

FRAMING THE ANTHROPOCENE: THE GOOD, THE BAD AND THE UGLY

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ABSTRACT

The Anthropocene has become a key theme in contemporary speculations about the meaning of the present and the possibilities for the future. While eco-pragmatists argue that present circumstances present opportunities and possibilities for a thriving future for humanity, a ‘good Anthropocene’, critics suggest that the future will be bad for at least most of humanity as we accelerate the sixth extinction event on the planet. These discussions are key themes in the discipline of geography, but the geopolitics of all this, which may be very ugly in coming decades, requires much further elucidation of the common Anthropocene tropes currently in circulation. As with the classic Western movie, in the search for the gold neither ‘the good’ nor ‘the bad’ have the whole story; ‘the ugly’ will probably turn out to be decisive in determining how things play out. How the Anthropocene is interpreted, and who gets to invoke which framing of the new human age, matters greatly both for the planet and for particular parts of humanity. All of which is now a key theme in the discussions of geopolitical ecology that requires careful evaluation of both how geology has recently become so important in global politics and discussions of humanity’s future and how political geographers might usefully contribute to the discussion.

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There are no necessities, but everywhere possibilities; and man, as master of the possibilities, is the judge of their use. This, by the reversal which it involves, puts man in the first place – man, and no longer the earth, nor the influence of climate, nor the determinant conditions of localities. Lucien Febvre, *A Geographical Introduction to History* [1924]1996: 236).

THE ANTHROPOCENE

The theme of the Anthropocene raises fundamental questions for how world politics is now to be understood. Geopolitics can now no longer take the context of the human drama for granted; transformations are afoot driven by contemporary production processes. Nature is increasingly being produced at the largest of scales and political thinking has to come to terms with this new condition quickly if there is any hope of maintaining the planetary system in something approximating what humanity has known since the last ice age. Globalization is a profoundly physical process, not just a matter of trade and cultural change networked by communication technologies. In these terms the global economy is the new geomorphic force at work in the biosphere. How cultures are beginning to come to terms with this dawning realization is now a key theme for the humanities as well as the sciences. The high modernist premises, of humanity apart from a nature it can engineer, are no longer tenable formulations for either research or for politics; the nature of nature is no longer what moderns for long assumed it to be (Wapner 2014).

Political economy is now too a matter of political ecology, or at the planetary scale perhaps now a matter better understood in terms of political geocology (Brauch, Dalby and Oswald Spring 2011). The future configuration of the earth system is now the key matter of geopolitics, of how the world is known, reorganized and rebuilt in the struggles for economic and political mastery in rapidly changing circumstances (Dalby 2013a). These circumstances are being shaped by decisions about production systems and investment priorities intermeshed with political maneuverings in an increasingly artificial, crowded and changing biosphere, the condition of living in the Anthropocene (Rockstrom and Klum 2015). The terms of discussion are also challenging traditional environmental formulations; in light of the dramatic transformations of the present, catalogued and monitored by earth system scientists, environmentalism now has to engage with conditions of living “after nature” (Wapner 2010), in the new circumstances increasingly articulated in terms of the Anthropocene, our new geological epoch.

Whether all this will turn out well, a “good Anthropocene” or disastrously for humanity a “bad Anthropocene” is a matter of considerable and sometimes acrimonious discussion recently, and the theme of this paper. The Anthropocene is

much more than a proposed new geological epoch that marks the transformation of the earth system wrought by humanity; it has become a contentious term and a lightning rod for political and philosophical arguments about what needs to be done, the future of humanity, the potential of technology and the prospects for civilization. This paper argues that the politics of this is likely to get increasingly contentious in the near future and because these themes go to the heart of the geographical discipline where arguments about humanity and environment intersect, the debate deserves widespread participation by geographers (Castree 2015).

The politics of the Anthropocene might indeed get ugly, not least because the premises that various protagonists bring to the discussion are varied and in part because they are interpreting the significance of the Anthropocene in different ways. The title of this paper borrows, cheekily, from the classic Western movie of the 1960s, 'The Good, The Bad, And The Ugly'. In the movie the seekers after buried treasure each have some of the clues to its location but none of them have the whole story. The plot is about the consequences of each trying to get the gold while denying the others a share of the loot. But they need each other's knowledge to find the precise location of the gold. My appropriation of the theme emphasizes the point that the Anthropocene is neither good nor bad, but that the politics of shaping its future are probably going to be both ugly and unavoidable. Neither the good Anthropocene nor the assumptions of a bad Anthropocene can be divorced from considerations of how decisions about what to create in the near future are taken; the political economy of making habitats, environments and inevitably new strata (Clark 2013) is key to the new geological politics of our times (Dalby 2014a).

Many of the themes of the Anthropocene discussion are formulated in terms of optimism or pessimism about the future. The paper looks first to the discussion of the good vs bad Anthropocene conducted by Andy Revkin, Clive Hamilton and Joe Romm online in 2014. It then contrasts Elizabeth Kolbert's *The Sixth Extinction* with Diane Ackerman's *The Human Age*. Both books published in 2014 contain sections called "Welcome to the Anthropocene" and extend the Revkin, Hamilton and Romm discussion at great length. The latter sections of the paper look to debates about the geopolitics of the present to contextualize the Anthropocene discussion in terms of governance and debates about eco-pragmatism and techno-utopianism.

While it might be objected that this selection of primary sources, mostly by New England intellectuals and one irate Australian, are highly selective and unrepresentative of larger discussions, the paper is concerned with the political implications of the term, and the texts that this paper engages in detail is where the discussion has been most intense. In focusing on this discussion the paper aims to link this discussion explicitly with the current engagement by geographers with issues of socio-ecological transformation (Braun 2015). In particular it emphasizes the importance of thinking about current global politics in terms of geology, not just environment, an important distinction that only some of the discussion of Anthropocene geopolitics so far takes seriously enough.

FRAMING MATTERS

Clearly humanity's geological role in the planetary system has been much more profound than was recognized until recently and this key theme, highlighted by climate change and biodiversity reduction is reanimating the longstanding discussion about the global human predicament (Rockstrom et al 2009; Steffen et al 2015). The Anthropocene provides a key conceptualization that bluntly reframes the discussion in terms of humanity as a geological force, not just an environmental or geopolitical actor. This synthetic quality to the term in part explains how it has become a major theme in contemporary discussions of the changing planet.

Framing matters in political and academic matters; it organizes thought, facilitates certain forms of identity and conduct (Goffman 1974). Popular discussions of climate change and related matters are now discussed in these terms as activists and writers struggle with how to tackle contemporary changes (Matthews and Matthews 2014; Romm 2012). How issues are bounded, how academic questions specify the appropriate context for research is unavoidable in intellectual inquiry too and this has become a matter for scholarly analysis of climate change too (O'Lear and Dalby forthcoming). Frames often need names, and the Anthropocene has recently emerged as a key term that reframes many things. Or as this paper will argue, it has the potential to do so in ways that might be very useful indeed both to political activists and academic practitioners, if careful thought is given to how this new signifier is invoked and how it is given content. Whether it is good or bad remains to be seen, but the claims made about its potential reveal much about the larger political assumptions made by those who contest its political and analytical utility.

The Anthropocene term has been in circulation for some time, used by Russian scientists to refer to the Quaternary, and by Eugene Stoermer well before before Crutzen's interventions (Crutzen and Stoermer 2000, Crutzen 2002), which have been key in formulating the current discussion, popularized the term. It has some similar predecessors including Andy Revkin's formulation of the Anthroscene in 1992, but the key ontological novelty comes from the new understanding of earth systems that the term encapsulates (Hamilton and Grievald 2015). The Anthropocene has entered both popular and academic discussion and as the debate about when it might most reasonably be judged to have started makes clear, it is posing key questions for geography and for political ecology. What its utility might be is a matter still undetermined, but so far at least the argument over its dating, the most significant themes that might be used to designated its appearance and the political usage of the terms have generated considerable attention. These matter both the discipline of geography and to larger political discussions that frequently very poorly formulate matters of climate change, sustainability, globalization and the possibilities of the human future (Galaz 2014).

The Anthropocene thus, the rest of this paper argues, provides a formulation for rethinking many of these things, not least transcending the human/nature dichotomy that bedevils intelligent political discussion of the options in decades ahead and is, as such, a profoundly useful category for both political and geographical thinking (Johnson et.al 2014). But if it is to live up to its political and pedagogic potential care has to be taken that existing conceptual frameworks don't simply coopt the language of the Anthropocene without thinking through the transformative potential inherent in the term. If it is simply assumed to be a neologism for environmental degradation, a trendy word for well-understood declensionist phenomena, a euphemism for imminent civilizational demise, or an apology for maintaining the profoundly unjust political economy of the present, then an intellectual and political opportunity will be missed. There may be good reasons to be suspicious of the term, not least by how it is sometimes used to evacuate key matters of politics (Purdy 2015), but engaging it is now unavoidable.

Geography is at the heart of both the intellectual and political debates about the Anthropocene these days, and as such an explicit engagement with the term is richly warranted both within the discipline (Castree 2014a,b,c,) and the larger discussion beyond (Castree 2015). Where Castree has worked through the debate for academic geography, this paper looks at the larger discussion online and in a couple of key journalistic contributions in the wider popular culture discussion of the term.

GOOD VERSUS BAD ANTHROPOCENE: REVKIN, HAMILTON AND ROMM

Andy Revkin author of the *New York Times* dot.earth blog has repeatedly posted items about the Anthropocene over the last few years; indeed his blog has at times become a clearinghouse for discussions on the theme. On 16 June 2014 he posted a blog post on "Exploring Academia's Role in Charting Paths to a 'Good' Anthropocene" where he discussed a couple of academic meetings in previous weeks and included a link to a video of his own June 2014 lecture about a "Paths to a 'Good' Anthropocene" which was delivered to the annual meeting of the Association of Environmental Studies and Sciences (Revkin 2014b). The title to his lecture came "with quotation marks around the adjective 'good' to stress that values determine choices" (Revkin 2014a). The lecture triggered a response from Clive Hamilton, Australian public intellectual and blogger, posted the following day. Hamilton (2014) took issue with Revkin on a number of points. Revkin (2014c) in turn replied briefly to these challenges. The lecture and Hamilton's reply generated an especially forceful intervention from Joe Romm (2014) that bluntly contrasts framings of the Anthropocene in terms of good or bad.

Revkin's talk is a rambling affair. Its part after dinner speech, part pep talk for the rowdy students in the audience who enjoy the frequent jokes, a personal biography of his journey through decades of environmental journalism, partly agenda setting performance for the conference at Pace University that follows on the theme of the talk. The talk is also partly about Revkin's insistence that social sciences matter and climate can't be left to hard scientists, but perhaps mostly it's a performance in the

genre of motivational speeches and an explicit rejection of pessimism in the face of dramatic environmental change. The talk is only loosely scripted and draws heavily on personal experience and amusing anecdotes including ones from Revkin's own youthful environmental activism. The YouTube video is low quality, and while the sound track is clear the illustrations that Revkin used in the lecture are only partly and inconsistently shown in the video. An early part of the talk points squarely at the difficulties of communicating science, of climate scientists as Moses bringing the tablets down from the ivory tower to an uninterested people busy with their lives and with priorities very different from the concerns of the Intergovernmental Panel on Climate Change (IPCC) authors. The social sciences have a role to play here in terms of communication and how messages are received; Revkin is clear that yet more climate science will not necessarily change minds. How understanding works is a key theme in the talk, and environmentalist themes of "Woe is me, shame on you!" figure prominently in his argument that this meme isn't enough to effectively engage in the politics to deal with climate change.

Variegation, a multiplicity of approaches, is necessary in the environmental movement Revkin asserts. There is no one size fits all commonly agreed solution to climate difficulties. The numbers used for climate projections are part of the problem according to Revkin because of their failure to communicate to numerous audiences in ways that relate to lived experience and hence the possibilities of effective engagement. What traits are important in dealing with climate? He suggests a list of matters that included flexibility, learning and teaching. Revkin bemoans the lack of sustained support for basic science and renewable energy research – something that he argues is clearly needed to move climate responses ahead. Twitter and hashtags as a communication tool that facilitates innovation and education gets enthusiastic endorsements. The ability to monitor and track environmental change matters too, but key is the ability to live well in changing times. This is about personal growth and given the applause that greeted these parts of the talk, the students in the audience appreciated it. There is little here specifically about the designation of the current era as the Anthropocene, and not much about it as either good or bad. The commentaries from Hamilton and Romm are more about the premise of the 'good' Anthropocene rather than the specific content of Revkin's talk.

Clive Hamilton's (2014a) argument is premised on the climate science that suggests that humanity is probably already locked into an increase in global temperature beyond 2 degrees Celsius and heading towards four degrees. "According to those best placed to make projections, a world 4°C warmer would be a very different kind of planet, one unsympathetic to most forms of life, including human life. Apart from climatic change, other manifestations of human impact in the Anthropocene, from interference in the nitrogen cycle to plastics in the oceans, only add to the grim outlook." Hamilton goes on to emphasize that Revkin, who he aligns with the "eco-pragmatist" school of thinking epitomized by the Breakthrough Institute, doesn't deny the science. Rather he chooses to reframe it, and in doing so conjures a notion of a good Anthropocene. Hamilton notes that Revkin declares disarmingly in his

talk: “You can look at it and go ‘Oh my God’, or you can look at it and go ‘Wow, what an amazing time to be alive!’ I kind of choose the latter overall.” Hamilton goes on to say that Revkin is “... of course, entitled to put on any kind of glasses you choose, including rose-coloured ones; but that does not change what you are looking at.” In short, unlike the climate deniers, Hamilton argues that Revkin is accepting the science but framing it as an opportunity, not a disaster. Hamilton reads the science to indicate that disaster is precisely what is in store for the future of humanity.

While lumping Revkin in with the larger school of eco-pragmatism or ecomodernism epitomized by the Breakthrough Institute (the terms are often used interchangeably (Nordhaus and Schellenberger 2014)), may be a bit of a stretch Hamilton nonetheless focuses in on how Revkin equates affluent technologically savvy Americans with humanity in general, suggesting that this conflation hides an ideological agenda, and in doing so disregards the current condition and likely fate of the majority of humanity in coming decades. Following the theme raised by an Indian student in the final question after the lecture, but not answered specially by Revkin, Hamilton suggests that Revkin “believe(s) that ‘with work ... we can have a successful journey this century. ... We are going to do OK.’ Personally, when I think about those toiling, vulnerable masses who are going to suffer the worst consequences of a warming world, I find it offensive to hear a comfortable, white American say ‘We are going to do OK’. I’m sorry if this seems harsh, but unless the IPCC has it completely wrong, much of the world’s population is not included in your “we”.” For the bulk of the world’s population then, Hamilton sees the Anthropocene as being anything but “good”. Thus the moral case against Revkin here is in terms of a geopolitical myopia that facilitates wishful thinking that has very obvious political consequences because it leads away from a priority on reducing greenhouse gas emissions and hence slowing the speed of transformation of the planet.

Hamilton draws a direct link between Revkin’s rose coloured thinking and the political conservatives and physicists who are uninterested in reducing the use of fossil fuels, who frequently deny climate science’s veracity but are happy to consider geoengineering ideas as a way of maintaining the political order that caused the problems in the first place (Lahsen 2008). Effectively the notion of a ‘good’ Anthropocene deflects attention from the need to deal with numerous problems facing the majority of humanity. “In the end, grasping at delusions like “the good Anthropocene” is a failure of courage, courage to face the facts. The power of positive thinking can’t turn malignant tumours into benign growths, and it can’t turn planetary overreach into endless lifestyle improvements” (Hamilton 2014a). He concludes his critique rather pithily by suggesting that less bad is still worth struggling for, and that is the best that is possible in coming decades: “Things are bad, and if we carry on as we are things will be very bad. It is the possibility of preventing bad turning into very bad that motivates many of us to work harder than ever. But pretending that bad can be turned into good with a large dose of positive thinking is, even more so than denying things are bad, a sure-fire way of ending up in a situation that is very bad indeed.” All of which bluntly frames the essential point of the discussion in terms of the trajectories of the planet and the question of for

whom the Anthropocene might possibly be good, and what to do about those for whom it is obviously, well, bad.

Revkin's (2014c) brief response, which generously included a reprint of Hamilton's critique, came on June 18th on his blog where he suggested that Hamilton's critique "doesn't deal with the core argument of my talk (the need for a shift in goals from numerical outcomes to societal qualities) and instead focuses on my use of the word 'good' in relation to an era he clearly sees as awful". On the substantive issues, especially the need to address the needs of poorer peoples, Revkin suggests that they were actually in broad agreement or rather they were if the wider corpus of Revkin's thinking beyond the lecture was considered. He suggested that the inference that he supported geoengineering was mistaken, and suggested that he was not under any illusions that techno-fixes were going to solve the problem of climate change. He concluded by adding links to Hamilton's (2014b) contemporaneous commentary in *Scientific American* on how "The New Environmentalism will Lead us to Disaster" (which includes a criticism of Ellis (2011a) formulations of a "good Anthropocene") and to a Joe Romm (2014) blog where the notion of a 'Good Anthropocene' is discussed explicitly in terms of language and the politics of communication.

While much of Romm's (2014) blog entry reprises themes in his earlier book on *Language Intelligence*, (Romm 2012) the first argument is that plain speaking is the key to effective communication and a term like Anthropocene is anything but. Adding good to it is only making matters worse. Focusing on personal growth and optimism about the future, what Romm interprets as the dominant theme in Revkin's lecture, but not on practical policy measures to reduce carbon emissions drastically in coming decades, that Romm insists is what matters to avert catastrophe, sets up an argument that 'good' Anthropocene is Orwellian obfuscation or self delusion, or perhaps both. For popular communication and political mobilization the Anthropocene is thus Romm argues a very bad idea. Whether it might have scientific or conceptual value isn't discussed. But Romm doesn't explicitly engage with Revkin's discussion of communication, which, given Romm's line of criticism, is a strange omission.

The implicit premise in Romm's text and the explicit point that he quotes both Hamilton and Elizabeth Kolbert on is that the Anthropocene is about the destruction of the natural world that humanity has set in motion in the last few decades. While watching Revkin's lecture Romm says Elizabeth Kolbert emailed him stating that:

I don't see the value in the "good Anthropocene" as a rhetorical construct, even if it's well-intentioned. What we are doing to the planet, which is of course the reason geologists are considering renaming the epoch in which we live, is in no way good. A few years ago, Paul Crutzen told me that he hoped the word Anthropocene would serve as "a warning to the world." I think part of the power of the term is that it resists modification.

Romm also quotes the conclusion from Kolbert's (2006) earlier book *Fieldnotes from a Catastrophe* to the effect that "It may seem impossible to imagine that a technologically advanced society could choose, in essence, to destroy itself, but that is what we are now in the process of doing." This is what Kolbert interprets Crutzen to be implying with his formulation of the term as a warning. One could then argue that a warning would be pretty useless unless it is effective as a device to facilitate a change of course and the kind of practical policy actions that Romm sees as essential to respond to climate change in particular, and hence implicitly take seriously the central insight of the Anthropocene that humanity is acting in ways that shape the future of the planetary system. But Romm at least seems to think the term Anthropocene is too esoteric to work effectively as such a political device.

HUMAN AGE AND THE SIXTH EXTINCTION: KOLBERT AND ACKERMAN

In addition to her *Field Notes from a Catastrophe* Elizabeth Kolbert wrote a cover story for the *National Geographic* on the Anthropocene in 2011 and then the lengthy account of biodiversity loss in *The Sixth Extinction*. The prose in *The Sixth Extinction* is compelling, the narrative gripping; a popular writer who knows her trade very well indeed. Her global travelogue of key field sites in the geological sciences is a fascinating introduction to geology. The author simultaneously takes the reader on a journey to places where animals are now going extinct, mostly because of habitat loss and ecological disruption. The destruction of non-human forms of life by the expansion of *Homo Sapiens* is relentlessly documented in these pages. The title of the volume suggests unambiguously that humanity is causing the loss of species on a scale that matches previous catastrophic events in the geological past. Life has survived but in each case in dramatically altered assemblages; the same is undoubtedly true now. Hence, given the geological scale of current biological changes, the formulation of the present as a geological transition, the Anthropocene. This is much more than is usually encompassed by traditional environmental concerns.

The first few chapters take the reader on a journey to Panama where frogs are dying en masse, to introduce the idea of extinction, a notion that is in fact fairly new to human thought. George Cuvier's eighteenth century work on paleontology marks the beginning of the idea, a tragic vision of earth history that as Kolbert (2014: 25) suggests, "has come to seem prophetic." Discussions of catastrophism and uniformitarianism, and Charles Lyell's geological writings follow, of importance because Lyell's work so influenced Charles Darwin on his Beagle voyage. Uniformitarianism postulated very slow incremental changes over very long time spans. This is the duration needed for evolution by natural selection to occur. Extinction is the other side of the coin; species appear and disappear in the geological record. Kolbert notes that Darwin passes over human caused extinctions without reflecting that these are such oddities in geological terms. What is clear is that extinction is part of the geological record; we are now according to her title in

the sixth major episode in the planet's history. But it is a unique one caused by the actions of one species.

Only much later in the twentieth century did catastrophic events as causes of extinction become a commonplace understanding of the "gaps" in the fossil record that the geological record had enumerated. A meteor impact and its aftermath eliminated the dinosaurs at the end of the Cretaceous, leaving a very different combination of species alive in the Tertiary, a point now familiar to most school children. Fitness and virtue have nothing to do with surviving such an event; luck has much more to do with survival in radically changed circumstances. "The reason this book is being written by a hairy biped, rather than a scaly one, has more to do with dinosaurian misfortune than with any particular mammalian virtue" (Kolbert 2014: 91). Hairy bipeds have now taken over.

Chapter five is titled "Welcome to the Anthropocene". A visit to Dob's Linn in Scotland and its graptolite beds guided by Jan Zalasiewicz and other geologists raises the question of the current episode of extinction, and how it stacks up against earlier events in geological history. Will rats be the dominant animals when humanity is through Zalasiewicz wonders? This leads Kolbert (2014: 108) to a discussion with Paul Crutzen where he recounted to her the now famous episode in a meeting where he grew exasperated with the designation of the present in terms of the Holocene and blurted out "We are no longer in the Holocene; we are in the Anthropocene". The argument subsequently appeared in Crutzen's 2002 paper in *Nature*. Zalasiewicz, Kolbert explains, was intrigued by the idea and as head of the stratigraphy committee of the Geological society in London set in motion the geologists' discussion as to whether we are now living in the Anthropocene (See Zalasiewicz et.al 2015).

Subsequent chapters deal in detail with ocean acidification, coral reefs, how forests are changing as a result of climate, island effects of fragmented habitat, and the extraordinary pace at which globalization as remixed the fauna and flora of the planet and changed the geographical distribution of species that Darwin among others wrote about. This, in Kolbert's terms, is the new Pangaea where forms of life separated for a very long time by continental drift are now effectively once again part of a single continental assemblage of species.

One of the striking characteristics of the Anthropocene is the hash it's made of the principles of geographic distribution. If highways, clear-cuts, and soybean plantations create islands where none before existed, global trade and global travel do the reverse: they deny even the remotest islands their remoteness. The process of remixing the world's flora and fauna, which began slowly along the routes of early human migration, has, in recent decades, accelerated to the point where in some parts of the world, non-native plants now outnumber native ones. (Kolbert 2014: 198)

This whole process is unique to our times; no other geological episode has so mixed up flora and fauna; as Kolbert notes, the new mixtures have inspired Erle Ellis (2011b) and others to remap the world in terms of Anthromes rather than the earlier notions of geographical distribution of “natural” species collections.

Trying to keep Sumatran rhinos alive and breeding emphasizes the efforts zoologists are making to try to prevent extinctions; keeping biodiversity options open for the future where reintroductions to suitable anthromes may be possible; there is no such thing as a wild anymore into which many species can be reintroduced. Extinction events of large mammals caused by human predation suggest to Kolbert that we should date the advent of the Anthropocene much earlier. Heroic efforts to keep species alive have become part of numerous scientific efforts. Kolbert (2014: 268-9) ends her volume with the following crucial reflection: “Right now, in the amazing moment that to us counts as the present, we are deciding, without quite meaning to, which evolutionary pathways will remain open and which will forever be closed. No other creature has ever managed this and it will unfortunately be our most enduring legacy.” Whether this is good or bad isn’t the final concern, but clearly the extraordinary circumstances of the present warrant the designation of the present in geological rather than just ecological terms.

Diane Ackerman (2014) starts her account of the Human Age by juxtaposing the famous 1972 NASA photo of the “Blue Marble” with their 2012 “Black Marble” image of the earth at night, illuminated by city lights. This is an indication of how far humanity has come given that it is now capable of lighting up substantial parts of its planet at night as the urban “hivelike settlements” spread across all the continents except at least so far, Antarctica (Ackerman 2014: 19). Landscapes have been radically altered; now Japanese tourists sign up for nighttime cruises through giant chemical plants. Such novel ‘scapes lead Diane Ackerman inevitably to Edward Burtynsky’s photographic studio in Toronto and meditations of the wastelands created by industrial production – quarries as inverted skyscrapers. It leads her also to Toronto zoo where Orangutan’s are experimenting with iPads, and in the process challenging humans to rethink their notions of nature. As the title of the first part of her book has it in the now familiar slogan: “Welcome to the Anthropocene!”

Ackerman is not reluctant to tackle the issues of climate change; her own garden is witness to dramatic changes. Humanity “... due to our tinkering has given the world a low grade fever, which we need to quickly calm before it climbs” (Ackerman 2014:42). Hurricane Sandy’s destruction is itemized in some detail, as are other floods and droughts that have inflicted harm on people in numerous corners of the planet of late. Residents of Alaskan coastal communities too have to face the remaking of coastlines and their migration to higher ground; that humanity is messing with Gaia is clear! But how to act in such circumstances isn’t clear beyond the obvious need to innovate, not least by thinking about coastal ocean farming among other novel ways to harvest food, a tricky matter with potential despite the ominous problems of rising acidification and the rapid growth of jelly fish populations in warming and depleted seas.

Urbanization gets considerable attention with innovative aquariums posited as a starting point in the search for new reefs, biodiversity experiments and urban forms. Novel arrangements with plants, hydroponics, and architecture inspired by termite mounds and passive heating and recycling systems are surveyed in Ackerman's breathless prose. Incinerators as heat sources in Sweden, solar panels in Germany; the list of possible new ways of making cities work is lengthy in these pages. Urban species that populate Anthropocene cities suggest that nature isn't natural anymore, but new artificial ecosystems are emerging; swallows with long wings are much less plentiful than those with short wings in some urban spaces. The quicker and more maneuverable birds can deal with vehicle hazards much better and have outbred their long winged cousins. Urban wildlife is now standard in many cities. Suburban life has opened up new ecological niches that are being colonized by numerous animals adapting to new "metropolitan jungles" (Ackerman 2014: 122). Some of these invasive species, pythons in Florida in particular, are a serious problem for their human neighbours. Much of this is related to the changed migration patterns of birds trying to cope with both climate change and the fragmented landscapes that agricultural activities have created.

Ackerman recounts the record of prior planetary extinction events briefly and then confronts the sixth extinction event head on suggesting that perhaps half the world's plants and animals will disappear by 2100. "But, for a change, we know the exact causes of the extinction, having created them ourselves – climate change, habitat loss, pollution, invasive species, big agriculture, acidifying the oceans, urbanization, a growing population demanding more natural resources – and we're in a position to stop them, if we set our collective mind to it." (Ackerman 2014: 154). On how this might be done Ackerman, "the poet laureate of the optimist camp" in Allen's (2014) terms, says not a word. After that brief interlude we get many pages on DNA banks and the possibilities of parks and conservation in a world where wildness is a thing of the past.

From there it is but a small step to the question in part four of the book, which ponders whether humans are natural any longer. High-tech wonders are now probing our brains. Will all this newly understood matter of brain function fundamentally change Anthropocene ethics Ackerman (2014: 178) wonders? Can nanobots in our bloodstream kill tumours without surgery or chemotherapy? If so what then for the future of human health, and what kind of nature might we have left behind. Nano technology may rework the world in ways as dramatic as that electricity has already done but which we no longer notice. Have we now, she wonders two presences, a physical one and an online one, effectively a virtual avatar twin although she doesn't use the actual phrase? Not surprisingly artificial intelligence gets lots of attention next in the book, and then 3D printing too, not least because of the possibilities that bioprinting might have for medical tasks that will replace painful surgical procedures. Implants, pacemakers, stents, artificial joints and numerous other innovations are turning us into cyborgs. Epigenetics just

adds more evidence to the argument. Thus the Anthropocene is the artificial age, if not really the human age. But all this is about only some humans.

After many chapters working through how we are no longer the biological beings we had long thought we were Ackerman returns to the theme of us as geological beings, ones that have dramatically changed things due to our bad habits. “Without really meaning to, we have nearly emptied the world’s pantry, left all the taps running, torn the furniture, strewn our old toys where they are becoming a menace, polluted and spilled and generally messed up our planetary home (Ackerman 2014: 307). While the metaphor obviously works for her North American middle class audience, the following paragraph is as close as she comes to a strategy for coping with the messed up planetary home. “I doubt any one fix will do. We need systemic policy changes that begin at the government level, renewable energy replacing fossil fuels, widespread green building practices, grassroots community and nationwide projects, and individuals doing whatever they can, from composting and recycling to walking to work instead of driving” (Ackerman 2014:307).

Crucially if this young species is to grow into a responsible one we need to look at ourselves once again from various angles. “Instead of ignoring or plundering nature, we need to refine our natural place in it” (Ackerman 2014:308). While the book may help in the task of rethinking our place, it does precious little to think through how the refining might be accomplished. As with Romm and Hamilton’s critiques of Revkin there is an ominous silence in how these new circumstances might be shaped collectively and how political strategies might be forthcoming as a result of the analysis of the Anthropocene. Clearly Ackerman suggests that the future has all sorts of technological possibilities, but she does not provide any guide as to how those opportunities might either facilitate dealing with contemporary difficulties for those in harm’s way, nor how long term notions of sustainability might be facilitated by taking the notion of the human age as point of departure for new social, political or economic arrangements. In terms of the movie script from the subtitle to this paper Ackerman follows it quite closely; good disposes of bad and the ugly is simply irrelevant.

AND THE UGLY: THE POLITICS OF THE ANTHROPOCENE

At the end of the question and answer period following Revkin’s talk an Indian student tried to engage Revkin on his assumptions of a single human “we”. Suggesting that over the last few hundred years humanity hasn’t operated as a “we” she went on to ask: “How does the concept of the Anthropocene acknowledge the differentials in how humans have interacted with one another?” Instead of tackling the political question implied in the student’s question Revkin replied by referring to Darwin and then to Verdnadsky and deChardin and their notions of the noosphere. The invocation of a single humanity evades the important questions of the politics of the present, and which ‘we’ is being invoked, something that Revkin partly acknowledges in his response but doesn’t address explicitly. Hamilton’s reprise of the student’s question in his blog response to Revkin puts the matter very

directly in terms of who it is that is likely to be OK in coming decades. Hamilton (2014a) is unconvinced that many millions of people in dangerous places will be; Revkin's 'we' doesn't seem to encompass them at all. Neither does Ackermann's formulation of the Anthropocene, and Revkin and her shared exuberance about technological innovation falls very short of any form of serious social analysis.

However, what this focus on what might be good about the Anthropocene does offer very clearly is the key point that whatever form of politics might engage with the larger questions, it simply has to recognize that in the Anthropocene numerous new technological possibilities are opening up, and how the next stage of the Anthropocene is shaped will be in part about how these new technologies are adapted and used by whom to what ends. This is crucial to Johan Rockstrom's (Rockstrom and Klum 2015) formulation of a big world in a small planet; the possibilities of innovative agricultural techniques, renewable energy sources and much more attention to matters of biodiversity loss still, he argues, offer the possibilities of shaping the future so all of humanity, not just the rich white urbanites who study earth systems, can thrive in the new urban circumstances that are being produced. The point is that the bad Anthropocene isn't inevitable if the politicians and corporate executives understand that intact ecosystems are essential for their success in coming decades; a shift in focus that Rockstrom like Nordhaus and Schellenberger, thinks is much further along than Hamilton does.

While critics, Hamilton (2013) in particular, fear the focus on technological fixes leads inexorably to a discussion of geoengineering (see Keith 2013), given many of the technologies that Ackermann surveys, not including climate modification devices, this isn't the whole story. The implicit assumption that technological innovation alone will be enough to ensure a promising future for humanity strikes Hamilton in particular as at best naïve, precisely because of its failure to engage politics. But the future will be played out in circumstances of rapid technological innovation, some of which will be relatively geologically benign, some of which obviously won't! Naomi Klein's (2014) insistence that political elites will have to be pushed to change their ways, and that innovative municipal arrangements in cities and strategies of rural regeneration are necessary to fulfill the promise of new architecture and energy systems seems a very necessary supplement to Revkin and Ackerman's optimism about technology.

Hamilton's engagement with the eco-pragmatism school of thought, which given their fascination with novel technological possibilities, Revkin's lecture, if not many of his other texts, and Ackerman's book, clearly are loosely aligned with, challenges them not just on the failure to consider humanity at large, rather than a narrow portion of affluent Americans, but also crucially on how they have in his terms misappropriated the earth system science literature and the notion of the Anthropocene in particular. "But the idea of a good Anthropocene is based on a fundamental misreading of science. It arises from a failure to make the cognitive leap from ecological thinking—the science of the relationship between organisms and their local environments—to Earth system thinking, the science of the whole

Earth as a complex system beyond the sum of its parts” (Hamilton 2014b). Failing to do this, and it is important to note that the label is eco-pragmatism, not geo-pragmatism, allows Hamilton to suggest that at least Ted Nordhaus and Michael Shellenberger in their 2004 essay on the ‘Death of Environmentalism’ (Reprinted and extended in their subsequent book *Breakthrough: From the Death of Environmentalism to the Politics of Possibility* (2007)) and some of Erle Ellis’s (2011a) writings too, ignore the full scale of the transformation of the planet currently underway. In doing so the technoutopian vision of the future simply ignores the calamitous trajectory humanity is on and, as such, is dangerously misleading.

Taking this line of argument further Hamilton complains that Ruddiman’s (2005, 2014) early Anthropocene formulation allows eco-pragmatism to suggest that humanity has already changed the planet fundamentally, we have been in the Anthropocene for many millennia, hence there is no undue cause for alarm. Thinking in these terms, Hamilton suggests, avoids dealing with the qualitatively different impact of humanity since the beginning of the industrial revolution, and specifically in the period of the great acceleration since the end of the Second World War when so many things have been changed very drastically, not only the levels of carbon dioxide with the resultant climate disruptions. (Hamilton’s 2014b criticism predates the Lewis and Maslin’s (2015) suggestion, “the orbis hypothesis” that the Anthropocene might be dated to the mass death of aboriginal peoples in the Americas as a result of diseases brought by Europeans. Rapid reforestation resulted in the early part of the seventeenth century and the subsequent reduction of carbon levels in the atmosphere is a noteworthy geological change. This argument in turn links to Geoffrey Parker’s (2013) historical reconstruction of the climate disruptions of the seventeenth century, events that were so crucial in the emergence of the contemporary global order. See Mitchell (2015))

The scale of the changes in the period of the great acceleration requires thinking in geological rather than ecological terms, and if that were done by Shellenberger, Nordhaus and others of similar intellectual ilk, Hamilton suggests, the true scale of current events, what Kolbert explicitly frames in terms of an extinction event, would become clear in a way that the technoutopians simply haven’t grasped. Their failure to shift from ecological thinking to a geological register means that their appropriation of the Anthropocene evacuates its epochal significance and allows them to suggest that technology promises all sorts of things that Hamilton suggests are implausible in the face of rapidly rising carbon dioxide levels. His forcefully stated case is that simply assuming technology is the answer without thinking through the geological transformation implied by projections of carbon dioxide levels as high as 700ppm, if current trends continue, is politically delusional. This is about much more than has traditionally been encompassed by environmental politics. In terms of the movie script theme of this paper it obviously diverges from the screen outcome. There the good disposes of the bad, tricks the ugly, and in the end allows ugly to live. Now clearly we need politics (ugly) to dispose of the bad Anthropocene if the good is to prosper. The good can’t do it all alone.

The eco-pragmatists, accused of these various political and conceptual inadequacies, have responded by planning a workshop dialogue for June 2015. But clearly, despite having Clive Hamilton, and Bruno Latour (as well as Andy Revkin) as invited participants, the online announcement of the dialogue completely fails to grapple with geological transformation. (see the online announcement at <http://thebreakthrough.org/index.php/dialogue/agenda/>). Neither is there any clear indication that the criticism of the eco-pragmatists on the grounds of invoking a universal humanity and in the process obscuring the condition of the majority of humanity is being considered seriously. The key argument made by eco-modernism's advocates is that technological innovation will allow for reductions in the human imprint on the natural world effectively reducing the carbon footprint of contemporary consumption lifestyles. Eco-modernism in this incarnation is all about rethinking technological and environmental things. No leading earth system scientist is on the invite list, although both Latour and Hamilton do know this literature in detail. Nor are there any indications that discussions will be had that explicitly engage the politics of contemporary transformations.

What the ecomodernism and ecopragmatism tropes do offer is a vision of a drastically changed future in which the human condition will be different from that of the present. It offers optimism in the face of the pessimism and emergency framings that the declensionist and catastrophist narratives frequently offer, none of which provide an appropriate political focus for effective innovation. While the temptation to dismiss ecomodernism as wishful thinking is obvious once a serious political economy analysis is engaged, to do so is to abandon some useful political resources that imagine a future that might be much less disastrous than the present trajectory suggests. Johan Rockstrom's (Rockstrom and Klum 2015) insistence that a prosperous future is possible within a safe operating space for humanity demands numerous political interventions to be achievable, but his point is that rapid innovation and tackling the problems of biodiversity, climate, nutrient amplification and ocean acidification is still feasible even if time is short.

Markets and technological innovations are not going to be enough to build sustainable futures for most of humanity, never mind other species, but how to engage them in a politics that looks forward and builds new funding and technological arrangements is now the question; the future will be partly good, and partly bad, and the politics may indeed be ugly, but it is now clearly unavoidable. All of which require an explicit working out of how new technologies and social arrangements can be engaged in political mobilizations that offer politicians and social movement activists useful practical things to work towards. Naomi Klein's (2014) focus on community regeneration is but one useful attempt to look to the positive possibilities of new technological assemblages connected to a progressive political agenda.

THE ANTHROPOCENE IN THE ACADEMY

Malm and Hornborg (2014) are more than a little concerned that the Anthropocene discussion is being led by natural scientists and in the process the inequities in human societies are occluded and politics replaced by an invocation of a universal singular humanity. Reading some of the prominent discussions of the Anthropocene (Steffen et.al 2011) the lack of engagement with power and political decision-making is noteworthy. They argue that none of this discussion should remove the importance of social sciences investigating power and culture. Further: “the physical mixing of nature and society does not warrant the abandonment of their *analytical* distinction. Rather, precisely this increasing recognition of the potency of social relations of power to transform the very conditions of human existence should justify a more profound engagement with social and cultural theory” (2014: 62-3). While the engagement by Revkin, Ackermann and the Breakthrough Institute’s eco-pragmatists might allay Malm and Hornborg’s fears a little on engagement by non scientists, eco-pragmatists frequently don’t deal with the more important point that social relations of power are key to how the Anthropocene is being shaped. And as such they leave out the potential of the Anthropocene as a way of simultaneously bridging the humanities and the sciences by recontextualising the human condition beyond the human/nature dualism, and a refocusing on the future as a matter of decisions about production rather than environmental protection (Dalby 2014b).

Crucially, this paper argues, the Anthropocene focuses attention on the need to think well beyond the modern categories of human and nature, and particular it requires shifting discussion out of modes of environmental discourse to think in geological terms, and in the process focus on production, the making of future worlds and the politics of deciding what is made. This is to reprise and update Neil Smith’s (1984/2008) influential formulations of the simultaneous production of space and nature as key to capitalism, and to simultaneously take seriously his insistence on challenging the ideological strictures in much environmental discourse with its preservationist ethos and its claims to universality that have, despite so many of its adherents’ hopes, often stifled its progressive potential. The Anthropocene also suggests that current transformations require political actions in numerous places, not just where it has long been assumed political power lies; governing climate isn’t a matter solely of state politics (Bulkeley et.al 2014).

Formulating matters in terms of geological politics (Clarke 2013) shifts the focus to matters of production while simultaneously emphasizing the point that the future is open to political interventions, not a matter of foregone conclusions (Dalby 2014a). More than this it suggests that the context for international politics itself is being remade by human actions; geopolitics no longer operates in a given context (Hommel and Murphy 2013). That said, the technocratic attempts at both mitigation and adaptation to climate change that have so far been attempted have often caused more conflict and security problems than the ostensible cause of these things in the changing climate (Dalby 2013b; Dunlap and Fairhead 2014). Determinism has been finally demolished by the earth system discussions of the Anthropocene; insights

from the earth system framing of current options (Anderson and Bows, 2011; Steffen et.al 2015) now need much more attention from scholars in the humanities.

A reworked notion of possibilism, one shaped by the much more comprehensive understandings of both earth system science on one hand (Whitehead 2014) and political ecology with its focus on lived environments on the other (Taylor 2015), offers a much better encompassing interpretive frame for present circumstances. It does so because it demands political action to shape the future, recognizing that we live in a world that, in William's Connolly's (2013) terms, is about fragile things and self-organizing processes that now urgently require democratic activism in the face of persistent neoliberal fantasies. Naomi Klein's (2014) arguments for linking various forms of political activism in a coalition of fossil fuel divestment, protest against mines and pipelines and a reconstruction of rural economies using renewable energy, offers a broad outline of what is needed. Climate change adds urgency to activism in a world where opposition to fossil fuel production is obviously necessary if the majority of those fossil fuels are to stay in the ground and the planet not push pass 2 degrees Celsius heating (McGlade and Ekins 2015).

All this inevitably involves engaging social and political theory much more explicitly; social scientists, and not just political scientists (Keohane 2015), have much thinking to do about how to facilitate rapid social change away from a global economy powered by fossil fuels premised on high modernist assumptions that nature is external to human affairs. "[T]he question is not how to continue present ways of life, but the deeper challenge of crafting new ways to respond with honor and dignity to unruly earth forces" (Ginn 2015: 7). More than this the additional question is how to tackle the simple fact that those forces are being made more unruly by the actions of the affluent part of humanity, and to do so in ways that understand the diverse human cultures that are trying to respond in multiple ways to circumstances not of their own making (Cameron, Mearns and McGrath 2015).

Asking what until recently might have seemed to be impossible questions as to how humanity should decide what the correct temperature of the earth should be are now on the agenda (Caseldine 2014); the key political point is to ensure that the political elites that have blindly operated on high modernist premises, and in the process created the conditions of the great acceleration, are not those that appropriate the right to decide the answer (Swyngedouw 2010). These are not matters that can be left to geophysists to decide; previously marginalized voices, and aboriginal ones in particular have to be heard because they are simultaneously least responsible for present circumstances, and those most likely to be most drastically affected by imminent transformations (Ridgeway and Jacques 2013). The Anthropocene is neither good nor bad but is going to be shaped by a politics that is necessary and probably will be rather ugly given the resistance of the fossil fuel industry in particular to attempts to keep 'rocks' in the ground. Climate change matters of biodiversity, ocean acidification, and nutrient amplification too then become a matter of what is being made for the future, a political choice rather than a matter of technological inevitability or imminent unavoidable doom.

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