

A. Author:

Stefan Herbrechter, Heidelberg University, Germany, stefan.herbrechter@as.uni-heidelberg.de

B. Abstract:

Posthumanism is often perceived as a more or less science fictional discourse focused on the imagination of posthuman futures that involve some form of technological enhancement, artificial intelligence or space travel. *Critical* posthumanism has been engaging *critically* with the desire to transcend the 'human condition' that usually informs post-, or rather, transhumanist fantasies of disembodiment, dematerialization and overcoming 'our animal bodies' (i.e. biology, biological evolution and 'nature'). Instead, it has been engaging in the ongoing deconstruction of the underlying humanist, anthropocentric, speciesist and exceptionalist values that inform post- or transhumanist discourse, and has emphasized the material and biological entanglement between human and nonhuman life at a planetary level. Apart from seeking alternative and affirmative forms of biopolitics in a time when humans are said to have become the most important geological and atmospheric force – this is what the new geological term of the Anthropocene stands for – the humanities and social sciences have undergone a 'geological' turn. As a result, the notion of deep time that a geological imaginary affords has also led to a 'geologization' of posthumanism, which provides an important antipode to the techno-utopian and techno-centred figure of the posthuman. Placing the human within a deep-time geo-political and geo-ecological framework in the context of the Anthropocene, global climate change and extinction threats allows for a new deep ecological thinking and new forms of postanthropocentric narrativizations, or 'geostories'. These deep-time narrativizations can also provide alternative and differential accounts of ancestry and extinction events.

C. Key words:

Ancestrality, anthropocene, deep time, ecology, extinction, geoengineering, geological turn, postanthropocentrism

D. Introduction:

While our current 'posthuman times' (Braidotti 2019: 1) tend to be largely focused on the prospect of a posthuman future, the geological notion of 'deep time' must be thought both forward and backward (Wood 2019: 2). One of the distinctive features of a *critical* posthumanism is therefore the recognition that the futural and often openly futuristic orientation in most posthumanist thinking, with its focus on cyborgs, artificial intelligence, interstellar travel and geoengineering, in fact throws us back to our origins. Asking where humans are going or what they are evolving into at the same time brings up the question of where we come from and how we became what we think we are. The anticipated deep future of the posthuman thus cannot help but also recall a deep past. Both contain worlds 'without' us. Both are, in a sense, 'before' us – a *prehuman* time that somehow contains the answer of the origin of our species – and a *posthuman* one, that may still lie before us, but which may also spell out our end, in the form of extinction or evolutionary supersession. What makes the ongoing search for an answer to what it means to be human so urgent in our time are two

perspectives that are closely related: the realization that humans may have become the most important geomorphic factor on the planet (this is what is behind the notion of the Anthropocene) and the increasing fusion between humans and technology (to a point where 'transhumanists' are projecting a post-biological future).

In this context, geology – one of the leading realms of inquiry in the late eighteenth and early nineteenth centuries – has become once more a focus of philosophical and cultural inquiry (Farmer 2018: 193). Deep time, traditionally the province of geology's investigation into mineralization, rock formation, sedimentation, strata and atmospheric change and so on, has captured the current posthumanist imaginary to a point where Jeffrey Jerome Cohen speaks of 'geophilia' or a 'love of stone' (2015: 72-73). In this context, a reminder of deep time at the very moment human society seems suspended between cataclysmic technological and ecological development, between speed and looming catastrophe, is increasingly seen as a kind of antidote. In a recent article aimed at a general readership, for example, the anthropologist Vincent Ialenti speaks of the "benefits of embracing 'deep time'" in the context of "a year like 2020", characterized by people being trapped in the short-term as a result of the COVID-19 pandemic (Ialenti 2020a). Ialenti, the author of *Deep Time Reckoning: How Future Thinking Can Help Earth Now* (2020b), claims that embracing the radical long-term can be good for our well-being. Among the ambient anxiety of climate change, biodiversity loss and viral extinction threats, the idea of deep or geologic time has an almost meditative and 'cathartic' quality to it. Extending one's intellect across time, Ialenti writes, helps "escape the pressures of the present and stretch the mind into the longer-term", especially through creating analogies across time to envisage distant future worlds.

While this contribution certainly shares (and even extends) Ialenti's felt necessity of engaging with the notion of deep time, it significantly differs in not finding much soothing or calming value in the notion of deep time. On the contrary, it only sees an increased urgency in the necessity of thinking in more-than-human time scales. Where Ialenti might see benefits in meditative self-effacement, *critical* posthumanism, in fact, mainly sees a conundrum: why are humans (at least some, or indeed, an increasing number of them) arguing themselves out of the picture, so to speak, precisely at the time when (some) humans have been identified as the main geomorphic agents of the present (apparently 'posthuman') moment – a time that more and more geologists are agreeing to refer to as dominated by '*anthropos*' – hence, the Anthropocene (Cruzen & Stoermer 2000)?

E. Main Text:

Anthropocene – Worlds With and Without Us

In 2007, Alan Weisman published a thought experiment under the title *The World Without Us*, that helped change the public perception of geology by extending the idea of 'fossilization' into a humanless future. It also managed to reach a wider public in the form of a US television series, *Life After People*, produced for the *History Channel* (2008). Weisman conjectured that:

If people cease to exist tomorrow and we never send another carbon-bearing molecule skyward, what we've already set in motion must still play itself out... we *Homo sapiens* didn't bother to wait until fossilization to enter geologic time. (Weisman 2007: 39)

We can in fact imagine a number of different scenarios of 'disanthropy' (Gerrard 2012) or 'worlds without us'. There is deep time *before* the human (one might even call this 'preanthropy') and deep futures *after* the human (or 'postanthropy'). There are prehistoric narratives of how we became human (i.e. our hominization) paleontology, paleobiology and paleoanthropology can tell us. There

are also “posthuman cosmologies” (Taylor 2013) that speculate about the supersession of the human by machines or artificial intelligence. Associated with these different scenarios there are ecological, or geocentric stories focusing on a human return to ‘Nature’ of which we are part and from which modern humans have sought to detach themselves in order to be able to control Nature (including their own, human ‘nature’); and there are speculative accounts of (human) life after Earth, either in the form of fantasies of absolute control that transform the planet into a spaceship to be cybernetically steered by geoengineering, or in the form of ‘interstellarity’, where humans leave planet Earth to colonize deep space and find exoplanets to restart life elsewhere.

While the projection of humans into the future even in the shape of posthumans or transhumans and its focus of human survival can be seen as a way of continuing the project of anthropocentrism (even though in a sometimes barely recognizable shape), the ‘retrojection’ of the human into a deep (nonhuman or prehuman) past opens up the idea of a post- or non-anthropocentrism in that it reconstructs primeval scenarios where the human was certainly not centre stage. An example of just such a speculative ‘science fictional’ (i.e. a mixture of narrative science fictional aspects and scientific facts; cf. Herbrechter 2013) can be seen at work in the cover story of *The New Scientist* issue on the “Primeval Planet” (Kemp 2013). This popular science magazine issue in fact asks what the Earth would be like if humans had never existed. Kemp’s thought experiment functions somewhat differently to Weisman’s world without us, however:

Imagine for a moment that the last 125,000 years of Earth’s history exist somewhere on a tape – a thick, old-fashioned ribbon loaded between two metal drums. With every second that passes, more tape slowly unspools from one drum and is wound onto the other. Now supposed it’s possible to stop the tape, to intercede, and to reverse its direction. Rewind. Gradually, with each turn of the drum, our existence is removed. Every minute, an area of natural forest and woodland the size of 10 football fields is restored. (Kemp 2013: 34)

It is an exercise in ‘rewind, erase and rerun’ that ‘removes’ *Homo sapiens* and imagines that 125,000 years ago, “our small band of ancestors in east Africa was wiped out by a catastrophe: a lethal virus, perhaps, or a natural disaster”. If the speculatively minded paleo(post)anthropologist doing the human removal now decides to run the tape forward again they would be able to imagine what the world looked like today if modern humans had never been here. The question then arises whether some other human, hominin, or humanoid (Neanderthals, Denisovans, *Homo erectus*...) would have taken ‘our’ place so to speak – which would mean that some kind of human and with them undoubtedly technological and cultural evolution would have been inevitable from an evolutionary point of view – or whether evolution would have privileged entirely other – i.e. nonhuman – scenarios.

Be that as it may, following the deep time logic of worlds with or without us unleashed through accounts like Weisman’s or Kemp’s ‘primaeval’ rerun – one could also name Jan Zalasiewicz’s *Earth Without Us* (2008) – in conjunction with the increasing acceptance of the ‘Anthropocene’ as a new geological period, the humanities and social sciences have undergone what one might call a ‘geological turn’ (cf. Ellsworth & Kruse 2013). However, at the same time as geology has managed to capture the imagination of a wider public, geology as a scientific discipline and endeavour has also changed. In fact, it can be said to have become a futuristic science, or at least a science that is now as much directed at the long-term future as it is, traditionally, an investigation into the distant past. Jan Zalasiewicz, a geologist and professor of paleobiology, has been a central figure in this process. Zalasiewicz directs the Anthropocene Working Group, which has been commissioned by the International Commission on Stratigraphy, in charge of the official Geological Time Scale, to come up with a proposal based on atmospheric, stratigraphic and geological evidence, on the basis of which

the Anthropocene may be adopted as an official follow-on epoch to the Holocene. The working group recently voted in favour of presenting a formal proposal for adoption, which will be decided upon in 2021. The proposed definition of the Anthropocene is that it denominates “the present geological time interval, in which many conditions and processes on Earth are profoundly altered by human impact... [and which] has intensified significantly since the onset of industrialization, taking us out of the Earth System state typical of the Holocene Epoch that post-dates glaciation” (Working Group on the ‘Anthropocene’ 2019).

Zalasiewicz provides interesting (anecdotal) details on how the notion of the Anthropocene was proposed by the atmospheric chemist Paul Crutzen elsewhere (Zalsiewicz 2017: 118ff). The term had, in fact, already been used by the biologist and limnologist Eugene Stroemer from the 1980s. However, it was not until Crutzen seized upon the notion that it gained wider circulation, for example through a widely cited article in *Nature* in January 2002 entitled “Geology of Mankind” (Crutzen 2002: 23) in which Crutzen evokes the anticipated legacy of human climatic and geomorphic power:

Unless there is a global catastrophe – a meteorite impact, a world war or pandemic – mankind will remain a major environmental force for millennia. A daunting task lies ahead for scientists and engineers to guide society towards environmentally sustainable management during the era of the Anthropocene. (Crutzen 2002: 23)

What is remarkable here is Crutzen’s trust in scientists and engineers whose future work schedule looks intense. Crutzen does not seem to foresee much of a place for the humanities or for ‘humanists’, however, even while he himself remains thoroughly humanistic – i.e. anthropocentric – in his belief that geoengineering will be able to ‘save’ humanity (by saving the planet). Together with Will Steffen and John McNeill, a few years later Crutzen asked: “Are humans now overwhelming the great forces of nature?” (2007: 614-621). Should humans indeed now threaten to surpass the ‘greatness of nature’, one can immediately see that the notion of the Anthropocene harbours a fundamental ambivalence in that such an acquired human ‘superpower’ also threatens to bring about humanity’s fall. This is what one might call the ‘human sublime’ – human power both as source of ‘awe’ and ‘terror’. Steffen, Crutzen and McNeill’s article is in fact full of mechanistic and economist if not managerial images. Earth’s environment and its ability to provide the services required to maintain viable human civilizations are seriously affected by human agency, the stocks and flows of major elements in the planetary machinery such as nitrogen, carbon, phosphorus and silicon are disrupted – the earth system and human stewardship is threatened (614). Moreover, there is the long-term effect of human geomorphic power:

Humankind will remain a major geological force for many millennia, maybe millions of years, to come. To develop a universally accepted strategy to ensure the sustainability of Earth’s life support system against human-induced stresses is one of the greatest research and policy challenges ever to confront humanity. Can humanity meet this challenge? (Steffen, Crutzen & McNeill 2007: 618)

From a critical posthumanist point of view there are a number of problems with such a characterization of the Anthropocene and the kind of future action that it seems to call for. It tends to homogenize humans into ‘humankind’ or a ‘humanity’ without acknowledging the vast social differences that exist between human individuals and groups. In doing so, it also tends to erase the historically different levels of responsibility of humans for geomorphic change. It keeps silent about the impact of Western colonialism with its ‘extraction’ practices (of people and natural resources) and the impact of ‘petrocapiatalism’ on the global climate. As Philip John Usher reminds us, “if we have stumbled into the Anthropocene, this age in which humans are the major geological re-shapers of Planet Earth, it is not only because we *emit* but first and foremost because we *extract*” (Usher

2019: 1). The notion of the Anthropocene, dangerously, tends to presuppose the possibility of a consensus (humankind accepting responsibility of human-induced stress on the Earth's life support system) where historically there is only difference. Critical posthumanism denies the existence of such a shared and essential human 'nature' and sees the idea of a universal or global 'humanity' as a humanist 'myth'. It is also largely sceptical of the idea of a (human) species identity, which seems to underlie the traditional idea of humankind. The most problematic aspect, however, is that Steffen, Crutzen and McNeill fail to mention all the nonhuman others (animals, plants, environments) that have suffered from human-induced climate change and human extraction and whose futures are even more dramatically affected. 'Unilateral' and anthropocentric decisions about proposed geoengineering 'solutions' to climate deterioration are particularly contestable in this respect.

In this sense, it is certainly true that the Anthropocene has the capacity to become the most politicized unit not only as far as the Geological Time Scale is concerned (Zalasiewicz, Williams, Steffen & Crutzen 2010: 2228-2231), but indeed for geopolitics more generally. Crutzen and Schwägerl in another opinion piece on the Anthropocene thus speak of a planet that is being "anthroposized at high speed" and of the "great acceleration of our own powers" against and above the superpower of 'Nature'. Humans, they claim, are no longer disturbing natural ecosystems, but are now living in human systems with natural ecosystems embedded within them so that the long-held barriers between nature and culture are breaking down (Crutzen & Schwägerl 2011). While critical posthumanists would certainly agree with the claim that nature and culture can no longer and indeed never have been clearly distinguishable, or that they are entangled forms of 'naturecultures' in Bruno Latour's term taken up by Haraway and many feminist new materialists, this does not in the least imply as Crutzen and Schwägerl state that "it's no longer us against nature, instead it's we who decide what nature is and what it will be" (Crutzen & Schwägerl 2011). Instead, what can be heard behind such a statement are science's vested interests or the 'politics of nature' (another famous phrase by Latour and critical science studies) that envisage a more or less uncritical continuation of the project of modernity as based on the idea of human exploitation of nature. As Crutzen and Schwägerl explicitly say, "we must far surpass our current investments in science and technology" in order to achieve a "durable bio-economy" (by which they mean "restoring our green security system", as if it was 'ours' and for 'our' benefit) and to protect the "intricate network of climate, soil, and biodiversity". In order to achieve these 'ecomodernist' targets, as one might call them, Crutzen and Schwägerl call upon science to "develop geoengineering capabilities, build a green infrastructure where organisms and genes can flow freely over vast areas and maintain biological functions".

Under the supreme rule of science, geoengineering (which replaces the 'natural' functions of the 'green security system') needs to be paralleled by a kind of 'cultural engineering' to ensure that 'we' humans "adapt our culture to sustaining what can be called the 'world organism'". The underlying antagonistics of 'us against the planet', however, can be taken as just another sign of human hubris and the human tendency to overestimate the power of technology and the positivity of its effects – a kind of techno-euphoria and techno-utopia often found in transhumanist accounts of human (and planetary) perfectibility. Crutzen and Schwägerl, in fact, have their own projective thought experiment of a world with and without us designed to kick humanity into action:

Imagine our descendants in the year 2200 or 2500. They might liken us to aliens who treated the Earth as if it were a mere stopover for refuelling, or even worse, characterize us as barbarians who would ransack their own home. Living up to the Anthropocene means building a culture that grows with Earth's biological wealth instead of depleting it. Remember, in this new era, nature is us.

It is the view from a future humanity that sees contemporary humankind as extractive ‘aliens’ plundering the planet’s resources which allows Crutzen and Schwägerl to draw up a cultural engineering plan designed to make us leave our current destructive trajectory. The realisation that ‘nature is us’ is key in this process. Nevertheless, their plan is based on a gesture that is just as appropriating of nature as the modern notion that nature is here *for* us. As such it threatens to degenerate into an almost psychotic move that denies nature altogether. It is what one may call an ‘ecology without nature’ (cf. Morton 2009). It is no surprise that both positions, the modern and the hypermodern or ecomodernist one, are uncomfortable with the posthumanist and neomaterialist stance of an inextricable entanglement of humans, nonhumans, culture and nature and their shared bio-geological condition.

Critical posthumanism has a rather ambivalent attitude towards the spectacular rise of the Anthropocene concept. Geologists like Zalasiewicz tend to see the birth of the Anthropocene concept with quite some excitement because it changes the very notion of “what geology *is*” by shifting geology’s focus on “present-day soil” as the “critical zone” of the planet, for example by investigating “pre-sedimentary concrete” as a new kind of “rock”, or indeed the “technofossil record of humans” (Zalasiewicz, Williams, Steffen & Crutzen 2014) and thus steers it closer to “seeing things as they really are” (Zalasiewicz 2017: 120). It ensures geology’s future by anticipating the prospect of a future geological ‘reader’ poring over “the future fossil record” (Zalasiewicz, Williams, Haywood & Ellis 2011: 837). The Anthropocene, however, is not only being discussed in exclusively geological terms. Apart from designating a new interval in geological history, the Anthropocene is also having a wider impact in the Earth sciences, namely as a significant change within the ‘Earth System’; and it has also become part of a wider discussion of the effect of human and nonhuman agency on the planet (cf. Hamilton, Bonneuil & Gemenne 2015: 2-3). Especially in this latter sense the Anthropocene sometimes also gives the problematic impression of ‘the human or the *anthropos* reigning supreme’. It can thus be seen both as a call on and as an abdication of human responsibility, as an apotheosis and a disappearance, or indeed both, at the same time.

In this sense, perversely, the Anthropocene could be seen as the logical conceptual continuation and conclusion of the human ‘extraction’ process (humans extracting from nature and human extracting themselves from responsibility towards nonhuman others). Anthropocene discourse –which basically comprises everything that is being said about what the Anthropocene is and what its effects might be – can thus either come across as covertly triumphal or as deeply melancholic in tone. Roy Scranton’s proposal, for example, contains traces of this thoroughly ambiguous attitude when he claims that “If we want to learn to live in the Anthropocene, we must first learn how to die” (Scranton 2015: 27). It is a learning process that involves a kind of “living in the ruins” (of the Anthropocene and its destructiveness) and an acceptance that ‘our’ (modern) civilization is already dead and extinct; an insight that may eventually lead to another, more ‘sustainable’ or more just way of life. However, it also seems to favour giving up any political intervention in the ‘here and now’. It is also to a certain extent based on the already mentioned denegation of the fact that “Intra-species inequalities are part and parcel of the current ecological crisis and cannot be ignored in attempts to understand it” (Malm & Hornborg 2014: 62).

Claire Colebrook (2016) provides one of the most trenchant critiques of Anthropocene discourse in this respect. The paradox Colebrook foregrounds is that “once the species comes into being as a geological force its survival is constituted as an imperative” (2016: 82). As soon as geologists provide evidence of damage at species level, the human seems to become “at once victim, agent and redeemer” (86). In the context of the ‘end of man’ (or *anthropos*), a frantic search has begun to look for escape routes, or what Colebrook calls “a thousand tiny industries of new dawns” (*ibid.*). The challenge for a critical posthumanism, however, lies in rejecting stories of ‘man’ (*anthropos*, or

humanity) as either global culprit or global victim. Instead the Anthropocene should lead to the realisation that “there are many living beings on this planet who live, dwell, struggle, and survive with no sense of humanity in general” (Colebrook 2016: 88). Maybe accepting the contemporary challenge precisely lies in refusing both the claim for humanity as a global agent and humanity as an end in itself and as the powerful agent who may (and ought) to inherit the earth fully, but differently, Colebrook argues. The ideological or political problem that such a notion of the Anthropocene is hiding in placing a too general, universal, responsibility on our self-understanding is that it implies accepting an idea of “the human as such”, while ignoring “the subtleties of history, culture and difference” (88-89).

Perversely, a declaration of guilt placed on humanity in general may thus serve as an exculpation of specific humans and human groups at the same time as it preserves the deeply humanist desire for another, ‘better’, humanity-to-come, which, according to Colebrook, is precisely the ideological move that needs to be questioned and resisted. As Colebrook writes:

To return to “anthropos”, now, after all these years of difference seeks to erase all the work in postcolonialism that had declared enlightenment “man”, to be a fiction that allowed all the world to be “white like me”, and all the work in feminism that exposed the man and subject of reason as he who cannibalizes all others and remakes them in his image. The Anthropocene seems to override vast amounts of critical work in queer theory, transanimalities, posthumanism and disability theory that had destroyed the false essentialism of the human. (Colebrook 2016: 91)

Instead, thinking politically in the Anthropocene, after the ‘geological turn’, is precisely to refuse both *the human* and the idea of *another* or *better* humanity under different circumstances.

To this end, it maybe indeed be still too comforting an idea to look at ‘ourselves’ from a speculative vantage point of our future fossil records because this tends to foreclose the idea of the future as radically unknowable and open. As Colebrook formulates it:

Precisely when we ought to be confronted with “civilization” as a trajectory of wreckage, we become all too focused on surviving. Far from recognizing the ways in which desires, intentions and an epoch of humanism, enlightenment and globalism have destroyed their own conditions of emergence, the overwhelming response has been an insistence on hope for the future (whether by way of politics or geo-engineering). (Colebrook 2016: 114-115)

Playing off scenarios of worlds with and without us may be characteristic of a ‘post-apocalyptic sublime’ that ultimately cannot accept the fact that the absence of humans may indeed not be a loss of the world as such.

A differential or particularist view of humans (as opposed to a universalist one of ‘humanity’), for example from the perspective of indigenous populations, allows one to see “anthropogenic climate change is an intensification of environmental change imposed on indigenous peoples by colonialism” (Whyte 2017: 153). ‘We’ can thus be said to be dealing always with the end of a very specific world and a threat to a very specific life style posed by other humans and their actions. It is nothing like the end of *the* world. In that sense, the Anthropocene as a concept is both unhelpfully “universalist and technocratic”, as Jeremy Davies explains: “It is universalist because it makes it sound as if we are all in this predicament together. It neglects humanity’s division into a multitude of unequal social groups, and the way in which wealth, nationality, ethnicity, gender, class and so on mediate the relationships between those groups” (Davies 2016: 52). And it is technocratic because it makes it sound as if there is “no alternative to the rule of experts. It is a counsel of despair, sacrificing freedom and wilderness to managerial diktat” (54).

Instead of an anthropocentric notion of a world without humans, Davies suggests, a “geology of the future” would imply a much more mundane, materialist and entangled “alien perspective of the far future [as] one in which plastics, grasses, humans, plankton, and carbon dioxide molecules were all bundled together” (Davies 2016: 83). Thus, instead of prompting us to envisage worlds either without humans or without nature or indeed both, the turn to geology arguably should bring us back “down to earth”, while “facing Gaia” (Latour 2017).

The Proliferation of Geostories and the Geologization of Posthumanism

Deep time and the genealogical imaginary it opens up can be said to have helped to produce a “geological posthumanism” – a posthumanism with an ‘earthier’ focus than other, parallel, forms that have been foregrounding cyborgization, digitalization and speciesism. This can be seen in the proliferation of the prefix ‘geo-’ in posthumanist discussions. There is a focus on geostories, geopower, geomedia, geophilosophy, geopoiesis and geoconstructivism to name only the most prominent current ‘geologisms’. The development seems to work in both directions, however. If there is a certain geologization of posthumanism one can also see, as the previous section has shown, that figurations of the posthuman and posthumanist concepts have entered geological discourse and the wider discourse on the Anthropocene more generally. This section will track some of these entanglements.

The proliferation of geostories, in the plural, highlights the fact that accounts of the *anthropos* in the Anthropocene are not consensual but conflictual; at the same time it also pluralises accounts of the earth and pays tribute to the multiple experiences of the contemporary ‘planetary’ condition, the infinite number of worlds, both human and nonhuman share. Timothy Morton, for example, speaks of a “geomorphic humiliation of the human” or “the human becoming humus” (2013: 18), while Rosi Braidotti invokes “a geological and terrestrial kind of materialism” (2019: 40), referring to Deleuze and Guattari’s notion of geophilosophy and their “geology of morals” (Deleuze & Guattari 1987: 39-74). However, it was arguably Manuel DeLanda who, already in 1997, opened up the extension of human consciousness and history into deep time from a posthumanist perspective. In *A Thousand Years of Nonlinear History*, DeLanda acknowledges that “all structures that surround us and form our reality (mountains, animals and plants, human languages, social institutions) are the products of specific historical processes” (11). Through the acceptance of such nonhuman or more-than-human histories and a focus on new or revived forms of materialism, sciences like physics, chemistry and biology have acquired a historical consciousness. DeLanda’s project is to allow physics to infiltrate human history in equal terms. A phenomenon like the Industrial revolution, for example, should be viewed in terms of a “reciprocal stimulation between technologies and institutions” and articulated in a historical narrative that DeLanda calls “geological” because “it concerns itself exclusively with dynamical elements (energy, flow, nonlinear causality) that we have in common with rocks and mountains and other non-living historical structures” (20). For DeLanda, the geological reality under investigation is:

a *single matter-energy* undergoing phase transitions of various kinds, with each new layer of accumulated ‘stuff’ simply enriching the reservoir of nonlinear dynamics and nonlinear combinatorics available for the generation of novel structures and processes. Rocks and winds, germs and words, are all different manifestations of this dynamic material reality, or, in other words, they all represent the different ways in which this single matter-energy *expresses itself* ... (DeLanda 1997: 21)

Such a comprehensive geological narrative or geo(hi)story in which the transformation of matter-energy is the hero, not human consciousness (cf. also Lyotard 1991), all kinds of materials – geologic, organic, and linguistic – get their say. There is for example the geo-evolutionary process of “mineralization of fleshy matter-energy” 500 million years ago, which produces bone as a new material for constructing living creatures (DeLanda 1997: 26). While bone allowed for the “complexification of the animal phylum to which we, as vertebrates, belong, it never forgot its mineral origins: it is the living material that most easily petrifies, that most readily crosses the threshold back into the world of rocks”, as DeLanda points out. This is why much of the geological record “is written with fossil bone”, a process of “geological infiltration of the human species” which is then further extended into what DeLanda calls the mineral-geological “exoskeleton” of the human (27) and by which he means the beginning of modern (urban) civilization about 8,000 years ago.

DeLanda’s early foray into a new kind of geologically informed and interdisciplinary writing of history between the humanities and the (geo)sciences more recently has been echoed by Dipesh Chakrabarty’s widely cited thesis that “anthropogenic explanations of climate change spell the collapse of the age-old humanist distinction between natural history and human history” (2009: 201). Somewhat more contested are Chakrabarty’s other theses he develops out of this new fusion of human and nonhuman histories, namely the idea that a focus on deep time histories which puts global histories of capital into conversation with the species history of the human, should lead to a new universalism based on “a shared sense of catastrophe” – a venture Chakrabarty proposes to call a “negative universal history” (2009: 222). This geohistorically induced new universalism, problematically, seems to imply a relativization of global capitalism as a driving historical force as well as posing a challenge to contemporary postcolonial thinking, which according to Chakrabarty “is having to think human agency over multiple and incommensurable scales at once” (2012: 1).

The question of size and scale has in fact been recognized as central to understanding the Anthropocene. As Derek Woods puts it, the Anthropocene requires “scale critique” (2014: 133), in order to tackle climate change’s “derangement of scale” or “scalar disjunction” (Clark 2012). Climate change as one of the most visible aspects of human geomorphic capability is what Timothy Morton calls an example of a ‘hyperobject’, by which he means “things that are massively distributed in time and space relative to humans – temporalities beyond the human scale” (Morton 2013: 7). The disruption to the human scalar perception may thus spell the end or the demise of the concept of ‘world’ as such. In fact, for Morton, the end of the world as that which constitutes the scaled-down anthropocentric ‘environment’ has already occurred, while “the inception of humanity as a geophysical terraforming force on a planetary scale” requires a “geophilosophy that doesn’t think simply in terms of human events and human significance” (*ibid.*).

It is precisely such a geophilosophy that a critical posthumanism seeks to provide in order to do justice to what Kathryn Yusoff has called the “geological life” of the human in the Anthropocene. By geologic life Yusoff means the “mineralogical dimension of human composition that remains currently undertheorised in social thought and is directly relevant for the material, temporal, and corporeal conceptualisation of fossil fuels” (Yusoff 2013: 780). Geostories, new geological narrativizations, can be helpful in this context by emplotting “fossils as material and discursive knots in the narrative arc of human becoming” – a ‘geological turn’ that takes seriously not just our biological (or biopolitical), but our geological or geopolitical lives, which are crucial to modes of subjectification in the Anthropocene, as Yusoff proposes (2013: 780). The idea of geologic life and geologic subjectivity that Yusoff proposes, provides “a space of experience that holds relations of nonhuman force between phenomena to blur boundaries and cross inhuman timescales” (Yusoff 2015: 384). Behind the geological turn and its implied critique of anthropocentrism or humanism is the necessity for ‘the human’ to recognize that it “is riven by the torques of non/inhuman forces in

the establishment and maintenance of identity. In a time of extinction, such recognition might constitute an understanding of ecological survival as dependent on these inhuman forces” (Yusoff 2015: 389).

What such a posthumanist understanding of geology can further provide is a reconceptualization of strata. DeLanda already argued for an “analogy between social and geological strata” (DeLanda 1997: 59), or that specific social groups impact on geological stratification differently and that, in turn, geological stratification has specific effects on different social groups, which can be traced in the “sedimentation of genetic materials” (61). Along the same lines, more recent ‘geocriticism’ challenges the construction of the Anthropocene as an undifferentiated social stratification, and instead, calls for another account of “anthropogenesis” (Yusoff 2016), the aim of which would be to stop future humanity becoming an “erasure of contemporary social differences and inequalities” (Yusoff 2016: 4). The (geo)political value of the idea of a geologic ‘proto-human’ as a human-as-fossil-to-come, for Yusoff, lies in the configuration of a “new originary moment for the human”, namely as the author of an epoch of *social* geology, or “geology as a social phenomenon and the social as a geological”, with humanity as a “more-than-social configuration, differentiated by inhuman forces” (Yusoff 2016: 10). The effect of such a stratified understanding and narrativization is to “socialize the Anthropocene and to geologize the social” (Clark & Yusoff 2017: 6) in the face of a current version of humanity that is “geophysically active but politically passive” (5). In analogy with Donna Haraway’s by now classic statement about human ‘inertia’ while faced with machinic ‘liveliness’ (Haraway 1991: 152), Clark and Yusoff describe this current human geophysical passivity in the following terms: “Our earth now looks disturbingly lively, and we ourselves frighteningly inert” (Clark & Yusoff 2017: 4-5).

This kind of posthumanization of our perspective the geological turn helps to produce leads to what one might call political geology. The specific role of critical posthumanism in the current turns *towards* materiality and geology is to recall that this does not necessarily imply a turn *away* from language and culture as is often implied. In fact, without a continued relevance of questions of language and culture in the face of deep time historicization, new forms of narrativizations or geostories and new forms of geologic life experiences and posthuman(ist) subjectivities, the geological turn would have had little relevance and thus little chance of infiltrating the humanities or the social sciences.

In fact, language, narrative and subjectivity and their geologization should be seen in the more general context of ‘geomedia’. As Jussi Parikka confirms, the geologization of the cultural imaginary has led to a “geological turn in the critical humanities” (Parikka 2016: 281). Parikka’s work on media archaeology builds on Siegfried Zielinski’s *The Deep Time of Media* (2006) in arguing that “the geological sciences and astronomy have opened up the idea of the earth, light, air and time as media (Parikka 2015: 3). What Parikka refers to as a “geology of media” investigates the “connections of media technologies, their materiality, hardware, and energy, with the geophysical nature: nature affords and bears the weight of the media culture, from metals and minerals to its waste load” (Parikka 2015: viii). In the context of such a long term, deep time view of media history, that includes nonhuman, prehuman and posthuman media, similar to DeLanda’s perspective outlined above:

geology is not only about the soil, the crust, the layers that give our feet a ground on which to stumble: geology is also a theme connected to the climate change as well as the political economy of industrial and postindustrial production. It connects to the wider geophysical life worlds that support the organic life as much as the technological worlds of transmission, calculation and storage. Geology becomes a way to investigate materiality of the technological media world. It becomes a conceptual trajectory, a creative intervention to the cultural history of the contemporary. (Parikka 2015: 4)

The geophysical nature of media seen through the lens of the deep times and places of media's reliance on rare earth minerals constitute, according to Parikka, a "psychogeophysics" (5) that shows that, through its entanglement with various "medianatures", human history is infused in geological time (6).

Similar arguments can be made for other medianatures and cultural technologies like poetry and literature, all of which, in the Anthropocene, have extended their reach into the deep time of geological pasts and futures. David Farrier recently argued for what might be called "geopoeisis" (cf. Leonard 2011; see also the related argument for a more general "Anthropocene aesthetic" in Davis & Turpin 2015) in the following terms:

In the context of Anthropocene debates about the need to revise our understanding of both deep time and the "geological status" of the human, the two principal characteristics of the lyric poem – the stability of the lyric "I" and... "the special 'now', of lyric articulation" – come under significant pressure. The Anthropocene involves us in a kind of deep-time negative capability, inducting us into the strangeness of a temporality that vastly exceeds both personal experience and intergenerational memory. (Farrier 2019: 5)

In a similar vein, writing about contemporary literature, Ben de Bruyn sees a "geological posthumanism" at work, which embraces "a non-anthropocentric conception of time". Cultural geology, de Bruyn argues, "recalibrates the scale of literature and criticism by drawing attention to the existential and representational problems associated with deep time" (de Bruyn 2013: 69-71).

More generally, David Wood writes of a "catastrophic intrusion of deep time within lived temporal experience" to characterize our contemporary geological (nature-media-cultural) imaginary (Wood 2019: 7). It is a time of "posthumanist history" writing, or geostorying, that understands the "cosmos as nested within other histories" (14). Wood, like many critical posthumanists, is concerned with the stark choice that comes with the realization of what he calls the "end of human sovereignty", with its insistent call for "respect to nature", on the one hand, and, on the other hand, the idea of geoengineering as the ultimate phantasm of absolute human sovereignty and control over the planet – the two sides of the Anthropocene referred to above. Caught between what Wood identifies as "a choice between the Unthinkable and the Impossible" (Wood 2019: 66) – extinction and the need to radically change humanity's destructive ways of inhabiting the planet – "we should jettison any sense that the natural world is there only for us", Wood suggests (30). In the context of the Anthropocene, the notion of deep time, instead, begins to refer to "issues and questions raised when we expand our historicity to a geological scale" (61). The question of what it could mean to be 'geologically' human, might thus lead to the development of a geological and cosmic species consciousness, after all. What Wood refers to as "geological angst" in this context might help produce "creative ways of exercising a certain negative capability (an ability to tolerate uncertainty) to keep the angst alive" (59). A geological posthumanism, as a way of thinking the human, the nonhuman and the more-than-human form a postanthropocentric, deep-time point of view, thus "throws up deep questions about agency and responsibility at a point in human and terrestrial history at which we most urgently need answers, as Wood writes:

Thinking geologically, understanding human beings on a time scale much greater than our own history (or even the history of life), invites a certain naturalism, in which our pretensions to being special are burst like a bubble. (Wood 2019: 96)

One more prominent literary example of such a turn towards a geological consciousness can be found in Don DeLillo's novella *Point Omega*, where one of the central characters, Richard Elster, in the middle of the American desert, vents his geo-existential *angst* by exclaiming: "Do we have to be

human forever? Consciousness is exhausted. Back now to inorganic matter. This is what we want. We want to be stones in a field” (DeLillo 2010: 67; for an extensive commentary see Herbrechter 2020). For Kate Marshall, DeLillo’s is one of a growing number of “novels of a newly self-aware geological epoch” (Marshall 2015: 524). These geological novels of the Anthropocene are concerned with writing “histories of the future” by using “speculative realism as a new hybrid literary form”, Marshall explains (530). Also referring to *Point Omega*, David Watson characterizes Elster’s geological angst in the following terms: “paranoia and anxiety morph into depression and passivity, a passivity that also seems to blend the human into its nonhuman environment, which, in turn, can switch back to anxiety over the fate of a loved one” (Watson 2016: 66). Watson uses the notion of “vanishing points” to explain the logic of ‘disappearance’ that seems to be at work in geological fiction and in many contemporary geostories more generally:

The expansion of temporal scales taking place in numerous recent novels brings into representation a catastrophic future that has already happened. That is as much to say that this future appears unavoidable because it is already slowly gestating in the present... [This implies] two different kinds of vanishing points: the catastrophic disappearance of this world or that species, and the disappearance of a future with no fixed outcome. (Watson 2016: 58)

What geostories – whether science fictional, or science factual – are thus engaged in, one might say, is the construction of a planetary memory that might do more justice to “the complex interrelations between human and non-human life worlds, between local, national, and global concerns, and, perhaps most importantly, between historical and geological pasts, presents and futures, made newly visible in contemporary attempts to narrate the scalar, systemic, and conceptual ructions of the Anthropocene” (Bond, De Bryn & Rapson 2017: 855). They also show the complex imbrication of both personal and planetary experience and how existing paradigms of memory may be remediated to imagine the past from a posthuman or more-than-human perspective, while gauging the possibilities of reading the physical landscape as an index of environmental memory”, all of this in the form of a “palimpsestic layering of human and non-human bodies” (860).

The reverse side to such a geo-ecological (re)writing of a planetary memory is the projective idea of human sovereign geo-technological control of the planet through strategies of geoengineering – a set of geostories of an entirely different and usually much more triumphant, (techno)utopian style. If humans can mark the world on a geological scale, this also promises to open up the possibility of rewriting the human and nonhuman geological future. This is the context in which geoengineering needs to be placed. One of the starting points is Buckminster Fuller’s redefinition of the planet as ‘spaceship’, in 1969, as a result of which earth becomes conceivably ‘manipulable’ and ‘steerable’ as a giant artefact or ‘Earth system’, with an ‘atmosphere management’, a ‘solar radiation management’, as seen in Crutzen above. This also includes the idea of ‘carbon dioxide removal’ as a solution to global warming and human-induced climate change. Evidently, the prospect of such geoengineering ventures poses “new challenges concerning global governance, human-nature relationships, ethics, risk assessments, and public deliberation” (Anshelm & Hansson 2014: 102). Geoengineers face a double task, however, as Elmar Altvater explains:

On the one hand, they must create necessary resources on the input side of the planetary social and geological systems at a time when they can no longer be easily extracted from external nature. On the other hand, they must organize new methods of dumping all emissions into the earth’s systems... they are tasked with controlling whole earth systems in order to combat – or at least reduce – the negative consequences of capitalist externalization. (Altvater 2016: 151)

Such, to large extent, entirely futural or ‘science factual’ accounts of geoengineering, which promise to intervene and rectify technological solutions at a geological and planetary atmospheric scale, are of course met with significant scepticism both as far as their feasibility as well as their conceptual framing is concerned. As Clark and Yusoff ask, rhetorically: “Is there anyone left on earth who actually believes geoengineering would go according to plan, should it come to that?” (Clark & Yusoff 2017: 9). Frédéric Neyrat (2019) is even more scathing in his critique of what he calls “geoconstructivism” and which he sees as one of the most dangerous and damaging ideologies of our time. Neyrat defines geoconstructivism as a discourse that considers earth as the seemingly consenting object of an ultimate human conquest that seeks to transform the planet into a pilotable machine. The Anthropocene, understood in Crutzen’s terms, as the time in which humans have taken over nature, or in which they have become a kind supernatural power, for Neyrat functions like the ultimate ‘myth’ that is supposed to legitimate geoengineering as a viable scientific and social project that controversially claims to be worthy of funding in a time when resources, financial, ‘natural’ and geological, are becoming scarce.

This conflict about how to conceive of ‘Earth System’ science is closely related to what Elizabeth Grosz has called “geopower” (Grosz 2017), which she sees in opposition to modern biopolitics. In an interview with Yusoff and Clark, she explains that: “geopower, the relations between the earth and its life forms, runs underneath and through power relations, immanent in them, as their condition of existence” (Grosz, Yusoff & Clark 2017: 109). It is, she continues, “a way of characterizing the geological, inhuman and preindividuated forces that subtend and provoke organic life, vs. Foucault’s concept of biopower as a specific set of technologies or strategies for managing bodies” (Grosz, Yusoff & Clark 2017: 134). Building on this notion of geopower as the underlying and hitherto neglected force that gives rise to the ontological dimension of biopolitics and biopower, Elizabeth Povinelli develops the notions of “geontopower” and “gerontology” in order to designate the reorganization processes and the current crisis of the “governance of Life and Nonlife” (Povinelli 2016: 172). Povinelli sees geontopower as a “hyperintensification” of Foucault’s notion of biopolitics, i.e. of “making live and letting die”, which characterize the shift to modern notions of sovereignty (Povinelli, Coleman & Yusoff 2017: 170). Geontopower or geontological power serves to regulate and ultimately to maintain the difference between life, being or *bios* and nonlife, or *geos*, in Povinelli’s terms. In this sense, the advent of the Anthropocene can be seen as a kind of “geontological drama”, or in fact, a “re-dramatization of the interface between *bios* and *geos* in terms of the looming threat of human extinction, and the triumph of a planet devoid of life” (172).

In a key chapter of *Geontologies*, Povinelli (2016) provocatively asks whether “rocks can die”, to expose the fact that the notions of sovereign power, disciplinary power or Foucauldian biopower obviously only work “as long as we continue to conceptualize humans as living things and as long as humans continue to exist” (Povinelli 2016: 8), which, in the time of the Anthropocene and after the geological turn, looks increasingly unlikely. For Povinelli, the Anthropocene with its very real extinction threats opens up and throws us back to the drama, maybe even the (posthuman) tragedy of “a time before the life and death of individuals and species, a time of the *geos*, of soulessness” (8-9). *Biopower* quite evidently can only be conceptually valid as long as biological life and thus humans continue to exist (Povinelli 2017: 53). *Geos*, on the other hand, understood the “non-living part of the planet” (i.e. geology) requires a geontology that forms an exit from the opposition between life and death and which points towards a world in which the opposition between life and nonlife, as well as between life and death no longer really make sense.

‘Gaia’ being stripped of life is a (posthuman) ‘tragedy’, or the final conclusion of the drama of life and death on earth. For Povinelli, however, this drama is the effect of a “scaling of extinction from a species level to a planetary level”, which ultimately depends on a dramatization of the difference

between life and nonlife. Seen from a geological point of view, however, this is not or no longer and, in fact has never really been, guaranteed. In this sense, extinction as a form of mass death is something that only life can experience (Povinelli 2016: 44), which means that “the inert is the truth of life, not its horror” (45). A rather different (geontological) view of earth’s cosmic drama would lead to the much more sobering insight that:

Nonlife created what it radically is not, Life, and will in time fold this extension of itself back into itself as it has already done so often and long. It will fold its own extension back into the geological strata and rocky being, whereas Life can only fall into what already is. Life is merely a moment in the greater dynamic unfolding of Nonlife... Life is merely another internal organ of a planet that will still be here when it is not, when we are not, undergoing its unfolding, creating who knows what. (Povinelli 2016: 176)

The production of a geological imaginary focused on putting human biopower into the perspective of deep time of geopower, in the current context of the Anthropocene with its political conflicts, may thus serve as a necessary reminder and humbling experience on which an alternative, posthumanist and postanthropocentric, politics and ethics can build. This is very eloquently put by Ted Toadvine in the following terms:

The vertigo of deep time has its source in the disruption of any correlation between self and world, in the impersonal worldlessness of the elements. And here the anonymity of the elemental bends around time; it is both the prehistoric, ancestral past and the eternity of an unimaginable future. (Toadvine 2014: 277)

It is precisely such a ‘disruption between self and world’ that the geological imaginary exacerbates by opening up the question of deep time perspectives of human pasts and futures, or in other words of human (and nonhuman) ancestors and successors.

Ancestrality and the Humanities

Ancestrality is a key and contested term in the context of the geologization of posthumanist thinking. Conceptually, the move to place ourselves within deep time reflects a desire “to get out of ourselves, to grasp the in-itself, to know what is whether we are or not”, as Quentin Meillassoux puts it in *After Finitude* (2008: 27). As much as this desire for an ancestral understanding is plausible, even necessary and inevitable, it nevertheless also remains somewhat suspicious. The main target of Meillassoux’s argument on rethinking ancestrality is (Kantian) “correlationism”, which Meillassoux characterises as “the idea according to which we only ever have access to the correlation between thinking and being, and never to either term considered apart from the other” (Meillassoux 2008: 5). It is the anthropocentric, arch-humanist, idea that nothing ‘exists’ outside a relation to a human observer which Meillassoux castigates as correlationism. Meillassoux’s work has been instrumental for a thinking that has come to be known as ‘object-oriented-ontology’ and ‘speculative realism’ (cf. e.g. Bogost 2012; and Shaviro 2014). It also coincides with a more general turn or return to various forms of materialist thinking. However, most importantly, it opens up the possibility of linking the question of ancestrality, humanity and geological pasts and futures, or of a deep time ‘before’ humanity. Meillassoux formulates this in terms of a “bereavement” of what he refers to as “the great outdoors”, or “the *absolute* outside of pre-critical thinkers: that outside which was not relative to us” (Meillassoux 2008: 7). The “great outdoors” can be understood in geological and paleontological terms as synonymous with both prehuman and posthuman deep time.

Meillassoux's starting point is a geological one in that he looks to overcome correlationism in anthropocentric or subject-centred philosophy by emulating science's ability to produce true statements about a time long before human existence. Philosophy, according to Meillassoux, should ask itself: "*what* is it exactly that astrophysicists, geologists, or palaeontologists are talking about when they discuss the age of the universe, the date of the accretion of the earth, the date of the appearance of pre-human species, or the date of the emergence of humanity itself?" (2008: 9). It should concern itself with things that are "*anterior to every form of human relation to the world*" (10). It is this anteriority that he refers to as "ancestral" (i.e. "any reality anterior to the emergence of the human species"). Traces of this ancestry can be found by recovering the "great outdoors", which geology and astrophysics take as their object. This recovery process, in turn, is directed towards what Meillassoux calls the "arche-fossil", which refers to "materials indicating the existence of an ancestral reality or event; one that is anterior to terrestrial life" (2008: 10). Abandoning 'correlationist' philosophy for which these questions have to remain illegitimate, as Meillassoux claims, since they originate in a literally 'unwitnessable' scenario and therefore remain strictly speaking 'unthinkable' from a human(ist) point of view, means embracing a notion of time that is closer to science idea of a pre-ontological 'givenness'.

In the current context of posthumanist 'postanthropocentrism', climate catastrophe, extinction threats and species angst, the notion of the arche-fossil and the question of deep time are no longer confined to the past but, like geology more generally, they have developed a futural dimension, as Meillassoux explains:

Closer inspection reveals that the problem of the arche-fossil is not confined to ancestral statements. For it concerns every discourse whose meaning includes *temporal discrepancy* between thinking and being – thus, not only statements about events occurring prior to the emergence of humans, but also statements about possible events that are *ulterior* to the extinction of the human species. (2008: 112)

The geological turn in the humanities (and, to some extent, the social sciences) relies precisely on such a diachronicity or temporal discrepancy that sees the human in between the deep time of the prehuman past and the posthuman future.

As guardians of humanism and human culture, the humanities, strictly speaking, as Wai Chee Dimock writes, "have no time frame of comparable length" to the "deep time of planet Earth" that geology and astronomy describe. Instead, what they do have are "written records going back five or six thousand years, and oral, musical, and visual material going back further" (Dimock, 2006: 6). While most ventures in the humanities are thus concerned with the short term, the human, or, even more narrowly, humanist time scale, Dimmock advocates that the humanities should at least do justice to the fact that we are a "species with a sedimented imprint" that we should be honouring, as well as "the imprints of other creatures evolving as we do". In doing so, "we take our place as one species among others, inhabiting a shared ecology, a shared continuum" (6). Dimmock's aim in embracing an extended time frame for the humanities is mainly concerned with a deepening of cultural globalization and with championing a transnationalist view in literary and cultural history. By recognizing the "dumbfounding smallness of human beings" in relation to the "antihumanist findings of the large-scale sciences", human knowledge is rendered increasingly problematic: "This is what scale enlargement does: it changes the perceptual field, changes the threshold of differentiation, raising the bar so high that what once looked like huge differences now fall below the line" (Dimmock, 2006: 55). This problematic of scale, as already pointed out above, is related to what Mark McGurl refers to as "the new cultural geology", which he sees at work in the climate of "the contemporary cultural-historical moment", supplanting the "postmodern" (McGurl 2011: 380).

However, what these concerns about the deepening of human history and the geologization of human culture mainly reveal is that the traditional humanities continue to be very much centred on *Anthropos* (the humanist notion of 'man' and 'his' cultural achievements). The way the Anthropocene has been embraced by the humanities therefore still harbours the possibility of a human(ist) re-centering, a shoring up of human(ist) values in the face of extinction and destructive sovereignty. It seems that the humanities still have not taken sufficiently on board the implications of what Freud called the 'narcissistic wounds' inflicted upon the human and 'man's place in nature' by Copernicus, Darwin and Freud himself. Freud was referring to the shifts from a geocentric to a heliocentric world picture, to the reclassification of the human as a 'naked ape' in terms of biological evolution, and to the blow psychoanalysis dealt to the idea of human consciousness and rationality. To these 'classic' wounds, which continue to provoke humanist defensiveness, Stephen Jay Gould famously added 'deep time' as arguably the greatest of "limitation upon human importance" (Gould 1987: 1-3; see also Rudwick 2005: 1-2). The predominant humanist and anthropocentric view, however, is still too preoccupied with what these wounds in the end mean 'for the human' and for human self-understanding. The geological turn might have contributed to expanding the remit of the humanities but it does not automatically or necessarily imply a radically postanthropocentric or posthumanist perspective. The question, in fact, is to what extent the humanities are reformable in their current form of institutionalization given that their 'subject' (i.e. the human) is also nursing other important 'narcissistic wounds', namely the threat that 'big data', or seeing human behaviour as computable algorithms, poses to a humanist self-understanding. There is also the challenge microbiology and the notion of the microbiome pose to the notion of a biological species integrity of the category 'human'.

From a critical posthumanist view, these developments should not be seen as threatening. They contain the possibility for a much needed fundamental transformation of the humanities, as Elizabeth Grosz points out: "We need a humanities in which the human is no longer the norm, rule, or object, but instead life itself, in its open multiplicity, comes to provide the object of analysis" (Grosz 2011: 16; see also Huffer 2017). To add a geological and deep time dimension to Grosz's call for a postanthropocentric (post)humanities means a further 'turn' in the decentring of the human. This de-anthropo-centering, however should not be leading to an abdication of human responsibility and politics in the time of anthropogenic climate change. Instead, it should facilitate a re-politicisation of humanity "as geologic", as Kathryn Yusoff suggests. Once humans begin to see themselves as 'geologic subjects' and put 'geopolitics' alongside 'biopolitics' within a posthumanist conceptual and value framework that takes postanthropocentrism seriously (but maybe not literally), a (new) materialist, geo-vitalist notion of ancestrality becomes available. This will contribute to seeing human agency in the Anthropocene not in the sense of an "undifferentiated colonizing" and homogenizing "age of man", but "offer alternative imaginaries for the inhuman forces within humanity" (Yusoff 2013: 781). This is, ultimately, what alternative origin or 'geostories' may perform:

If origins are conserved in the forgotten strata of endings, new origin stories possess the possibility to disturb the reality of the end so that other modes of apprehending the buried geological subjectivity of the Anthropocene might be unearthed that question its unifying claims of global geologic agency. (Yusoff 2013: 781-782)

It is therefore vital for a critical posthumanist politics to extend agency to the nonhuman, on the one hand, but also to pluralize the human from within, so to speak to take into account a plurality of "geontologies", as Povinelli (2016) argues.

What the long-term view of placing the human within a deep time or geological imaginary achieves is thus both a 'de-dramatization' and a more ecological posthumanist and postanthropocentric politics. This also extends to the phenomenon and prospect of extinction. Contemporary extinction studies (Bird Rose, Van Dooren & Chrulew 2017) start from the assumption that extinction is nothing exceptional. Most species that biological evolution has produced through time have gone extinct and it is only reasonable to assume that the only remaining human species of a number of other ones that have already disappeared will sooner or later succumb to the same fate. This does not mean, however, that extinction should be trivialised, whether it concerns humans or nonhuman species. Instead, a more ecological and ethical approach lies in the valorization and proliferation of 'extinction stories', because "each time an existence disappears, it is a piece of the universe of sensations that fades away" (Vinciane Despret, in Bird Rose, Van Dooren & Chrulew 2017: 2-3). The 'biocultural complexity' of this time of extinctions shows the entangled significance of extinction as it is experienced, resisted, measured, enunciated, performed, and narrated in a variety of ways (*ibid.*).

Telling 'multispecies stories' in which these extinction events occur should also be placed within the larger context of the decolonization of Western boundaries around knowledge and expertise, and as an attempt at "staying with the lives and deaths of particular, precious beings" (Bird Rose, Van Dooren & Chrulew 2017: 8), in the ruins of the Anthropocene and the "sixth mass extinction" (Kolbert 2014) this is in the process of causing. One could thus say, that contemporary work in geology, paleontology and evolutionary biology including extinction calls into question, according to William Connolly, "the background assumptions of sociocentrism, exceptionalism, cultural internalism and scientific reductionism" (Connolly 2018: 3-4). Learning to die in the Anthropocene (Scranton 2015), however, should not ignore the fact that extinction, whether human or nonhuman, in the time of the Anthropocene also has its own geopolitics, as Jarius Victor Grove reminds us (Grove 2017). It thus requires an ecological approach to global politics that in its decentering of the does not lose sight of the role of hegemony and power (Grove 2017: 204). Instead, in the face of 'global' extinction threats, it becomes even more important to "not lose sight of the real differences in politics, geography, history, meaning, and cosmology that modulate how each one of us will confront the end of this epoch", as Grove explains. From an 'indigenous' perspective, the Anthropocene looks more like a "Eurocene", or "the last great planetary struggle for homogenization" (206). In fact, there has never been, as the notion of the Anthropocene seems to imply, "an *Anthropos* for which we can now discuss the geological consequences of something like a single human species" (214).

The real challenge for a geologically informed postanthropocentrically minded politics is thus to find ways of reconciling particularist and universalist claims attached to the Anthropocene and human responsibility. At an ecological level, this means critically engaging with the "interventionist" views associated with geoengineering, hyper- or ecomodernism, at one end of extremes, and any nihilistic or purely fatalistic idea of 'learning to die', acceptance or ecological 'humility', at the other end of the spectrum. However, this most certainly does not mean an acceptance of a view like that by Clive Hamilton, who claims that: "If humans were wiped from the Earth the planet would not live on, not in any meaningful sense. For *it is we who give the Earth meaning* and mark it out as the unique planet in the cosmos" (Hamilton 2017: 113-114). Instead, a posthumanist geopolitics must be first and foremost be based on the insight that something like the Anthropocene, "redistributes agencies, reconfigures systems, and reorders the loops of consequence and assimilation out of which the workings of the earth are made" (Davies 2016: 8). This is precisely what the geological turn and its notion of deep time seem to suggest, namely that in "inhabiting deep time imaginatively, we give up mastery and gain mutuality" (Davies 2016: 11).

The geological turn and the embracing of deep time in the humanities and social sciences therefore also has to be seen in conjunction with a return to and a continuation of the kind of deep ecology that first appeared in the 1960s and which was characterized by a move from anthropocentrism to ecocentrism and environmental activism (Sessions 1995). It was Arne Naess who famously introduced the distinction between ‘shallow’ ecology – a mainly anthropocentric, technocratic environmental movement concerned primarily with pollution, resource depletion and health and affluence of people in the developed countries – and ‘deep’ ecology, as an ecocentric, long-range, or one could say a biocentric, movement (Sessions 1995: xii). What contemporary deep ecological thinkers like Timothy Morton add to this is a further problematization of the idea of ‘Nature’. What is traditionally called by that term, for Morton, “is a way to blind and deafen oneself to the strangeness of the symbiotic real” (Morton 2017: 62). Morton therefore engages with the prospects of an “ecology in a time without Nature” (2009), or “dark ecology”, as he also calls it, by accepting the condition of entanglement. This entanglement, or ‘mesh’, as he also refers to it, calls for an ecology understood as a thinking of interconnectedness. A geological or deep time awareness is an essential part of such an ecological thought, as Morton writes:

All life forms are the mesh, and so are all the dead ones, as are their habitats, which are also made up of living and nonliving beings. We know even more now about how life forms have shaped Earth (think of oil, of oxygen—the first climate change cataclysm). We drive around using crushed dinosaur parts. Iron is mostly a by-product of bacterial metabolism. So is oxygen. Mountains can be made of shells and fossilized bacteria. Death and the mesh go together in another sense, too, because natural selection implies extinction. (Morton 2010: 29)

For Morton, the Anthropocene is that geological time and ecological moment at which “the human becomes truly thinkable in a non-teleological, non-metaphysical sense” (Morton 2017: 42), or, in other words, it is the moment when posthumanism develops a deep time dimension. In *Humankind*, Morton therefore goes on to develop an ecological ethics based on the idea of “solidarity with nonhuman people” (Morton 2017). In this sense, an alternative, namely a postanthropocentric, ecological narrative is key to bringing about the necessary political change that might lead to a ‘kinder’ humanity, one that is not based on exceptionalism and humanism. As Christophe Bonneuil says about the ‘geological turn’: “The various Anthropocene narratives we tell are performative; they preclude or promote some kinds of collective action rather than others, and so they make a difference to the becoming of the Earth” (Bonneuil 2015: 30), which returns us to the role of narrative in the form of factual and speculative geo- or ecostories, at the conjunction of posthumanism and a geological or deep time imaginary. As Jane Bennett so aptly puts it, the goal of this geological turn is thus “to figure out how to stick around as one species on the planet among numerous others – *how to maintain our Earthling status* in its various entanglements” by seeking the “postponement of the arrival of a radically posthuman future” (Bennett 2013: 245-246).

F. Cross-References:

Anthropocene; Constructions of the Future; Narrative and Posthumanism/Posthumanist Narratives; Nonlife: The Geologic; Planetary Subjects and the Ante-Human; Posthumanism and Anthropology;

G. References:

- Altwater, E. (2016). The Capitalocene, or, Geoengineering against Capitalism's Planetary Boundaries. In J.W. Moore (Ed.), *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*. Oakland: PM Press/Kairos. 138-152.
- Anshelm, J. & Hansson, A. (2014). The Last Chance to Save the Planet? An Analysis of the Geoengineering Advocacy Discourse in the Public Debate. *Environmental Humanities*, 5, 101-123.
- Bennett, J. (2013). Earthling, Now and Forever? In E. Ellsworth & J. Kruse (Eds.), *Making the Geologic Now: Responses to Material Conditions of Contemporary Life*. New York: Punctum. 244-246.
- Bird Rose, D., Van Dooren, T. & Chrulew, M. (Eds.) (2017). *Extinction Studies: Stories of Time, Death, and Generations*. New York: Columbia University Press.
- Bogost, I. (2012). *Alien Phenomenology, or What It's Like to Be a Thing*. Minneapolis: University of Minnesota Press.
- Bond, L., De Bruyn, B. & Rapson, J. (2017). Planetary Memory in Contemporary American Fiction. *Textual Practice*, 31(5), 853-866. doi: 10.1080/0950236X.2017.1323458.
- Bonneuil, C. & Fressoz, J.-B. (2016). *The Shock of the Anthropocene*. London: Verso.
- Bonneuil, C. (2015). The Geological Turn: Narratives of the Anthropocene. In C. Hamilton, C. Bonneuil & F. Gemenne (Eds.), *The Anthropocene and the Global Environmental Crisis: Rethinking Modernity in a New Epoch*. London: Routledge. 17-31.
- Braidotti, R. (2019). *Posthuman Knowledge*. Cambridge: Polity.
- Chakrabarty, D. (2009). The Climate of History: Four Theses. *Critical Inquiry*, 35(Winter), 197-222.
- Chakrabarty, D. (2012). Postcolonial Studies and the Challenge of Climate Change. *New Literary History*, 43, 1-18.
- Clark, N. & Yusoff, K. (2017). Geosocial Formations and the Anthropocene. *Theory, Culture & Society*, 34(2-3), 3-23. doi: 10.1177/0263276416688946.
- Clark, T. (2012). Scale. In T. Cohen (Ed.), *Telemorphosis: Theory in the Era of Climate Change*, Ann Arbor: Open Humanities Press. 148-166.
- Clark, T. (2016). 'But the real problem is...': The Chameleonic Insidiousness of 'Overpopulation' in the Environmental Humanities. *Oxford Literary Review*, 38(1), 7-26. doi: 10.3355/olr.2016.0177.
- Cohen, J.J. (2015). *Stone: An Ecology of the Inhuman*. Minneapolis: University of Minnesota Press.
- Colebrook, C. (2016). What is the Anthro-Political? In T. Cohen, C. Colebrook & J. Hillis Miller (Eds.), *Twilight of the Anthropocene Idols*, London: Open Humanities Press. 81-125.
- Connolly, W. (2018). Extinction Events and Entangled Humanism. In R. Grusin (Ed.), *After Extinction*. Minneapolis: University of Minnesota Press. 1-26.
- Crutzen, P. & Schwägerl, C. (2011). Living in the Anthropocene: Toward a New Global Ethos. *Yale Environment 360*.
https://e360.yale.edu/features/living_in_the_anthropocene_toward_a_new_global_ethos.
 Accessed: 3 January 2021.
- Crutzen, P. (2002). Geology of Mankind. *Nature*, 415 (3 January), 23.

- Crutzen, P. & Stoermer, E. (2000). The 'Anthropocene'. *Global Change Newsletter*, 41, 17-18.
- Davies, J. (2016). *The Birth of the Anthropocene*. Oakland: University of California Press.
- Davis, H. & Turpin, E. (Eds.) (2015). *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies*. London: Open Humanities Press.
- Dawkins, R. (2005). *The Ancestor's Tale: A Pilgrimage to the Dawn of Life*. London: Weidenfeld & Nicolson.
- De Bruyn, B. (2013). Earlier is Impossible. Deep Time and Geological Posthumanism in Dutch Fiction. *Journal of Dutch Literature*, 4(2), 68-91.
- DeLanda, M. (1997). *A Thousand Years of Nonlinear History*. New York: Zone Books.
- Deleuze, G. & Guattari, F. (1987). *A Thousand Plateaus: Capitalism and Schizophrenia*. Minneapolis: University of Minnesota Press.
- DeLillo, D. (2010). *Point Omega*. London: Picador.
- Dimock, W.C. (2006). *Through Other Continents: American Literature Across Deep Time*. Princeton: Princeton University Press.
- Ellsworth, E. & Kruse, J. (Eds.) (2013). *Making the Geologic Now: Responses to Material Conditions of Contemporary Life*. New York: Punctum Books.
- Farmer, J. (2018). Technofossil. In G. Mittman, M. Armiero & R.S. Emmett, Robert (Eds.), *Future Remains: A Cabinet of Curiosities for the Anthropocene*, Chicago: University of Chicago Press. 191-199.
- Farrier, D. (2019). *Anthropocene Poetics: Deep Time, Sacrifice Zones, and Extinction*. Minneapolis: University of Minnesota Press.
- Garrard, G. (2012). Worlds Without Us: Some Types of Disanthropy. *SubStance*, 41(1), 40-60.
- Gould, S.J. (1987). *Time's Arrow – Time's Cycle: Myth and Metaphor in the Discovery of Geological Time*. Cambridge: Harvard University Press.
- Grosz, E. (2011). *Becoming Undone: Darwinian Reflections on Life, Politics, and Art*. Durham: Duke University Press.
- Grosz, E., Yusoff, K. & Clark, N. (2017). An Interview with Elizabeth Grosz: Geopower, Inhumanism and the Biopolitical. *Theory, Culture & Society*, 34(2-3), 129-146. doi: 10.1177/02632276417689899.
- Grove, J.V. (2017). The Geopolitics of Extinction: From the Anthropocene to the Eurocene. In D.R. McCarthy (Ed.), *Technology and World Politics: An Introduction*. London: Routledge. 204-223.
- Grusin, R. (Ed.) (2018). *After Extinction*. Minneapolis: University of Minnesota Press.
- Hamilton, C. (2017). *Defiant Earth: The Fate of the Human in the Time of the Anthropocene*. Cambridge: Polity.
- Hamilton, C., Bonneuil, C. & Gemenne, F. (Eds.) (2015). *The Anthropocene and the Global Environmental Crisis: Rethinking Modernity in a New Epoch*. London: Routledge.

- Haraway, Donna (1991). *Simians, Cyborgs, and Women: The Reinvention of Nature*. New York: Routledge.
- Herbrechter, Stefan (2013). *Posthumanism: A Critical Analysis*. London: Bloomsbury.
- Herbrechter, Stefan (2020). Posthuman/ist Literature? Don DeLillo's *Point Omega* and *Zero K*. *Open Library of Humanities*, 6(2): 18, pp. 1–25. doi: 10.16995/olh.592.
- Huffer, L. (2017). Foucault's Fossils: Life Itself and the Return to Nature in Feminist Philosophy. In R. Grusin (Ed.), *Anthropocene Feminism*, Minneapolis: University of Minnesota Press. 65-88.
- Ialenti, V. (2020). The Benefits of Embracing 'Deep Time' in a Year Like 2020. *BBC Future*. <https://www.bbc.com/future/article/20201209-the-benefits-of-embracing-deep-time-in-a-year-like-2020>. Accessed: 10 December 2020.
- Kemp, C. (2013). Rewind, Erase, Rerun. *The New Scientist*, 2943 (16 November), 34-38.
- Kolbert, E. (2014). *The Sixth Extinction: An Unnatural History*. New York: Holt.
- Latour, B. (2017) *Facing Gaia: Eight Lectures on the New Climate Regime*. Cambridge: Polity.
- Leonard, P. (2011). Geopoiesis, or the Responsibility of Literature. *Oxford Literary Review*, 33(2), 189-205. doi: 10.3366/olr.2011.0017.
- Lyotard, J.-F. (1991). *The Inhuman: Reflections on Time*. Cambridge: Polity Press.
- Malm, A. & Hornborg, A. (2014). The Geology of Mankind? A Critique of the Anthropocene Narrative. *The Anthropocene Review* 1(1), 62-69. doi: 10.1177/2053019613516291.
- Marshall, K. (2015). What Are the Novels of the Anthropocene? American Fiction in Geological Time. *American Literary History*, 27(3), 523-538. doi: 10.1093/alh/ajv032.
- McGurl, M. (2011). The New Cultural Geology. *Twentieth-Century Literature*, 57(3-4), 380-390.
- McGurl, M. (2012). The Posthuman Comedy", *Critical Inquiry*, 38, 533-553.
- Meillassoux, Q. (2008). *After Finitude: An Essay on the Necessity of Contingency*. London: Continuum.
- Mertens, M. & Craps, S. (2018). Contemporary Fiction vs. the Challenge of Imagining the Timescale of Climate Change. *Studies in the Novel*, 50(1), 134-153. doi: 10.1353/sdn.2018.0007.
- Morton, T. (2009). *Ecology Without Nature*. Cambridge: Harvard University Press.
- Morton, T. (2010). *The Ecological Thought*. Cambridge: Harvard University Press.
- Morton, T. (2013). *Hyperobjects: Philosophy and Ecology after The End of the World*. Minneapolis: University of Minnesota Press.
- Morton, T. (2017). *Humankind: Solidarity with Nonhuman People*. London: Verso.
- Morton, T. (2018). Melancholy Objects: If Stones Were Lacanian. In S. Matviyenko & J. Roof (Eds.), *Lacan and the Posthuman*, Houndmills: Palgrave. 193-209. doi: 10.1007/978-19-76327-9_11.
- Neyrat, F. (2019). *The Unconstructable Earth: An Ecology of Separation*. New York: Fordham University Press.
- Parikka, J. (2015). *A Geology of Media*. Minneapolis: University of Minnesota Press.
- Parikka, J. (2015). *The Anthroscence*. Minneapolis: University of Minnesota Press.

- Parikka, J. (2016). Deep Times of Planetary Trouble. *Cultural Politics*, 12(3), 279-292. doi: 10.1215/17432197-3648846.
- Povinelli, E. (2016). *Geontologies: A Requiem to Late Liberalism*. Durham: Duke University Press.
- Povinelli, E. (2017). The Three Figures of Geontology. In R. Grusin (Ed.), *Anthropocene Feminism*. Minneapolis: University of Minnesota Press. 49-64.
- Povinelli, E., Coleman, M. & Yusoff, K. (2017). An Interview with Elizabeth Povinelli: Geontopower, Biopolitics and the Anthropocene. *Theory, Culture & Society* 34(2-), 169-185. doi: 10.1177/0263276417689900.
- Rudwick, M.J.S. (2005). *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution*. Chicago: University of Chicago Press.
- Scranton, R. (2015). *Learning to Die in the Anthropocene: Reflections on the End of a Civilization*. San Francisco: City Lights Books.
- Sessions, G. (Ed.) (1995). *Deep Ecology for the Twenty-First Century*. Boston: Shambhala.
- Shaviro, S. (2014). *The Universe of Things: On Speculative Realism*. Minneapolis: University of Minnesota Press.
- Shyrock, A. & Lord Smail, D. (Eds.) (2011). *Deep History: The Architecture of Past and Present*. Berkeley: University of California Press.
- Steffen, W., Crutzen P. & McNeill, J. (2007). The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature? *Ambio* 36(8), 614-621.
- Taylor, M.A. (2013). *Universes Without Us: Posthuman Cosmologies in American Literature*. Minneapolis: University of Minnesota Press.
- Toadvine, T. (2014). The Elemental Past. *Research in Phenomenology*, 44(2), 262-279.
- Usher, P.J. (2019). *Extraterranean: Extraction in the Humanist Anthropocene*. New York: Fordham University Press.
- Watson, D. (2016). Vanishing Points; or, the Timescapes of the Contemporary American Novel. *Studia Neophilologica* 88(sup1), 57-67. doi: 10.1080/00393274.2015.1096042.
- Weisman, A. (2007). *The World without Us*. New York: St. Martin's Press.
- Whyte, K. (2017). Indigenous Climate Change Studies: Indigenizing Futures, Decolonizing the Anthropocene. *English Language Notes*, 55(1-2), 153-162.
- Wood, D. (2019). *Deep Time, Dark Times: On Being Geologically Human*. New York: Fordham University Press.
- Working Group on the "Anthropocene" (2019). Results of binding vote by AWG. 21 May. <http://quaternary.stratigraphy.org/working-groups/anthropocene/>. Accessed 5 January 2021.
- Yusoff, K. (2013). Geologic Life: Prehistory, Climate, Futures in the Anthropocene. *Environment and Planning D: Society and Space*, 31, 779-795. doi: 10.1068/d11512.
- Yusoff, K. (2015), Geologic Subjects: Nonhuman Origins, Geomorphic Aesthetics and the Art of Becoming Inhuman. *Cultural Geographies*, 22(3), 383-407. doi: 10.1177/474474014545301.

- Yusoff, K. (2016). Anthropogenesis: Origins and Endings in the Anthropocene. *Theory, Culture & Society*, 33(2), 3-28. doi: 10.1177/0263276415581021.
- Yusoff, K. (2017). Geosocial Strata. *Theory, Culture & Society*, 34(2-3), 105-127. doi: 10.1177/0263276416688543.
- Zalasiewicz, J. & Williams, M. (2012). *The Goldilocks Planet*. Oxford: Oxford University Press.
- Zalasiewicz, J. (2008). *The Earth After Us: What Legacy Will Humans Leave in the Rocks?* Oxford: Oxford University Press.
- Zalasiewicz, J. (2010) *The Planet in a Pebble: A Journey into Earth's Deep History*. Oxford: Oxford University Press.
- Zalasiewicz, J. (2017). The Extraordinary Strata of the Anthropocene. In S. Oppermann & S. Iovino (Eds.), *Environmental Humanities: Voices from the Anthropocene*. London: Rowman & Littlefield. 115-131.
- Zalasiewicz, J., Williams, M., Steffen, W. & Crutzen, P. (2010). The New World of the Anthropocene. *Environmental Science & Technology*, 44(7), 2228-2231. doi: 10.1021/es903118j.
- Zalasiewicz, J., Williams, M., Haywood, A. & Ellis, M. (2011). Introduction: The Anthropocene: A New Epoch of Geological Time? *Philosophical Transactions of the Royal Society: Mathematical, Physical and Engineering Sciences*, 369(1938), 835-841.
- Zalasiewicz, J. et al. (2014). The Technofossil Record of Humans. *The Anthropocene Review*, 1(1), 34-43. doi: 10.1177/2053019613514953.
- Zielinski, S. (2006). *Deep Time of the Media: Toward an Archaeology of Hearing and Seeing by Technical Means*. Cambridge: MIT Press.