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Can we remain *just-humanities* in an age of planetary scale engineering and massive changes to the very physical ground in which we live? (Parikka, 2015: 69)

In A Geology of Media, Jussi Parikka offers a refreshingly raw materiality approach to media studies. The book is the final installment in Parikka's media ecology trilogy that also includes Digital Contagions: A Media Archaeology of Computer Viruses (2007), and Insect Media: An Archaeology of Animals and Technology (2010). As these titles suggest, he is generally interested in the relationships between creatures, non-organic materiality, technology, energy, and nature - what he calls 'medianatures,' a concept 'that crystallizes the "double bind" of media and nature as co-constituting spheres'(14). While in the first two books he reconstructed the conceptual migrations between biological and technological worlds - from viruses, swarms, and bees to networks, synchronization, and hive minds and back again - Parikka now argues 'that the world of thought, senses, sensation, perception, customs, practices, habits, and human embodiment is not unrelated to the world of geological strata, climates, the earth, and the massive durations of change that seem to mock the timescales of our petty affairs' (vii). In this regard the book should be read as another, largely critical contribution to the multiplying Anthropocene discourse, which Parikka also explicitly addresses in the short preamble to the book, The Anthrobscene (2014), published as part of the University of Minnesota Press' Forerunners Series. This essay presents itself as a (very) short version of A Geology of Media, with some more decisive statements concerning the implied 'obscenity' of the Anthropocene, which he declares 'self-explanatory when one starts to consider the unsustainable, politically dubious, and ethically suspicious practices

that maintain technological culture and its corporate networks' (2014: 6).

The book under review, however, manifests itself as a 'green book' eschewing overly political statements. It reads more like a fascinated discovery of even deeper, ever more severe, and rougher materialities, and the concomitant mobilization of planetary if not cosmic timescales that we should thoroughly look at in order to understand our contemporary technological condition. It is an enticing project - comparable, in many respects, to the comprehensive oeuvres of Lewis Mumford or Peter Sloterdijk. Parikka aims to implement this project in chapters that are meant to function as geologic strata themselves, as a sort of dynamic textual apparatus in which different sorts of materials can be mobilized, condensed and related to each other: historical sources, theoretical approaches, and many references to contemporary media art projects and practices, which makes it in turn a relatively tedious task for the reader to extract all these assorted analytical elements from the textual mine that the author opens up.

In the first chapter he situates his project within media materialist and media (an)archaeologist programs. From the writings of Friedrich Kittler he assumes the extension of Foucault's understanding of what governs our contemporary life - its archive to the level of machines, circuits, networks, and institutions. From Wolfgang Ernst he borrows the focus on the micro-temporalities and time-critical aspects of electronic media, the specific *Eigenzeit* of machines that forces a reconsideration of historical macro-narratives - an idea for which Siegfried Zielinski already adopted the geological concept of deep time as a way to bypass the short-term 'psychopathological' capitalist media discourse to understand that the interactions between media, art, and science have long roots (Ernst, 2013: 134-135; Zielinski, 2006). To such a theoretical plateau Parikka then adds some free radicals such as Manuel Delanda and Douglas Kahn in order to raise some 'what if' questions. One of fifteen 'what if' questions in the book is the following: 'what if we should think more along the lines of Manuel Delanda's proposition of thousands of years of nonlinear history and expand to a geology of media art history: thousands, millions of years of "history" of rocks, minerals, geophysics, atmospheric durations, earth times, which are the focus of past decades of intensive epistemological inquiry and practical exploitation as resources?'(8) The urgent necessity for such speculative perspectives stems from various challenging diagnoses about the ecological impacts and

geological consumptions of contemporary media technologies. For Parikka, media arts and design projects will be most suitable to shift the focus to the stuff of what machines and hardware are essentially made of, metals, minerals, chemicals, and what they will become, dust, technofossils, plastiglomerates (Zalasiewiecz et al., 2014; Corcoran et al., 2014). Avantgarde and contemporary artistic practices and works allow him to loosely couple the previous theoretical, historical, material and speculative elements. This is Parikka's inspiring but also challenging discursive pattern that runs in different compositions throughout the book as a whole. While he calls them case studies, I would rather categorize the chapters of this book as virtual or alternative histories as they lack a truly detailed account in favor of poetic experiments on alternative agencies and relationships.

The second chapter focuses on alternative deep times of media, which is about how 'history conflates with earth history [and how] the geological materials of metals and chemicals get deterritorialized from their strata and reterritorialized in machines that define our technical media culture' (35). Parikka discusses the Arthur Conan Doyle short story 'When the world screamed', published in 1928, in which the slightly dubious Professor Challenger drills deeper and deeper into the earth until he encounters a throbbing, pulsating, jellylike core. The scientist penetrates this layer too, causing the earth to scream out in pain. Through this, Parikka tests for some pages the notion of an 'Ecology of Deep Time', breathing some life and evolution into the geology of media. It takes him to James Hutton's Theory of the Earth, from 1778, in which the geologist formulates the James Watt-inspired idea that the globe is actually a machine, constructed upon chemical as well as mechanical principles, and running in cycles and variations of immense time periods. He then also touches on Stephen Jay Gould's paleontological theories of variation, contingency and the 'punctuated equilibrium' (against the continuity of evolution and progress), which had previously been picked up by Zielinski again for his 'variantology' of media (2006: 7; Zielinski, 2005-2011). By way of conclusion Parikka states: 'The earth is a machine of variation, and media can live off variation – but both are machines that need energy and are tied together in their dynamic feedback loop. Electronic waste is one of the examples of the ways in which media feed back to the earth history and future fossil times' (43). The latter sentence delivers the first sediments of the next stratum: zombie media (there are no dead media), the 'Junkyard Planet', China, rare earth elements, alchemy, Pynchon.

In the third chapter, Parikka presents a stratum that is structured around the artistic strategy of psychogeophysics, a variation of the Situationist pyschogeography that goes beyond the urban sphere, the region, the neighborhood: 'the human condition is being shaped by the entire earth: psychology as plate tectonics of the mind ... complexity is my sextant' as the psychogeophysicists claimed in their 2010 manifesto. Parikka is interested in the 'radical aesthetics of the media and technological world that maps the relation between subjectivity, capitalism, and the earth in long-term durations and geophysical assemblages' (27) that he mainly finds in sound art and critical mapping projects such as Martin Howse's 'Earthbooth', Florian Dombois' 'Earthquake', Katie Paterson's installation 'Vatnajökull (the sound of)', and the 'Crystal World' projects by Jonathan Kemp, Ryan Jordan, and Martin Howse.

'Dust and the Exhausted Life'is the fourth chapter dedicated to the elements not quite of the ground, yet not also quite from the atmosphere: hair, fibers, dead skin, plant pollen, soil minerals, coal dust, dirt. Dust is indeed a multifaceted phenomenon. It results from all kinds of human or natural activities, it is dense where things happen. It often renders electronics functionless if they are contaminated with dust during the manufacturing process. It also threatens the functioning of electronic devices but is nevertheless attracted through electrostatic effects. Dust is a phenomenon that expands the notion of merely natural ecologies. Drawing upon Félix Guattari's ecological thought, Parikka reminds us 'that we need to think ecology not only through nature but through subjectivity and social relations' (91). Meditations on Franco 'Bifo' Beradi's cognitive capitalism, Daniel Paul Schreber's 'Memoirs of My Nervous Illness', the YoHa art project on 'Coal Fired Computers', and LeCorbusier's fantasy of 'exact air' all follow.

The fifth chapter is concerned with the question of how the fossils currently being produced from Silicon Valley to Shenzhen will appear in the future, and how the earth, 'the compilation machine, an assembly line, which offers a natural history of the changes over the past decades of intensive industrial involvement in our planet' (110), will process this synthetic future. Parikka seems to suggest that we are currently producing a stratum that will be discovered by future archaeologists or robot historians as a monument of abrupt change within Gould's model of a punctuated equilibrium, not least because of the high chance of a substantially displaced fossil record, if you think of the 'the graveyard orbit of zombie media' (127) for example. Amongst other art works, he discusses Trevor Paglen's

'The Last Pictures' project. Together with materials scientists, the artist developed an 'ultra-archival disc' with a promised lifetime of billions of years for one hundred photographs etched onto a silicon wafer. In November 2012, a communications satellite reached the geostationary orbit with the disc mounted to its anti-earth deck. The satellite will spend fifteen years broadcasting television and high-bandwidth internet signals before maneuvering into a graveyard orbit where it will become a ghost-ship, carrying 'The Last Pictures' towards the depths of time. Paglen's project indicates how humanity through its material agents engages not only with the slowness of natural history of the planet but is shaping to a great extent its accelerated fossil futures.

A Geology of Media can be understood as a quest for rendering visible the various kinds of hidden geo-historical dramas that happen on multitemporal scales in our contemporary technological world. Parikka wants to create an awareness for the geo-logics of our technological condition that are determined by the extractive regimes fueling global digital capitalism. He wants to track 'chemicals, metals, and minerals [...] extending traditional notions of media materialism into a more environmental and ecological agenda' (5), and he seeks to think of these rough materialities as 'agents of history' (19). But as many thought-provoking, sometimes paradoxical ideas the reader finds in Parikka's passionate book, just as many difficulties arise. For example, how can he use the term 'geoengineering' in such an affirmative and rhetorical way and at the same time lament the obscenity of the Anthropocene? There is an unpleasant and unresolved indecision throughout the book between a cool, post-humanist attitude on the one side, and an alarmist tone on the other. One also wonders what 'media geology' would look like in practice, and Parikka himself asks: 'How does a media theorist turned pseudo-geologist operate?' (5).

This is indeed a good question if you recall some of the very idiosyncratic academic practices of some media archaeologists. Is it enough to open up the humanities to some artistic methods, as he seems to suggest? The book indeed lacks in-depth case studies of some elementary 'agents of history', and largely ignores what other disciplines, such as science and technology studies, geography and history of science, have already contributed to the field. Regardless, Parikka fails to ask: what are the specificities and radical natures of media in contrast to other technologies and industries? It is doubtful that the ideas offered by Parikka are sufficiently cogent to contribute something substantial to the important issues discussed in *A Geology*

of Media, such as the mobilization of pre-historical time scales in the contemporary extractive regimes, or the often problematic co-constitution of environmental knowledge and environmental impact. It is furthermore evident that Parikka's strong claim for the specific methodological capacities of media studies to study the issues at hand are displayed by their somewhat imprecise execution in this very book.

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