene concept might benefit from a richer understanding of the wider landscape in which the concept exists. Surveying this landscape reveals that many geoscientists operate in international circles enjoying high-level institutional support. It reveals their growing desire to exert broader societal influence. It also shows that these scientists are much closer to the world of policy and politics than is the typical humanities scholar. This closeness also applies to a certain group of social scientists commonly found in the disciplines of economics, psychology and political science. Yet, as we have seen, there are some signs that the humanities are receiving a long-overdue invitation to engage with geoscientists and with social scientists studying the "human dimensions" of environmental change. There are signs too that more diverse and unconventional thinking about humanity and the Earth is being called for. Such thinking ought to exceed the largely cognitive register of geoscience and also explore key things like hope, wonder, grief, humility, faith, awe, love and attachment in their many and varied forms. It could also challenge the reigning "linear" model of interdisciplinary dialogue where scientists produce evidence and technologies that subsequently become the focus of humanistic concern "downstream" (thus perpetuating a problematic fact-value dualism).

These openings are important if the geoscience community is to think more richly about the social subtexts of its research and various ways in which it might be deemed "relevant" to society. They also offer environmental humanists a rare opportunity to operate on a global stage, one long occupied by the natural sciences. This is not to suggest there is now a large door with well-oiled hinges waiting to be pushed wide open by willing humanists. Some lock-picking remains to be done, and a fair bit of graft is needed to create route-ways out of the spaces many environmental humanists are accustomed to occupying. As if this were not enough, there are challenges of translating often esoteric academic language into forms that facilitate dialogue with those not already in our "epistemic community." Additionally, there's always the risk that our ideas will be coopted by geoscientists, unwittingly or otherwise. However, the good news is that there are several reasons to believe engaged analysis is possible, even if unlikely to be successful in many cases.[82] Let me itemise a few (in no particular order).

First, the Anthropocene concept has already inspired some geoscientists and some environmental humanists to share a platform. The most notable example was the launch of the

[82] The field of Science and Technology Studies (STS) furnishes us with over 25 years of analysed examples of whether and how non-scientists can engage formatively with sections of the scientific community in various different arenas. These non-scientists include STS scholars themselves and, putting the "science wars" off to one side, well-intended engagements have not always proven to be fruitful. For an example see Brian Wynne, "Further Disorientation in the Hall of Mirrors," *Public Understanding of Science* 23, 1 (2014).

Anthropocene Project by the Haus der Kulturen der Welt (HKW) in Berlin (January 2013).[83] There the likes of Jan Zalasiewicz engaged with humanists like Claire Colebrook, Cary Wolfe and Ursula Heise. At a smaller scale, such engagement was attempted by the Sydney Environment Institute in its "Encountering the Anthropocene" event (February 2014), subtitled "The Role of the Social Sciences and Humanities." Second, this institute is one prominent example of something that is, happily, becoming more common in the world of leading research universities: namely, multidisciplinary fora expressly designed to facilitate exchange on subjects of shared environmental concern. Others include the Nelson Institute at the University of Wisconsin, Oxford's Environmental Change Institute, and the Fenner School of Environment & Society at ANU in Canberra.[84] The sheer existence of these fora does not, of course, guarantee anything. But they create an infrastructure whereby willing people can cross the usual disciplinary divides (and not a few environmental humanists have been energetic bridge-builders in these settings). In part, this infrastructure exists because of, and has enabled cross-disciplinary work on, the anthropogenic climate change concept the Anthropocene idea subsumes. Third, and relatedly, major research funding bodies today offer real encouragement to engaged analysis across the science-humanities "divide." Though submitting bids can be time-consuming and the risks of failure off-putting, serious money exists to facilitate engagement (and "upstream" of the research process too) —even in a time of austerity. Fourth, the international geoscience networks and institutions out of which the Anthropocene proposition emerged are more open than some might think. For instance, recounting her participation in the 2012 "Planet Under Pressure" conference, leading ecological economist Bina Agrawal reports that there were few barriers to entry.[85] Indeed, she now sits on the steering committee for the Future Earth initiative. There is little to prevent environmental humanists attending the global change workshops and conferences where physical scientists and (currently) a certain sort of social scientist might normally be found.

Fifth, environmental humanists in subjects like philosophy and literature have allies in fields positioned more closely to the natural sciences. These include historians and geographers of science, and STS scholars like Sheila Jasanoff and Brian Wynne. Individuals like these can serve as bridge-builders because they are highly literate about both science and about humanistic inquiry; they also often have public policy experience. Similarly, senior figures in geoscience like Mike Hulme and, as it turns out, Will Steffen—who, among his wide-ranging academic engagements, attended the HKW event above—challenge the stereotype of

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[83] http://issuu.com/hkwberlin/docs/booklet_anthropocene_an_opening.

[84] Though it goes way beyond environmental issues, Cambridge University's CRASH centre also deserves a mention here. Institutes, centres and schools like these can be "intellectual hotspots" that have global influence within and beyond universities. Trying to get humanistic scholarship taken seriously within them is thus important. A case-in-point is the University of East Anglia in England. Its "post-disciplinary" structure has, among other things, allowed it be a leading international voice in climate change science and "human dimensions" research (including environmental economics). However, the University's environmental research has only been weakly affected by the full range of humanities thinking, giving it a distinctly rationalist flavour at times. The well-known STEPS research centre at the University of Sussex has better encompassed this range, though majors in a style of critical social science reasoning that not all humanists would recognise as their own.

[85] Bina Agrawal, personal communication, 27 March 2014.

the "hard" scientist content to let others deal with the "value" questions.[86] These individuals are amenable to engagement with the humanities, and on more equal terms than "pure" geoscientists might be. In the sixth place, it is worth remembering that one area of geoscience has for many years opened itself up to the big "extra-scientific" questions many humanists want to tackle. Conservation and restoration biology has, for over three decades, bled into environmental politics and the environmental movement. This has affected many biologists' self-understanding, so too their sense of how fact-value/is-ought relationships are configured. Some environmental humanists have played their part in this story, and it may not be fanciful to think that other areas of geoscience could now be more richly infused with humanistic insight.[87] A key reason is that even "hard" geoscientists are openly acknowledging the limits to scientific understanding of an exceedingly complex Earth system undergoing anthropogenic forcing (see Oldfield and Steffen, 2014). As much as implying the need for better geoscience, this implies that serious exploration of alternative trajectories for ways of living is necessary and urgent.

Next, there are new publication outlets expressly designed to include the widest range of thinking about present and future Earth. Two notable examples are *WIRES Climate Change* (published by Wiley-Blackwell) and *The Anthropocene Review* (published by Sage). Peer review journals aside, the web is becoming a more central location for academics to disseminate ideas and engage beyond their home disciplines. The Breakthrough Institute website is a good example of how geoscientists, social scientists and humanists can share a non-academic forum intended to enable mutual learning.[88] In the seventh place, there are some existing concepts and debates that are familiar to many geoscientists and which can usefully be referenced by any environmental humanist wishing to translate their own concerns with some integrity. Examples include "wicked problems," "mode 2" inquiry, "post-normal science" and "transdisciplinarity." Alien as these terms may be to some environmental humanists, upon close inspection they offer ways to engender just those debates the Anthropocene concept invites through its sheer capaciousness. Finally, the humanities have a relatively long (and at times distinguished) tradition of considering the social implications of science in extra-academic arenas. A good example is the sort of "practical philosophy" bioethicists and legal scholars engage in when invited onto government advisory committees or commissioned by a charity of NGO. Though these engagements often pertain to technologies and techniques (like stem cell research), one can imagine them extending to the epistemology and politics of a scientific concept like the Anthropocene.

There are other precedents, resources and opportunities I could mention if space permitted. But I have said enough to make my point. I realise that some readers may criticise me for either over-optimism or for down-playing existing humanist engagements with geoscience. In the first case they might say that opportunities for engaged analysis in the arenas

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[86] All the while oblivious to the values contained in their own "value free" depictions of reality!

[87] Crist makes this point, despite her withering critique of the sort of science represented, as she sees it, in Anthropocene discourse. A fan of Lovelock's "Gaia" framing of life on Earth, she points approvingly to several concepts issuing from the biological as opposed to the planetary sciences. See Eileen Crist, "Intimations of Gaia," in *Gaia in Turmoil,* edited by E. Crist & H. B. Rinker, 315-33. (Cambridge, Mass.: MIT Press, 2010).

[88] http://www.thebreakthrough.org

I am describing are few and far between, and that sustained—as opposed to ephemeral—engagements rarely arise. They might argue that too many geoscientists view reality as one big (Comtean) jigsaw, and wrongly expect the humanities to supply the neat "pieces" their own expertise is not designed to. There is thus a risk of incorporation and of "asymmetrical" interdisciplinarity.[89] They might further argue that there is an "invisible college" underpinning global change science that is only prepared to pay lip-service to the value of the environmental humanities. They might thereby conclude that engaged analysis is not feasible for the many, and that only a select number of humanists can or should commit to it as anything more than a pastime. In the second case, and conversely, I might be accused of overlooking innovative research[90] and novel arenas (e.g. the Anglo-North American Cape Farewell project activities[91]) that bring environmental humanists and geoscientists together in mutually transformative ways. The conclusion here would be that I am greatly overstating the need for engaged analysis with geoscience: there's plenty ongoing that I am wrongly ignoring.

These criticisms are worth considering—though I obviously regard the first as too pessimistic, yet worry that the second might wrongly lead us to believe there is more depth-and-breadth to current humanities-geoscience engagement than in my view there is. Regardless, what both criticisms imply is that greater engaged analysis of and with geoscience is either too challenging or else easy enough to further foster. But, to my mind, this implication might be symptomatic of a problem. That is, notwithstanding the institutional barriers and sheer hard work of trying to engage geoscientists, and notwithstanding any existing engagements, might O'Brien's point about intellectual inertia apply to some or many environmental humanists too? Is the so far highly intellectual reaction to the Anthropocene concept by these humanists indicative of a professional mindset that is now, in some senses, a professional impediment—albeit one those humanists interested in other areas of science have tackled with some success? O'Brien cites Robert Kegan and Lisa Lahey's book *Immunity to Change*[92] and suggests that communities professing an interest in changing thinking or practice in the wider world must first themselves reflect deeply on their own *modus operandi*. Otherwise, she claims, they can end up looking to others when hoped-for changes fail to occur, all the while failing to recognise that their own immunity to change is a key part of the problem. Sociologist Ingolfur Blühdorn pushes this further. He points to the "performance of seriousness" by analysts whose institutional roles do not readily allow them to engender the changes their words call for.[93]

Only time will tell if more environmental humanists than at present decide to make engaging geoscience more of a vocation. Such engagement can be hugely time consuming and

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[89] On which see Bron Szerszynski and Maialen Galarraga, "Geoengineering Knowledge," *Environment & Planning A* 45, no. 11 (2013): 2817-24.

[90] Such as Catarina Landström *et al.*, "Coproducing Flood Risk Knowledge: Redistributing Expertise in Critical 'Participatory Modelling,'" *Environment and Planning A*, 43, no. 7 (2011): 1617-33.

[91] http://www.capefarewell.com/

[92] Kegan and Lacey, *Immunity to Change* (Boston: Harvard Business Press, 2009).

[93] Ingolfur Blühdorn, "Sustaining the Unsustainable: Symbolic Politics and the Politics of Simulation," *Environmental Politics* 16, no. 2 (2007): 251-75.

frustrating.[94] At the risk of sounding horribly instrumental, it also does not help if the reward systems structuring academic life place little value on doing things beyond peer review publications and teaching degree students. Yet if they do not try, despite these impediments, then two things seem fairly certain to me. The first—and this is the point made by deconstructor-critics like Crist—is that a relatively small number of geoscientists will continue to represent the Earth in ways that may ultimately set the agenda for others, yet without sufficient awareness that alternative framings are possible or desirable. The second, relatedly, is that an analytical, quantitative and managerial style of social science thinking will continue to dominate discussions of "human dimensions" among societal decision-makers.[95] A recent trawl through the pages of *Nature* and *Science*—the world's two premier science periodicals—suggests powerfully that the insights of environmental humanists are badly needed in all their diversity. When "society" is discussed in these journals, it is almost always presented as a "system" in need of accurate and timely monitoring, leading to preventative or adaptive measures of a technological or behaviour-modification type.[96] Many geoscientists advancing the Anthropocene idea and those environmental social scientists set to frame its normative implications would, it seems, benefit from a richer intellectual diet.[97] An "upstream" engagement with environmental humanists before new rounds of research into the physical and human dimensions of global change could make a real difference. For instance, it could foreground different ways of valuing the Earth, and pluralise the sorts of scientific "truths" and societal changes thought to be necessary and desirable looking ahead.[98] Yet if humanists persist in playing the "inventor-discloser" and "deconstructor-critic" roles in the usual places, it is unlikely that the metaphorical food will reach the table any time soon. A few willing scientists like Mike Hulme, aided by a few engaged environmental humanists, cannot alone alter the terms of future debate about how decision-makers should best respond to the advent of the Anthropocene.

Conclusion

Writing back in 2007, a multi-disciplinary group of authors—including Will Steffen— rightly noted that "The humanities … have been marginal to sustainability research to date, which reflects the science-arts divide that has pervaded both the academic world and much of policy,

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[94] The "embedded" experience of Paul Rabinow and Gaymon Bennett with "synthetic biologists" is most instructive here: Rabinow and Bennett, *Designing Human Practices* (Chicago: Chicago University Press, 2012).

[95] Indeed, the very idea of "human dimensions" tells us a great deal.

[96] See, for example, Biermann *et al*., "Navigating the Anthropocene: the Earth System Governance Project Strategy Paper," *Current Opinion in Environmental Sustainability* 2 (2010): 2020-8; Paul Stern *et al*., "Managing Risk with Climate Vulnerability Science," *Nature Climate Change* 3, July (2013): 607-9.

[97] Jerome Kagan, *The Three Cultures* (Cambridge: Cambridge University Press, 2009) has suggested that the "two cultures" divide famously identified by C. P. Snow in 1959 is now a "three cultures" one between natural science, much social science and the humanities. According to him, the arguments advanced here about geoscience and the environmental humanities are one aspect of a larger, deeper and persistent problem of academic Balkanisation.

[98] See Noel Castree *et al*., "Changing the Intellectual Climate," *Nature Climate Change* 4, September (2014): 763-8.

legislation and management for many decades."[99] Seven years on their assessment has continued relevance, at least if my analysis of "Anthropocene discourse" is on the mark. But in 2014 the need to bridge the divide is not only more urgent but arguably a little more possible. In this essay I have shown that most environmental humanists' responses to one of geoscience's "big ideas" have so far been notably academic. In itself that's not problematic (I am not questioning the value of academic inquiry *per se*). But I have made the case for engaged analysis as a worthy, indeed, necessary activity that might attract more than a few environmental humanists interested in geoscience. As geoscientists Anthony Barnosky and Elizabeth Hadly recently put it, "making the Anthropocene the 'best' it can be will require not only communicating across disciplinary boundaries within academia, but also making sure that what we learn in the 'ivory tower' does not stay there."[100] Environmental humanists can, if so minded, enlarge what the likes of Barnosky and Hadly think they mean by cross-disciplinary dialogue, with wider consequences for policy and society.

The "conversation of humankind" is much needed today, yet a pale shadow of what it ought to be in the wider political, economic and civic arenas. The English political philosopher Michael Oakeshott once said of this conversation that "it's not … a contest where a winner gets a prize, nor is it an activity of exegesis; it is an unrehearsed intellectual adventure … Properly speaking, it is impossible in the absence of a diversity of voices: in it different universes of discourse meet, acknowledge each other and enjoy a … relationship which neither requires nor forecasts their being assimilated to one another."[101] If the larger dialogue global humanity needs is to be sufficiently rich to be useful for considered real world change, it will help if more environmental humanists can stand toe-to-toe with scientists like those proclaiming the Holocene's eclipse. Of course, some may hope that, in time, their academic journal articles, monographs, lectures and seminars will enrich the wider world in this moment of "emergency," with one or two public intellectuals among them leading the (slow) charge. But if we committed to engaged analysis in greater numbers we could join more vocal others within the academic community—such as Crutzen and Steffen—in trying to "change the conversation" directly. Such commitment would reflect a change of mindset in which more environmental humanists regarded theirs as a "crisis field" necessitating many more "dirty hands" activities in sites and situations currently alien to some practitioners. Without such activities, key moments of decision about Earth future by various elected and unelected elites will be all the poorer—less considered, less democratic, less legitimate and more harmful than they might otherwise be.

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[99] Joern Fischer *et al.*, "Minding the Sustainability Gap," *TRENDs in Ecology & Evolution* 22, no. 12 (2007): 623.

[100] Barnosky and Hadly, "Problem Solving in the Anthropocene," *The Anthropocene Review* 1, no. 1 (2014): 77, scare-quotes added.

[101] Michael Oakeshott, *Rationalism in Politics and Other Essays* (London: Methuen, 1962), 66.

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