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Geologic life: prehistory, climate, futures in the Anthropocene

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Abstract. The diagnostic of the Anthropocene proposes a new geological epoch that designates humans as beings capable of geomorphic force, shaping Earth systems on a par with inhuman forces. This social geology marks an ascendance to inhuman planetary power fuelled by fossil fuels from the Carboniferous. Yet nowhere are the geophysical, genomic, and social narratives of this geologic subjectification considered together to interrogate these geologic capacities, not just in terms of impacts *on* the Earth, but as forces that subjects *share*—geologic forces that compose and differentiate corporeal and collective biopolitical formations. I argue in this paper that the concept of the Anthropocene is axiomatic of new understandings of time, matter, and agency for the human as a collective being *and* as a subject capable of geomorphic acts; a being that not just affects geology, but is an intemperate force within it. This immersion of humanity into geologic time suggests both a remineralisation of the origins of the human and a shift in the human timescale from biological life course to that of epoch and species–life. The paper is structured as a modest conversation between two fossilised subjects that define the imagined origin and ending of the narrative arc of the Anthropocene—one from the prehistory of human origins, the other from the future of the Anthropocene—in a conversation about time, geology, and inhuman becomings. Examining fossils as material and discursive knots in the narrative arc of human becoming, I argue for a 'geological turn' that takes seriously not just our biological (or biopolitical) life, but also our geological (or geopolitical) life and its forms of differentiation. Fossils unlock this life–death, time–untimely, corporeal–incorporeal equation, suggesting the need for a theory of the geologic and a reckoning with the forces of mute matter in lively bodies: a corporeality that is driven by inhuman forces. This paper investigates what I am calling "geologic life"—a 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. This geologic life prompts a need to rethink the coherency of the human as a territorialising force of the Earth in its prehistoric, contemporary, and future-orientated incarnation. As such, this paper proposes a speculative theoretical framework for thinking modes of geologic life within the Anthropocene.

Keywords: climate change, Anthropocene, geology, inhuman, subjectivity, fossils

> "in order to watch over the future, everything would have to be begun again."
>
> Jacques Derrida (1994, page 175)

> "It seems to me that we can push even further the impetus to antihumanism by acknowledging the formative, productive role of inhuman forces which constitute the human as such and provide the conditions and means by which it may overcome itself."
>
> Elizabeth Grosz (2005, page 186)

The diagnostic of the Anthropocene proposes a new geological epoch that designates humans as a collective being capable of geomorphic force, shaping Earth systems on a par with inhuman forces (Crutzen, 2002). This social geology that marks the ascendance to an inhuman planetary

power is fuelled by fossils from the Carboniferous era, the matter–energy of which gives rise to the political formations of late capitalism. If human life has been characterised in late capitalism by the biopolitics of securitisation and far-reaching forms of economic and cultural commodification, the nomination of the Anthropocene institutes a reminder that the biopolitics of life has a more expansive mineralogical geography that needs attention (see Clark, 2012; Clark and Yusoff, forthcoming; Yusoff et al, 2012). The intermingling of social and natural causality in anthropogenic climate change and the 'renaturalising' (see Grosz, 2005; Sharp, 2011, page 6) of humanity *as* geologic in the Anthropocene suggest a need to think about inhuman nature and geologic capacities within the context of a new Anthropocene-inflected geopolitics and its modes of subjectification. Further, this new understanding of *being as geological* effects the temporal and material imagination of the capacities of the human that move beyond a conceptualisation of social relations with fossil fuels into the contemplation of the social as composed through the geologic (and thus politically constituted by it in both political and radically apolitical ways). Yet nowhere are the geophysical, genomic, and social narratives of this geologic subjectification considered together so as to interrogate these geologic capacities, not just in terms of impacts *on* the Earth, but as forces that subjects *share*—geologic forces that compose and differentiate corporeal and collective biopolitical formations.

Considering the geologic as defining strata of contemporary subjectivity within the designation of the Anthropocene opens up the question of what forms of geologic life subtend subjectivity; and how this geologic life holds the potential for a more expansive inhuman thought,[(1)] as well as exemplifying the destruction of forms of subjective life that are tied to fossil fuels (and thus late capitalism). One way into the sensibility of this *longue durée* of geologic life is to look at the remainders and evidential base of hominin fossils on which material and conceptual archaeologies of the human are mobilised. Hominin fossils, actual and imagined, exhibit and evidence modes of extinction and forms of survival pertinent to a consideration of "life as a geological force" (Westbroek, 1991) and the "geo-logic" (Frodeman, 2003) of the Anthropocene. This paper, then, investigates what I am calling "geologic life"—a 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. Examining fossils as material and discursive knots in the narrative arc of human becoming, I argue for a 'geological turn' that takes seriously not just our biological (or biopolitical) life, but our geological (or geopolitical) life, as crucial to modes of subjectification in the Anthropocene.

While the biopolitical turn spoke to concerns around bodily integrity, the molecular, and various forms of securitisation, the geopolitical (as geologic life) has yet to be substantiated as such, and must grapple with new forms of geomorphic effects and planetary changes that are specific to the designation of the Anthropocene and its recognition of the mass mobilisation of fossil fuels. While the Anthropocence names humans as a geomorphic force (Crutzen, 2002), thus recognising the impact of fossil fuel extraction and the manifestation of particular forms of late capitalism on the Earth, what language do we have we to describe this geological life, its territorialisation, and its (in)corporeal manifestations? How do we speak of deep time and inhuman beginnings within the context of these Earth forces in ways that offer a generative politics of minerality, rather than one of unilateral destruction? That

[(1)] As Grosz argues, "A new humanities becomes possible once the human is placed in its properly inhuman context" (2011, page 21). That is, to discuss "what is before, beyond, and after the human: the inhuman, uncontainable condition of the human, the origin of and trajectory immanent within the human" (page 11). How the inhuman dimensions of subjectivity are articulated matter for the very conceptualisation of material relations and forms of subjectivity at stake in the Anthropocene, and for how the life-defining (im)material legacy of fossil fuels is conceptualised.

is, to recognise the geologic as a praxis of differentiated planetary inhabitation and corporeal affiliation, rather than an externality.

While the geologic is an emerging area of investigation in various disciplines, the imagined geologic subject that underpins such a collective geomorphic event remains underexamined and often metaphoric in its composition (in which the geologic becomes folded into existing models of the biopolitical). This sketchiness of geologic subjectification is particularly pronounced in discourses of sustainability that are mobilised in response to calls for a more enduring, less disastrous geological impact. Although laudable in the search for more sustainable modes of living, this literature often neglects the geopolitical and evolutionary debt that ‘we’ *owe* fossil fuels, and perhaps forgets to ask *why* capitalising on the forces of fossil fuels became such a compelling collaborative project, and *how* the geochemistry of fossil fuels underpins the geopolitical life of the subject of late capitalism (now the new geological subject of the Anthropocene). There are many ways to ‘cut’ into fossil fuels and the attendant questions about the ‘lives’ of geological matter. But if we use the Anthropocene as a provocation to begin to understand ourselves as geologic subjects, not only capable of geomorphic acts, but as beings who have something *in common* with the geologic forces that are mobilised and incorporated, it is possible to identify some of the collaborative junctures that govern and provoke these affiliations to enact corporeal and planetary (de)sedimentations.

Combined with new modes of geologic subjectification, the Anthropocene defines a new temporality for the human as a being situated in geologic time. The Anthropocene folds geologic time into human corporeality, refocusing attention on the temporality of inhuman forces within the subject: on epoch being, on thresholds in evolution and extinction, and on a new humanity that is defined through the end of the Holocene. The concept of the Anthropocene is axiomatic of new understandings of time, matter, and agency for the human as a collective being *and* as a subject capable of geomorphic acts; a being that not just effects geology, but is an intemperate force within it. It bids us to imagine ourselves as geomorphic agents and see our ways of being as geological rather than biological *per se* (a biology that is more-than-biological or inhuman in its vitalism), representing a shift in terms of material production and the bodies politic of the human. As geological agents, humans are explicitly located alongside other Earth and extraterrestrial forces that possess the power of extinction and planetary effect through the ability to capitalise on and incorporate geologic forces, making the “geopower” (Grosz, 2012, page 975) of previous fossilisations their own. If, according to Grosz, geopower is the potentiality of matter that is capitalised upon, then geopolitics must be the political formations of those modes of capitalisation. So political questions are shot through with geologic forces and their mineralisations.

The Anthropocene proposes an epic planetary agency for humanity that is material, symbolic, and virtual. Yet, rather than think with the empire of impacts, another way into the end of the Holocene might be to think with its subjects. Rather than accept the unitary designation of the subject in the ‘age of man’, if we delve into the prehistory of geologic life, a reading of corporeality that is inflected with the differentiating forces of geologic life can be substantiated to refute such an undifferentiated colonising view. Such a deep history of geologic life might well elaborate on more generative climate futures that break with the disastrous reproduction of ‘fossil fuelism’ and offer alternative imaginaries for the inhuman forces within humanity. To that end, I want to stage a modest conversation between two fossilised subjects that define the imagined origin and ending of the narrative arc of the Anthropocene. 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. As Derrida suggests in the epigraph to this paper, attentiveness to the future and its political possibilities requires an understanding of originary conditions. Inheritance, according to Derrida, requires vigilance about what is inherited and how it is carried forward: "we inherit it, we must watch over it" (1994, page 175). If origins are a potential site of disruption in the reinvention of futures to come, then watching over the future requires conversing with the alternate-facing temporal moments of fossils that summon the pasts and futures of geologic life. As fossils organise the material structure of geologic time in their substantiation of the geologic record, we might also turn to them to critically inquire after our own temporal moment in the strata.

Part I: two fossils talk across time about geologic life

Imagine a conversation between two sets of fossils—the future fossils of the Anthropocene and fossils from the prehistory[(2)] of human origins. Their meeting is staged to unlock the discourses of geologic agency, time, and inhuman becomings that remain immanent within life, but often obscured within understandings of its biopolitical or geopolitical dimensions.

Fossil No. 1: the Anthropocence, the human fossil to come

The framing of humans as a geological force in the Anthropocene creates a geologic corporeality for humans as a collective surge on an inhuman scale: the social formation of what Michel Serres has called "the dense tectonic plates of humanity" (1995, page 16) capable of shifting geologic planetary processes. Anthropocene fossils are a spectre of the *human as fossil to come*, a unified strata that names a geologic epoch defined through its trace or end (Zalasiewicz, 2008). This framing has two effects on the production of subjectivity: to name humans as a collective (defined in terms of population or strata) and to place humans *into* geologic time. As a geologic collective, their impacts are defined as a singular undifferentiated force—a form of geomorphogenesis—that poses environmental shifts as a 'problem of population'. In this unitary geologic frame, the body politic of geologic humanity seemingly transcends borders and differences while simultaneously posing the perceived problem (of population) at particular operative sites that are gendered, racialised and geographically bifurcated (such as women's bodies in the Global South). There are clearly no neutral narratives around how we place the human in our understanding of planetary change. Long before 'the human' became an explicit area of concern in climate sciences, humans were already framed in particular causal ways in 'human dimensions' research: as both the recipient and the cause of climate change; as caught between the poles of population and individuation; and subject to the same mechanisms of quantification that are used in the modelling of Earth systems. These subject formations are primarily due to the late placing of humans (and the humanities) into climate-change science policy, so that humans became the effect of the modes of organising the physical geography of the Earth, which explicitly required a unitary humanity (and Earth). Whether the designation of the Anthropocene is accepted as a formal geologic epoch or not, it is arguably more important for the geographic imaginations it releases as much as the scientific claims it makes. Implicit within the use of CO_2 as the material trace of the Anthropocene is the designation of a politicised stratigraphy composed through the event of carbon capitalism from the 1800s. This stratigraphic trace also inadvertently gives us a glimpse of the end of capitalism as an extinct stratum of the Earth. From this stratigraphic glimpse it could be concluded that the actual extinction that is presupposed in the Anthropocene is not the totality of life, but rather

[(2)] Prehistory has many incarnations. For scientists in disciplines of paleontology and geology it tends to mean everything that happened before the written record and the ability to store information and experienced outside of genetic codes.

the subject of late capitalism. This suggests an imperative to think through social geography as differentiated by geologic forces and flows, as much as by social conditions.

As a temporal device that shifts perspectives, the Anthropocene has a double action of settling anthropogenic climate change into the ‘ground’ of multiple past climate changes, while simultaneously locating humans as exceptional in their authorship of a new geologic ground. That is, the Anthropocene in its nomination of humanity as geologic force renaturalises ‘our’ climate change in the context of the many climate changes that have characterised Earth *and* hominin histories, while calling attention to humanity’s unprecedented conditions of planetary agency. Bronislaw Szerszynski comments on this double bind: “the very notion of the Anthropocene contains an element of indecision: is this the epoch of the apotheosis, or of the erasure, of the human as the master and end of nature?” (Szerszynski, 2010, page 16). As the Anthropocene mobilises and naturalises a universal subject—‘man’ that is the foundational subject of humanism, it simultaneously negates the differences (ontological, political, sexual, and biological) that result from the uneven geographies of fossil fuel consumption.[3] Could this problematic be more usefully formulated as a question of geontologies,[4] as Elizabeth Povinelli argues (2013)?; of differentiated forms of geologic life that characterise subjectivities and produce territorial effects through these historical geontological configurations? The appeal to a singular ontological origin (‘man’) and ‘the ends of man’ obscures gross differences in responsibility and attribution and forms of geologic life (from high-intensity fossil fuel consumption to organic fuel consumption), while mobilising what Tariq Jazeel calls “a litany of stultifying ‘pre-critical geographic givens’ that ‘normalize universality *as* an extension of Eurocentric modernity” (2011, page 78, original emphasis). As Jazeel concludes, “This planet *is* the ground that unites humankind, a geo common to all, but one that can only be glimpsed through moments of willing transcendence of that ground” (page 80, original emphasis). What is important to note is how the *geo becomes a collaborator* in particular formations of subjectivity, while simultaneously appearing as a benign entity that can be taken for granted as neutral ground.[5]

[3] If there is only a singular ontology, there is no register of difference. While prehistoric Man is often accorded neutrality through the negation of time (that is carried forth in the geologic temporality of the Anthropocene), he is rendered prehistorical and thus assumes an originary position that is undifferentiated.

[4] Elizabeth Povinelli has recently used the term geontologies to refer to the interpenetration of biography and geography, and particularly as an analytic for how power is arranged around biogeographical obligation, often in violent confrontation with forms of governance. This makes a distinction between naturalising ways of being in relation to particular geographic/geologic formations and the survival and extinguishment of biographical obligations to particular places, while simultaneously recognising the carbon substrata of biopolitics. I use the term geo-ontologies somewhat differently to signal how the geologic, in its manifestation in the Anthropocene, presents a fracture in the ‘geo’ that introduces a radically incommensurate temporal signature into ontological questions. Part of this ontological question is located around the mobility of the border that is established between the vital and nonvital in accounts of matter; yet it is also a question, as Povinelli asserts, of how ontological differences are stretched across forms of life and modes of mineralisation, and what territorialisations become possible as a consequence of this.

[5] The question of ‘man’s place in nature’, as Thomas Huxley posed it in 1863 in the context of fierce struggles over evolutionary theory generated by hominin fossils, haunts the formation of the Anthropocene. Although differently formulated, as ‘locating the human in climate change’ or ‘human–environment interactions’, the question remains remarkably close to Huxley’s iteration in its formulation of ‘man’ as a universal concept that is distinct from ‘nature’ and whose condition is defined through the recourse to a geographical location in time and space. That is to say, ‘man’s place in nature’ is posed as a metaphysical question that has a geologic resolution. This geographical formation has ontological implications and the ontological formations of the human have territorial effects.

The geoformation of subjectivity that is at stake in the Anthropocene is a result of the capitalisation of fossil fuels, so while the Anthropocence might seem a neutral proposal that registers geomorphic force, the imaginaries of this geologic life actively campaign on our senses for a particular political scene that universalises the inheritance and responsibility for fossil fuel consumption, while obscuring the differentiated material and temporal geo-ontological arrangements in the composition of geologic life. Yet, the Anthropocene narrativises a materialism that couples *Homo sapiens* and fossil fuels into a trajectory of geologic force at the level of the genus, suggesting an ontogeny of a singular hominin (and by extension, geography and history). It creates a new geologic subject, defined by its use of fossil fuels from the 1800s onwards, with a period of intensification called by its authors "the great acceleration" from the 1950s (Steffen et al, 2007). To imagine the Anthropocene as an event, we must become attuned to fossils—seeing ourselves as the material expenditure [(6)] of the remains of late capitalism; the fossil remainder as geologic witness and mimetic memory device for both Earth and social histories; naturalising the geologic subject of late capitalism into the stratigraphic record. This is a shift in the sensibility of social–environmental logics. But, what has actually lubricated this passage to geomorphic force is the material *reanimation* of another extinction event; it is the trajectory of one extinction event feeding another.

Dead matter—organisms of oil, the biogenic and thermogenic organic matter of gas, and the carboniferous plant matter of coal—animates life in the engines of the Anthropocene. These fires of combustion that underpin late capitalism—the energy, the heat of transformation, and the compulsive materialism of the Carboniferous—are irreducibly part of what it is to be a subject of late capitalism. This fossilised materiality is not external to that subjectivity, but active within its reproductive, creative, and technological possibilities and their expiration; it is a form of geologic immanence. As Szerszynski comments, "If our carbon metabolism is undermining the very stable climate that made human civilization possible, perhaps also at risk is the specific semiotic *dispositif* of the human that was at the heart of that metabolic regime" (2010, page 17). Humanity built on the dead matter of the Carboniferous is not just underpinned by that materialism, but an expression [(7)] of it; and the subsequent geographic expansion of human populations across the Earth (as a planetary colonisation) and into the atmosphere and strata is a consequence of it. Fossil fuels are a material condition that subtends contemporary geopolitical life. Massive biodiversity loss in its most simple expression is the battle over geography that has ensued in securing the material conditions for the reproduction of life in its contemporary geologic forms. The increasingly desperate forms of material exchanges that are involved in 'unconventional' mineral extraction, such as tar sands, 'fracking', and deep seabed drilling, are testament to the wider biological compromises of this new political geology—in unearthing one fossil layer we create another contemporary fossil stratum that has our name on it.

The immersion of humanity into geologic time suggests both a remineralisation of the origins of the human and a shift in the human timescale from biological life-course to that of epoch and species-life (this is most evident in the 'future generations and extinction' narratives that currently constitute climate change discourses). The contemplation of the longue durée of climate is a reminder that climate change is not an exclusively human event and something

[(6)] In his recent work, *Malfeasance*, Serres (2011) takes his earlier "plates of humanity" (Serres, 1995, page 16) metaphor further to argue that humans have laid claim to the Earth through their pollution, both hard pollution—the poisoning of the Earth—and soft pollution—the pollution of subjective life. For Serres, we are an animal that claims geography through our excretion, our defecating prowess, and the force of our wasting.

[(7)] Much of the climate policy and sustainability literature bifurcates the human into either population or individual, which parallels closely the nation-state and neoliberal subject as the twin poles of identity under late capitalism.

that has an ancestral trace that is evident in human evolution (although this human–Earth collaboration *is* a specific actualisation of contemporary geologic life). The ancestral trace that survives in the composition of modern humans today suggests that ‘we’ not only *follow after* climate change, in as much as it is part of human becoming (climate events have conditioned and provoked hominin evolution), but also *follow after* fossil fuels that gift the potential and provocation for geological force (and its geopolitical possibilities). Thinking of ourselves as embedded in geologic temporalities (rather than just as authors of them) has the potential to release some of the narrative trajectories beyond the narrow confines of ‘our’ humanism and historicity into inhuman beginnings, and beyond biological materialism into thinking better with different geologic materialisms. This is to say that ‘our’ geologic force is not ours alone and owes a *debt* (of force) to the mobilisation of other geological materials: fossil fuels. To focus solely on ‘man’ in the Anthropocene is to marginalise the material openings that make such geologic forces possible in the first place, and to end up anthropomorphising the geological (rather than geologising the *anthropos*), without paying sufficient attention to the temporal and material logic of such a scene.[8] Prioritising ourselves as a species within the generation of meaning and material effects, while minimising the force of fossil fuels in organising forms of life, fails to properly acknowledge the active power of fossils that subtend this equation. This failure has consequences for how the relation to fossil fuels is thought, in terms of subjectification, future-orientated practices, and inhuman forces.

Fossil No. 2: human origins theory (HOT)

Writing the geological record from fragments of fossils is marked as an impossible project that is subject to possible revision with every new unearthing of fossil fragments. However, until 2010 the origin point of *Homo sapiens* remained fundamentally conserved. As the American Museum of Natural History (2012) puts it, “After several million years of human evolution, only one hominid species remains: *Homo sapiens*. We have spread across every continent into a wide range of environments—and in the process, minor differences between people living in separate regions developed over the course of thousands of years … . But studies of human DNA reveal that all humans are remarkably similar—we are 99.9% genetically identical.” And the Smithsonian Institution (2012), “The billions of human beings living today all belong to one species: *Homo sapiens*.” Fossils of *prehistoric hominins* (or ancestral fossils),[9] recently discovered in conjunction with new technologies of dating and sequencing of mitochondrial DNA, have radically disrupted accepted narratives of human history and theories of evolution in HOT, just at the historical moment that they are being concretised in the Anthropocene. Confident declarations of “one species, one world”, with a species-life and *geo* common to all, have been problematised. From a singular geographical origin—‘out of Africa’[10]—and singular genetic species—*Homo sapiens*—the genus of the human is rapidly becoming articulated as multiply situated and genetically differentiated. These new fossils have complicated genealogical narratives of the ‘human story’, promoting an awareness of geographical and biological differences in territorialisation and species-being.

[8] Geologist Marcia Bjørnerud suggest there should be less anthropomorphising in reading the rocks and more geomorphising (2005, page 6).

[9] This reference to ancestral fossils is used within the context of archaeological literatures to denote a fossil that is ancestral to contemporary hominins rather than as deployed by Quentin Meillassoux [Meillassoux’s (2008) concept of an “Arche-fossil” is an anterior fossil before life, but actualised in the present, like light from stars].

[10] The ‘out of Africa’ theory is associated with Stringer of the Natural History Museum, London, who argues that modern humans first evolved in Africa and then migrated over the world replacing the prehuman species of other continents over the last 100 000 years, including the European Neanderthals. There are several notable other models of human evolution: the hybrid model (Bräuer); the assimilation model (Smith and Trinkaus); and the multiregional model (multiple authors).

In what might be viewed as a subaltern move, because of its focus on minoritarian survival, genomic approaches to hominin fossils are generating new genealogical accounts that suggest the human that we have become has no 'we' at the level of genus, or in terms of racial, sexual, or geographic identity. As the geneticist Michael Hammer puts it, "We need to modify the standard model of human origins" (Hammer et al, 2011, page 15123). Similarly, Professor Chris Stringer of the Natural History Museum and author of the 'out of Africa' model, recently conceded in his (2012a) book *Lone Survivors* that genetic intermingling occurred, and has now adopted a 'mostly out of Africa' perspective (2012b). In bringing attention to this radical shift in the field of HOT, I do not want to suggest that one origin story can be substituted for another (Gamble, 2007), or that genomic approaches are unproblematic; rather, I want to highlight how understandings of the genus of human identity are shifting and becoming rearticulated in ways that destabilise the presumed collective of the anthropos.

Until 2010, *Homo sapiens* was generally considered the 'last human' in a trajectory of another twenty-two hominins that had gone extinct (Sarmiento et al, 2007). This progressive narrative of evolution as it is being retold within the context of climate (Fagan, 2010; Hetherington and Reid, 2010; Renfrew and Morley, 2009) has been complicated by the Lazarus effect that genetic research is having in its detection of genetic contributions from archaic forms of *Homo* from outside Africa to anatomically modern humans. As it turns out, many of the "other twenty-two" did not go entirely extinct, and we are not quite who we think we are. The narrative of 'our' sole survival, living on while all the other hominins failed, and the way this narrative seemed contrived towards a heroic tale of human exceptionalism (Gamble, 1993, page 4), named an inability to catch sight of an 'other' anterior and interior to us in the 'not-us' part of the origin story. Perhaps the biggest science story of 2010 was the sequencing of Neanderthal DNA, and an answer to the long-asked question whether humans and Neanderthals interbred (Burbano et al, 2010; Green et al, 2010). As the paleobiologist Clive Finlayson subtly puts it: "Put together, this evidence shows us that humans formed an interwoven network of populations with varying degrees of gene flow between them. Some humans may have looked quite different from each other, revealing a combination of adaptation [(11)] to local environments and genetic drift, but it does seem as though those differences were not large enough to prevent genetic interchange" (Finlayson, 2011, no page). Alongside the incorporation of Neanderthal (up to 4% of the modern Eurasian genome), the interwoven network of geographic and genomic differences in genus between humans provides a much more complex account of human origins, sexual, and geographical interchange, and of survivals and extinctions that have different temporal signatures.

While the narrative accounts of both popular and scientific cultures defined *Homo sapiens* in opposition to the Neanderthal as a superior being whose survival was testament to various cultural and biological powers of overcoming (see Finlayson, 2004; 2009), the Neanderthal, in contrast, was the nonsurvivor who failed to become of the future (or so it was thought), despite weathering 200 000 years of the most intense period of climate change. As a denigrated counterpoint to 'our' becoming, the Neanderthal's primitive prehistory provided the oppositional ground for *Homo sapiens* mobilisation. Like many theories of race (that were historically contemporaneous with human evolutionary theory), superiority was operationalised through the denigration of difference. While the Neanderthal was once posited as the oaf of prehistory, *Homo sapiens* is becoming rearticulated as a self-made subject of the climate era, with increasing attention to adaptability and innovation (technological and neurological) in human origins within the context of climate change (Stringer and Andrews, 2005, page 228). The popular-science writer Brian Fagan typifies

[(11)] Clive Gamble argues against simplistic notions of adaptation because of the tendency towards tautology (1993, page 5).

this: "Cro-Magnon captures the protean adaptability that has made humans an unmatched success as a species" (Fagan, 2010, front cover). What the concept of *Homo sapiens* holds in tension towards the Neanderthal collapses when 'we' become part-Neanderthal and other possible survivals become apparent.

The second major fossil find of 2010 was that of 'X-woman' who was reported to be a possible new species of human (Callaway, 2010a). An article in *Nature* proclaimed:

> "The ice-age world is starting to look cosmopolitan. While Neanderthals held sway in Europe and modern humans were beginning to populate the globe, another ancient relative lived in Asia, according to genome sequence recovered from a finger bone in a cave in Southern Siberia. A comparative analysis of the genome with those of modern humans suggest that a trace of this poorly understood strand of hominin lineage survives today, but only in the genes of some Papuans and Pacific islanders" (Callaway, 2010b).

While the discovery of 17 000-year-old *Homo floresiensis*—dubbed the 'hobbit'—had dispelled the notion that there were no other species of hominins that existed contemporaneously with humans, many archaeologists looked on *Homo floresiensi*s as an anomaly. X-woman and her Denisovan kin folk (Denisovans are said to contribute around 4–6% of modern Melanesian genomes) suggested that multispecies living and polymorphism may have been more prevalent than is implied by the nomination of a singular genus of hominin (Berger et al, 2010).

These recent 'discoveries' have reconceptualised humanity as interspecies, articulating hominin evolution as temporally, sexually, and geographically differentiated in their migration and forms of territorialisation (Gibbons, 2011, page 392). While these various new hominin alliances are neither conclusive nor uncontested, they do suggest a loosening of the biological unity of human life and a querying of its autoreproduction as a singular force into the future. The idea here is not to take one origin scene and replace it with another; rather to point to the forms of genesis that are at stake in the Anthropocene (Yusoff, 2012). The querying of long-held views about origins and identity, and the troubling of assured modes of reading the human, are enough to crack open the concept of the human without reinstating the deductive powers of genetics or human essentialism. What this diffraction achieves is a break with the unity of a singular conceptualisation of the human, shattering the plane of an originary condition by which life is constituted—geographically, genomically, and geologically. The articulation of these survivals within extinction events might also serve to remind us that a focus on the 'ends of man' might be a distraction from the task of thinking about who or what might survive the subjectification of late capitalism.

Part II: fossil theory

The human fossil is a material remnant that unearths the process of sedimentation that accrues around and is historicised within the concept of the human, while also reminding us of the longue durée of our geologic life and our inhuman mineral origins (and futures). Both these aforementioned fossils,[12] as narrativistic devices for the material and temporal dimensions of the human and as geologic evidence for the origins and endings of human time, are implicated in the way the human is conceived of in the Anthropocene in terms of: (1) *Forms of life* (modes of subjectivity as universal or bifurcated; 'man' as the dominant signifier for the human; and differentiated modalities of geologic life); (2) *Forms of responsibility and*

[12] Martin Rudwick traces the word 'fossil' to its origin in Aristotle's *Meterologica*. He "used it to describe any distinctive objects or materials dug up from the earth or found lying on the surface" (1972, page 1). In Conrad Gesner's recognition of the term, fossils became organised into those that resembled organisms and were termed "organised fossils" on the one hand and those called *Problematica* on the other: "a collection of objects that are doubtfully organic or at least of uncertain affinities". Fossil fuels were the exception to *Problematica* and retained the term 'fossil' (Rudwick, 1972, pages 1–2).

inheritance (in a genealogy of concepts of the human and the propagation of these forms into the future); and (3) *Forms of territorialisation and geomorphic transformations of the Earth*. Fossils speak to and raise questions about human genealogy, inheritance, and modes of future and past survival, and thus they provoke thought to travel along the temporal cusp of geologic corporeality, crossing 'live' and 'dead' matter. Fossils both make manifest and historicise the geological condition of the human, a reminder that our bodily composition has an originary mineralisation and a fossilised end. As Manuel DeLanda comments:

> "In the organic world, for instance, soft tissue (gels and aerosols, muscle and nerve) reigned supreme until 500 million years ago. At that point, some of the conglomerations of fleshy matter–energy that made up life underwent a sudden *mineralization,* and a new material for constructing living creatures emerged: bone. It almost seemed as if the mineral world that had served as a substratum for the emergence of biological creatures was reasserting itself, confirming that geology, far from having been left behind as a primitive stage of the Earth's evolution, fully coexisted with the soft, gelatinous newcomers … And yet, while bone allowed the complexification of the animal phylum in 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" (DeLanda, 1997, pages 26–27, original emphasis).

This material/mineral origin story of evolutionary phylum is sedimented into the human corpus, but rarely acknowledged in work that takes a vital or social body as its primary subject (that is, life understood as the mover and shaker of matter). In contrast to the volume of work on vitalism and biopolitics, the geologic is more often than not a forgotten stratum in our becoming. And its temporality and mineral affiliations as a substratum for the emergence and differentiation of biological life remain underconceived of in contemporary social theory. The movement from living bone to mineral at the threshold of fossilisation names the reciprocal processes of inscription that mark Earth and bodies as concomitant geologic territories (albeit in radical asymmetry). The assumption is often that something of one (mineral) passes to the other (life), but that this crossing is a one-way street until death fossilises life, returning it to mineral, so that death becomes the agent of the threshold and its actualisation. But what if the relationship has other paths in which the geologic criss-crosses corporeality not only to make fossils per se, but also to mobilise specific modalities of geologic life, and in doing so direct what bodies become through the force of fossil matter–energy? If this seems abstract, we have only to think of the differences in life expectancy between the fossil-fuel rich and poor to understand that the potential of a body to be what it is is conditioned by the fossil fuels that it can incorporate. But how to speak of this corporeal geologic work in both its aliquid and fossilised manifestations?

Fossil bones are tiny fragments of a larger process of mineralisation that represents the utilisations of minerals within life and their eventual disintegration back into the geologic dust that constitutes the material composition of the bulk of the Earth. This is also a movement that tears time apart, shattering an originary body into fragmentary pieces so that any archaeology is always speculative in how it 'scales up' from fragments to a larger set of genealogical assertions. The fossil is always an asymmetric knowledge object, a tiny bone record of a much larger life that has moved on without trace. Nonetheless, it has power[(13)] precisely because it is a trace-like entity, a fragment that provokes narrative constellations that shift (and sometimes 'split') the classificatory order of things. In an attempt to deal with the fragmentary nature of fossils, archaeologists divide themselves into 'lumpers' and

[(13)] Gesner (1516–65), author of *On Fossil Objects* (1565), suggested that the "natural magic" of fossils was an essential reason for thinking about fossils, to delve into their hidden affinities and what this revealed about the ontological analogy between man and the universe (Rudwick, 1972, pages 18–21).

‘splitters’: a lumper classifies fossils based on broad existing categories; a splitter does the opposite and uses new finds to generate new categorisations. Whether a fossil disorders or reorders epistemologies of knowledge, a fossil thrown up out of its strata by a digger, by mining, or by an ice age is incongruent to the present environment: *Who will pick it up? How will it break the surface of our understanding to either confirm what we think we know or to radically alter the understanding of human history?*

To imagine humanity as a future fossil in the geologic strata of the Anthropocene is to become given to the time and chaotic churnings of the Earth; it is to become attentive to our minerality in its less vital and more enduring form. Implicit in this imagining is a model of the Earth as strata: vertical rather than horizontal territory, intensified by the passage of time, in layers that press hard on the possibilities of forms that become fragmented in time and material integrity. The fossil, then, is an abandoned being that suddenly in the midst of the present reconfigures the possibilities of times, of past and future,[(14)] and like a line of flight thrown from some prehistoric world or imagined future it offers a hitherto unimaginable direction to thought and becoming—ourselves as Neanderthals, others as Denisovan, human strata, geologic subjects, extinctions, and survivals. This is the temporal and spatial scene in which fossils speak. But what is the nature of their speech and what would they say ‘if’ they could speak? *Speak! Nothing? Only a spectre? A dumb object?* What mutism is this that characterises our lack of language for this geologic dimension of life? The question here may not be, “How does a fossil speak?” but what is being said for and of this fossilised inheritance for the future, and where is agency located within these geographical, temporal, and material utterances? And why is this geological being, implied in the Anthropocene, so muted in our discussions?

The work of fossil fuels is everywhere evident, and yet there is a strange absence in the conceptualisation of the agency and historicity of fossil fuels within corporeality and an overreliance on the study of the effects of fossil fuels on the Earth in political geology. In this externalisation of fossil fuels as commodity, geopolitical power, or political economy, an inheritance is missed in geologic genealogies, which obscures the full historic materiality of this Anthropocene inheritance. By understanding this geologic dimension of subjectivity as immanent yet unspoken within the human, attentiveness shifts, not to what they ‘say’ but to how the agency of fossil fuels is disavowed in current modes of articulating massive planetary change. By understanding fossil fuels as active within contemporary corporeality, we can think about a mobile and mobilising material conversation between ‘dead’ fossils and ‘live’ bodies amongst the geopolitical subjects of the Anthropocene. At present, accounts of the work of fossil fuels are centred on human subjects and their practices, rather than on developing a philosophy of the geologic that grapples with what fossil fuels allow and what they might say to the work of inhuman forces. What has been difficult to theorise is how fossil fuels differentiate life while remaining seemingly ‘mute’ within the Earth and corporeality. As Nigel Clark notes: “explicit engagements with a nonliving materiality remain rare … in most of the encounters with elemental matter to date, it has paradoxically been the ‘liveliness’ of the inorganic that has been highlighted, at the expense of properties that are more specific to the mineral or chemical structures that make up most of the known universe” (2011, pages 23–24). If matter is mute till life operates on it—life cuts matter (or the force of matter only becomes actualised within life)—then how can we begin to explain the ways in

[(14)] Human fossils can be thought of as a mobile citational object with the ability to bring new texts into existence, while simultaneously overwriting previous forms of geological indexicality. Ancestral fossils, then, are always involved in sedimenting and unearthing what the human *is*, and what it can be. In Grosz’s terms the fossil is a gift in as much as it gives time and moves “freely” in terms of exchange (2005, page 68).

which we differentially become with fossil fuels, in ways that are not entirely our own, but driven by the geologic forces of these compelling anonymous materials?

While fossil fuels have a significant downtime (about 360 to 286 million years) during which fossils acquire the hyperenergetic materialism of fuel, in terms of theory they remain mute and only begin to matter the moment they become productive in social worlds. DeLanda comments that the privileging of vital biopolitics is a form of "organic chauvinism" (1997, page 103), "that leads us to underestimate the vitality of the processes of self-organization in other spheres of reality. It can also make us forget that, despite the many differences between them, living creatures and their inorganic counterparts share a crucial dependence on intense flows of energy and materials" (pages 103–104). What we can draw from being attentive to the work of forces as a unit of analysis (Grosz, 1994) is an understanding of how forces direct, author, and allow possibilities for forms of life.[15] As Grosz suggests, "force needs to be understood in its full subhuman and superhuman resonances: as the inhuman which both makes the human possible and at the same time positions the human within a world where force works in spite of and around the human, within and as the human" (1994, pages 187–188). Fossil fuels are compelling subjects/objects/forces precisely because they cross bodies and states: fossil and fuel, matter and energy, deep time and transformative possibility. Fossils unlock this life–death, timely–untimely, corporeal–incorporeal equation, suggesting the need for a theory of the geologic and a reckoning with the forces of mute matter in lively bodies: a corporeality that is driven by inhuman forces. Fossil fuels are life that comes back to us, as it were, to take up new life forms and make new geopolitical subjectivities. While the unearthing of fossil fuels underpins a massive spike in populations from the 1800s onwards that is coupled to CO_2 production, the specificities of these geologic lives are lost in the universalising logic of the Anthropocene.

What kind of account of matter would be needed that would allow fossil fuels their proper agency in our differentiated and differentiating geologic genealogies? One answer might be: an account that does not underestimate geological affiliations or corporealities and the excitement and inheritance of fossil fuels as active within life rather than external to it. Fossil fuels suggest another path into the work of mute matter [a nonvitalist materialism, what Claire Colebrook calls "a passive vitalism" (2010, page 7)]. Namely, that there is some agreement or patience[16] between the fossil fuels and bodies that allows both contemporary and Carboniferous life to expand, biologically and socially, to take up and transform matter, but also be transformed by it. The passage of this inheritance may not be as pronounced as some genomic inheritances, but it shapes the possibilities of what a body can be. Considering how these forms of geologic life, fossil and fuel, touch one another (and are sensible to one another through that touching) is part of beginning to know better the traversals between minerality. Grosz suggests we think of how "Matter and life become, and become undone. They transform and are transformed. This is less a new kind of materialism than it is a new understanding of the forces, both material and immaterial, that direct us to the future" (Grosz, 2011, page 5). Understanding geologic forces as something that the subject shares requires a new formation of the geopolitics of the Anthropocene—one that acknowledges the force of

[15] Here, Grosz's framing of culture as nature's prosthetic, or part of its *charge* and innovation, ties an ontology of life across social–natural worlds as "a point of connection and transition between the biological and the cultural, the ways in which matter opens itself up to social transformation, and the ways in which social change works with and through biologically open, individual and collective, bodies" (2004, page 37).

[16] Isabelle Stengers uses Alfred North Whitehead's term "patience" (or "patience of the environment") to describe a certain ethos in which an organism grasps aspects of its environment that are patient with the organism in the giving and receiving of interests (Stengers, 2008).

fossils and their corporeal place in the geopolitics of life. This is a geopolitics that must direct its thought into the Earth, as world–matter and intimate corporeality.

What might this geologic collaboration look like? The fire historian Stephen Pyne has suggested that our pyric sensibility is hardwired into our evolution (Pyne, 1995); we are because of fire, he says, not the other way around. While anthropogenic fire expanded the range of climates available to humans (Pyne, 1991, page 73), the intensity of flows mobilised by fossil fuels scaled this expansion up to the level of the planet. Understanding how to work with fire, not to control it, but to coax it into different forms of being entailed, in Aboriginal cultures, learning what the fire wants, its proclivities, its energy; this is what Pyne calls “fire farming” (Pyne, 1991, page 72; see Clark, 2011, pages 172–182). If the same logic is applied to fossil fuels, what can be said about their needs and proclivities? What say the ghosts of mineralisation rattling in our bones? What is it *in* this fossil biomass that is so insistent and seductive? Speculating on what responsible fossil fuel farming might entail would require different approaches to what is left in the ground and what is mined. One way into this would be to look at fossil fuel practices (as much energy and sustainability research does), but while it is assumed that it is the subject who is in control of practices—as a producer rather than a collaborator in praxis—the particular material–agentic intensification of fossil fuels is erased, and fossil fuels are stripped of their mobilising force. Looking at the difference between economies that are dependent on living biomass and fossil biomass is sufficient to indicate the extreme geopower (Grosz, in Yusoff et al, 2012, page 975) of that intensification that is expressed as a form of geopolitics. Similarly, in sustainability literature, the focus is often on limits and the rationalisation of those limits in modes of behaviour, rather than on the openings that this geologic mobilisation *allows* in terms of life forces and their reproduction (as bodies and as the affects that bodies become affiliated to). Approaches that attempt to flatten agency across different material economies might provide a better account of the active properties of fossil fuels, but they would say little to the geological inheritances and forces that are capitalised upon over generations through the vagaries of hominin evolution and deep history.

If the aim is to leave fossil fuels in the ground, not to actualise their energetic materiality, then it is the openings of fossil fuels to forms of geopower that need attention, and not just in terms of geopolitical and democratic arrangements (see Mitchell, 2011), but in terms of the geologic corporeality that is fuelled by that intensification as a specific mode of subjectification. After Félix Guattari, the question becomes how to address collective formations of subjectivity through fossil fuels so that transversal grafts might be made that cut across those openings into geologic life to new subjective geoformations (Guattari, 1995). Only when this work is done does it become possible to make a counterintuitive move, and turn against the ‘gifts’ of fossil fuels and against the human that is its inheritance (the geopolitical subject of late capitalism), and into other energetic relations that redirect, reimagine, and aestheticise the forces of geopower in equally sensible ways. If the art of living without fossil fuels is a one kind of survival amidst dominant forms of extinction, then there is a need to develop forms of nonparticipation and block certain fossil collaborations even as they compel us. All of this entails understanding and experimenting with the active forces of the geologic—both as inheritance and future force. Refusing the reproduction of this inheritance requires a *sacrificial responsibility* that entertains the relation between the gift and sacrifice, between unlearning forms of geologic corporeality as far as we are able, and fostering new geologic subjectivities.

Feminist work on corporeality has provided a compelling account of how to account for inheritances that mark and differentiate the body (Diprose, 2002; Grosz, 1994), and this work has done much to complicate the emergence of subjectivity and point to forms of

collaboration in the composition of life. This is also Guattari's (1995) notion in psychic life of a collective production of subjectivity, where there is no self-sufficient subject, but differing forms of coproduction and prohibition that govern the possibilities of subjective life. Within this work, attention is located in the collective possibilities of responsibility and a distributed understanding of it, rather than in the isolating logic of a neoliberal subject that is entirely responsible and 'free' in his or her choices, coming to a decision independently of social and collective inheritances. Notions of subjectivity that emphasise duty and blame to pathologise certain practices that were hitherto an acceptable part of the 'good life' isolate individuals to bear the brunt of responsibility while governments fail to build effective institutions to reduce and ameliorate the accummulation of fossil fuels in the collective corporeal and societal body. In sustainability literature, 'behaviours' are curiously cleaved off from the subject to be operated on, made better, and trained towards new practices, without any acknowledgement of how collectively, and to different extents, life has been constituted *with* and *in* fossil fuels (and as if this inheritance did not matter or direct what life and bodies become). That is to say, *a cultural or sociological account of fossil fuel consumption is not sufficient to account for the imbrication of biological and social dependences on fossil fuels as life-forming materialities*. Following after fossil fuels, then, requires not just making them abject within social practices or generating a discourse of limits, but something more generous that acknowledges what they have opened up in social practices and in life forms, and what has been *given* by this energy as an inheritance that is at once corporeal and planetary. If this givenness of fossil fuels is disavowed, understandings of use remain 'outside' of forms of corporeality, desire, reproduction of forms, and their becoming. This wilful disinheritance of the geological has a cost in its prohibition of understanding what is carried forward into the future. If the geologic is responsible for and a material directive of forms of geologic life, then it is surprising that there is no adequately developed philosophy of the geological (Frodeman, 1995, page 960) or a geopolitics that is as fateful to the 'geo' as it is to the political (Clark, 2012, page 686).

In this paper I have argued that in multiple ways, being is always *tied into being toward the geologic*, conceptually, ontologically, and materially. Contemporary Anthropocene subjectivity (human and otherwise[17]) is not indivisible from fossil fuels, so to think of a futurity without fossil fuels and the proffered ending of the Anthropocene requires undoing forms of becoming that are coconstituted with fossil fuels, as much as reconstituting alternative energetic materialities. It requires the formation of new collective subjectivities and material forms of life that examine and then move on from the geopolitical inheritance of the Anthropocene. The matter under consideration—fossil fuels—is not outside of life; it has agency, and directs, forms, and differentiates the geologic subjects of the Anthropocene. We cannot, as it were, go *against* the Earth, go *against* climate; humans can only follow after the flows of energy, be in concert with Earth processes and inhuman forces. And, in the case of fossil fuels, either increase their mobility and release their energy, or not. It is not a case of 'our' responsibility *for* the Earth, but our responsibility to forms of collaboration within geologic life. This is as much about the reception of new forms of subjectivity and geo-ontologies of the Earth as it is about creation of new energy forms.

The fossils I have talked about here, then, are something like an ancestral statement in as much as they are not just bones in a long line of bones, but they have a symbolic and imaginative function, caught up as they are in origin stories and endgames, in the making of stories of history, futurity, and identity. The contention here is that the contextual tie of human origins is crucial to understanding the human that permeates the phenomenon of the

[17] Nonhuman forms of life are equally coconstituted through the force of fossil fuels, from the use of organophosphate fertilisers in farming practices to the impact of oil pipelines and tar sands on the possibilities of reindeer migrations.

Anthropocene, its orders of time, scientific and social practices, and its modes of exclusion and excess. While origins may be forgotten, and human endings seem far-fetched, evolutionary models and imaginations of the human as a particular form infect the present in the framing of the human in the climate sciences (human factors, adaptation practices and policy, notions of imaginable or attainable futures) and as geomorphic agent to come (the human as ‘locked-in’ to fossil fuel consumption and particular modalities of late capitalism). The ‘new’ survival of hominin fossils becomes productive of the interiorisation of others within the ‘we’ of *Homo sapiens*; disrupting a prehistoric protohistory that ‘grounds’ contemporary *Homo sapiens* within the lineage of the Earth (a process that naturalises humans to every continent except Antarctica). This grounding has a double action of burying origins within the prehistory of modern humans so that these origins become taken for granted (as the ‘we’ of humanity) and naturalising this particular formation of the human subject (the subject of late capitalism) as endemic to the Earth (as a being *entitled* to global geography). Ironically, the question of the human as it is currently posed has arisen precisely because this ground has lost its perceived stability—the Earth is no longer *pregiven* as a permissive Earth—tying the human with the Earth into the future as a precarious concept that is subject to dynamic Earth processes as well as being an agent of them. Both these hominin fossils suggest a need to rethink the coherency of the human as a territorialising force of the Earth in its prehistoric, contemporary, and future-orientated incarnations.

If ‘man’ as unified and hierarchical signifier of the Anthropocene starts to disintegrate as a stable concept and identity, infected by its origins, do the possibilities for Anthropogenic futures change? Until recently, prehistory maintained a narrative of common geographic and genomic evolution, so that humanity was unproblematically tied together as a collective with a shared ‘out of Africa’ inheritance. If origins are no longer inherited as a collective, the name of the human turns against itself, its own name, to name the human to come (that which exceeds the limits of that name and is underived from it). New ancestral fossils release nascent modes of subjectivity: partial survivals and differentiated historical geographies in which the *geo* is not pregiven as a common ground. Under the sign of the anthropos, ‘we’ all become equally responsible for the world, yet are not all adequately represented by that sign. How concepts of human, Earth, and temporality are developed in concert and in seemingly collaborative ways, while masking the genealogy of these forms and their narratological formations, is a question that still remains to be asked in the context of the Anthropocene. In that movement towards a universal geologic life there is simultaneously the elision of the hard work that needs to be done to come together as a collective within a planetary [(18)] geopolitics that is not built on violent exclusions or forms of hierarchy that reproduce existing power structures, or fail to notice different geological capitalisations or geo-ontological formations of the Earth. To mobilise a narrative of human origins is to question what it is that is taken forward into the future, what is inherited under the concept of the human, and what survives it as excess or exclusion within its formations. Who knows what our collective experiments with fossil fuels will entail, what kind of new forms of geologic life will be born of this mobilisation? Yet it is incumbent on us, before we think the ‘where’ of the human in the Anthropocene, to think what this question mobilises in terms of thinking, framing, inheriting, and reproducing the world in its corporeal and ontological territorialisation of the Earth.

[(18)] Jazeel takes up Gayatri Spivak’s concept of planetarity to suggest that “the challenge planetarity poses is the *work* of grasping the aesthetic and actualities of incommensurable difference from their own insides out, because it is that hard and uncertain work without guarantees that decentres the ‘we’ beholden to the cosmopolitan dream of a rationally knowable universality. In this sense, *un*learning is a crucial part of the work that planetarity demands, and unlearning cospomolitanism is one such step towards more egalitarian modes of living together” (Jazeel, 2011, page 89, original emphasis).

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