

## Knowing the Anthropocene

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### Abstract

How to best approach the Anthropocene in terms of knowledge is an open question. In this paper we outline and discuss how the Anthropocene is imagined as an ongoing project attempting to develop systems of knowledge. Referring to Paul J. Crutzen, Reinhold Leinfelder, and Jan Zalaciewicz, we show how a tradition is forming around the notion of diverse Anthropocene knowledges as unified but split into two, more particularly, into science, technology, engineering, and mathematics (STEM) and social sciences and humanities (SSH). After a reading of two representative takes on the Anthropocene and knowledge by Carolyn Merchant and Timothy Morton and Dominic Boyer respectively, we conclude that, despite attempts at interdisciplinarity and knowledge integration, the current ways of approaching the Anthropocene as a field of knowledge

involve an uneasy mix of unification and stratification. We end by suggesting ways of overcoming this situation.

**Keywords:** Knowledge, STEM, SSH, Interdisciplinarity,

### Introduction

How to best approach the Anthropocene in terms of knowledge is an open question and ongoing project. Thus, in their introduction to a special issue on “Knowledge in the Age of Climate Change,” Ian Baucom and Matthew Omelsky ask what it means “to generate knowledge in the age of climate change” (2017, 2). Similarly, in his introduction to *Knowledge for the Anthropocene: A Multidisciplinary Approach*, Francisco J. Carrillo states that “if there is going to be a Knowledge for the Anthropocene, it has yet to be imagined” (2021, 4). In this paper, we outline and discuss some of the ways in which Anthropocene knowledge is imagined by some key players in academia in both science, technology, engineering, and mathematics (STEM) and social sciences and humanities (SSH). Referring to Paul J. Crutzen, Reinhold Leinfelder, and Jan Zalaciewicz, we begin by outlining how a tradition is forming around the image of knowledge as simultaneously interdisciplinary and integrating yet at the same time hierarchical and divided into two, more particularly, into STEM and SSH. Then, we present a reading of two takes on the Anthropocene by scholars from SSH, Carolyn Merchant and Timothy Morton and Dominic Boyer. We conclude that imagining knowledge for the Anthropocene does involve integration, albeit in a stratified way. We end by suggesting some alternative approaches to integrating knowledge in the Anthropocene.

### Integrating and Stratifying Anthropocene Knowledge

Early attempts at imagining the kinds of knowledge needed to address the Anthropocene adequately tend to favour STEM. To give just one example, in a “Concepts” contribution to *Nature* entitled “Geology of Mankind,” Paul Crutzen – the inventor of the term – concludes that “[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). Generally speaking, today science and engineering is no longer regarded as having a monopoly on imagining Anthropocene knowl-

edge. Rather, it is commonly agreed in academia that we are facing a challenge that necessitates the integration of knowledges across disciplinary boundaries. Attempts are made to think systematically about the kinds of work and the forms of knowledge that must be accessed by members across the scientific community. However, the integration of knowledges is accompanied by ideas of hierarchy. Integrative attempts split knowledge into two distinct levels.

For instance, in an article entitled “The Anthropocene – The Earth in Our Hands,” Reinhold Leinfelder identifies “three levels” or ways of working with and knowing the phenomenon: “a) the Earth system level, b) the geological stratigraphic level, and c) the consequential meta-level” (Leinfelder 2020, 2). Within the Earth system sciences (ESS), Anthropocene knowledge is synonymous with “the coupled “Great Acceleration” of geological and socioeconomic processes” (3) since 1945. According to Leinfelder, knowledge at the second level – the geological level – concerns “to what extent the changes in the Earth system are also manifested” in the geological record and whether the Anthropocene constitutes a new geological epoch. The first two levels of knowledge are regarded distinct from the third – “the consequential metalevel,” which concerns “the social relevance of the Anthropocene analysis” (4). More particularly, this involves, for instance, knowledge in the form of “[...] recommendations for urgent behavioral change. This needs translation, dialogue and discourse skills, communicative interaction, ethical discourse, transdisciplinary cooperation with all social groups as well as scientific monitoring of all implementation processes” (4). While Leinfelder speaks of the three distinct levels, they appear to form *two* distinct levels of knowledge: a fundamental level of research involving the STEM disciplines of ESS and Geology and a secondary one dedicated to purposes of communication, mediation, and persuasion. The integration of knowledges across the disciplines comes at a price, then. Unity creates hierarchy.

Leinfelder also makes a rhetorical attempt to unite the levels of Anthropocene knowledge. He forwards the metaphor or image of the physician:

From a physician treating us we not only expect that his examination methodology is adequate and that his diagnosis is correct, but also that he presents his diagnosis in

an understandable way, suggests further action, monitors the treatment, and, if needed, urgently advises us to change our lifestyle (if necessary, with emphasis on the risks if we do not follow. (Leinfelder 2020, 4)

But the integrating image of single bodied academic unity is splitting down the middle into distinct analytical and broadcasting agents.

A recent article, first authored by Jan Zalaciewicz<sup>2</sup> and crediting Leinfelder as co-author, continues this manner of imagining knowledge in the Anthropocene. It sketches out “a possible integrative and extended multilevel Anthropocene concept, highlighting systemic and interlocking interdisciplinary and transdisciplinary approaches.” (Zalaciewicz et al 2019, 9, fig. 3) According to the authors, inter- and transdisciplinarity involve recognizing the contributions made by SSH in creating “criticism and debate” and understanding “more fully the deeper (i.e., political, ethical, cultural, and epistemic) implications of the diagnosis inherent in the scientific term.” But the authors’ inclusion of SSH rests on a hierarchy with science at the top. Like Leinfelder, the soft sciences are regarded as second order activities engaged in teasing out the consequences of the hard diagnostic facts discovered by geology and ESS. The hard sciences form the “important point of reference” for SSH. The authors suggest that SSH “should be seen as *complementary* to the very precise, strict understanding in geology / ESS.” (Italics original).

Zalaciewicz et al. sum up their understanding of the Anthropocene in a manner that enforces the split between the two levels of knowing: “While the scientific term is descriptive and analytical with regard to a given state of affairs, the humanities term is either normative (“what should we do now?”) or narrative (“how did we get here?”), or both (“why did we get there?”).” (2019, 9, fig. 3) However, their understanding of science as purely descriptive and analytical and the humanities as normative and narrative is inherently problematic.<sup>3</sup> Moreover, the authors have already proposed that the “precise, strict” scientific term actually comes with an implied diagnosis and suggestions to be fleshed out by SSH, suggesting that the scientific term is *already* normative.<sup>4</sup>

While Leinfelder and Zalaciewicz do attempt to forge unity across different kinds of knowledge by speaking about STEM and

SSH in terms of inter- and transdisciplinarity, they tend to do so in a manner that reduces the latter to a secondary role, reserving epistemological primacy for the former. This does not mean that we have a return to the two cultures debate between C. P. Snow's science and F. R. Leavis' literature – that would assume parity between the two epistemologies in so far that each would regard itself as “better” than the other (Cohen 2001, 8). Similarly, Leinfelder and Zalaciewicz are not reloading the science wars of the 1990s – that would involve the complete rejection of the “perverse theories” (10) allegedly constituting the soft sciences. Rather, we believe that Leinfelder and Zalaciewicz – in attempting to integrate knowledges – come to engage in what we want to call a *social utilities* transformation of SSH knowledge. They are imagining the alleged social usefulness of the hard and soft sciences respectively. Thus, the authors' stance recalls the conclusion of an article exploring the relative social usefulness in academia entitled “Are ‘STEM from Mars and SSH from Venus’?: Challenging disciplinary stereotypes of research's social value” (Olmos-Peñuela et al. 2014). Here, the authors also find that academe is not split into opposing planets. Both create social value, but SSH does so “in a less visible way, creating content for the media, and working with government and NPOs to contribute to improving the quality of life” (Olmos-Peñuela et al. 2014, 397). Among STEM representatives of the academe, the Anthropocene, then, is a field where diverse knowledges are sought unified but in a manner that distinguishes hierarchically between kinds of knowledge and their social utility. What is needed is integration on a less hierarchical basis – an equal acceptance of knowledges.

In the following, we outline examples of two basic ways of positioning yourself within SSH in relation to the Anthropocene as a field of knowledge and social utility outlined by Leinfelder and Zalaciewicz: inside it, accepting the supplementary position or outside it, rejecting STEM's claim to epistemological primacy. We argue that neither are useful if we want to regard the Anthropocene as the pursuit of the integration of different kinds of knowledge.

### **Merchant: In the Service of Science**

A highly influential academic in the field of environmental history, philosophy, and ethics, Carolyn Merchant has published widely for more than 40 years (Merchant 2022). In *The Anthropocene & the Hu-*

*manities: From Climate Change to a New Age of Sustainability* (Merchant 2020), she introduces the term and sets out to “critically assess the various meanings and significance attributed to it by scientists and humanists” (xi).

Carolyn Merchant embraces the distinction between STEM and SSH outlined by Leinfelder and Zalaciewicz. She outlines the necessary knowledge needed for humanity to solve the climate crisis. In the following, we will look at three examples of how she imagines knowledge. Merchant begins by imagining herself as a communicator. For example, she addresses her reader concerning the nature of her book, which “[...] is meant for an educated public interested in the current state of the planet, its future, and what we as humans can do to preserve life on earth” (2020, xi). Here, Merchant expresses that the implied reader of her book is a specific educated public, and she positions herself as a narrator whose goal is to enlighten the implied reader on how to enter an Age of Sustainability. Thus, she creates a distinction between those who possess knowledge and those who do not. Furthermore, she states that her book is meant to “[...] provoke thoughtful responses and inspire creative solutions by examining the arts and humanities, science and history, ethics and justice” (xi). This places the SSH in the complementary role envisaged by Leinfelder and Zalaciewicz, which is clear from the manner she presents knowledge as hierarchical: “We can use our knowledge of science, technology, and society, along with our spiritual and ethical relations with each other and the nonhuman world, to create a new story for the earth’s future” (2020, 145). Regardless, she presents the approach as a way of unifying our efforts towards solving environmental problems. She emphasises that all knowledge is necessary but the manner she presents how to solve the environmental crisis depicts a separation into two fields. This is the case as STEM is portrayed as the key actors, while SSH is secondary and, in that sense, something that is supposed to accompany the primary actors.

However, Merchant also counters this complementary role when she states that the soft sciences are supposed to analyse our relationship with the environment and address how climate concerns challenge dichotomies “[...] such as nature/culture, ethics/environment, and mind/body [...]” (144). She describes the humanities as highly important and attempts to depict them in this regard.

Nevertheless, she does not actively engage in this act and instead reproduces the already-established conventions by Leinfelder and Zalaciewicz. This is, for instance, clear in the manner she reproduces gendered and ethnic discourses when she incorporates pictures of women and minorities who rarely relate to people that she portrays as able to solve the climate crisis (135-138). Instead, she portrays white men as having the necessary solutions (147-149).

By presenting STEM as the protagonists of knowledge of the climate crisis, Merchant embraces “the consequential meta-level” carved out by Leinfelder and Zalaciewicz because she considers them separate from the context in which they act in. In other words, STEM is allowed to act as if it is somehow exempt from ethical considerations and questions regarding the consequences of their actions. This dichotomy illustrates how the hard sciences are supposed to be the protagonists that solve the problems of the Anthropocene while the soft sciences are supposed to inhabit the secondary role that Leinfelder and Zalaciewicz describe.

The dualistic relationship involving different kinds of knowledge and utility formed between these groups is best illustrated through Merchant’s mantra, which is part of her concluding statement: “Solar panels on every roof; Bicycles in every garage; and Vegetables in every backyard” (2020, 156). Here, Merchant proposes that entering an Age of Sustainability requires that humanity adopt a certain lifestyle and embrace specific technologies. She chooses to call her statement a mantra, which insinuates that this is a statement of utmost importance that needs to be repeated almost religiously. This is reflected in how it is supposed to sum up the requirements of exiting the Anthropocene and entering an Age of Sustainability. In this mantra, the aforementioned dichotomy presents itself as the ideas Merchant proposes rely on solutions that do not include SSH. Instead, it reduces SSH to a secondary role as its application is limited to promoting the solutions of STEM. Additionally, the mantra appears to be targeted toward a specific privileged group of people who have the economic means to adopt Merchant’s ideas. While Merchant provides the reader with a goal to strive towards, the unified effort imagining a collective knowledge consisting of SSH and STEM seems unfulfilled.

### **Timothy Morton & Dominic Boyer: Replacing STEM with SSH**

Since 2000 Timothy Morton has been an influential philosopher who takes his epistemological departure in phenomenology and object-oriented ontology (OOO), with some of the primary models for his theoretical background being Graham Harman, Immanuel Kant, and Martin Heidegger (Morton 2018, 4). Therefore, it comes as no surprise that, in contrast to Merchant, Morton's work is defined by a distinct reimagination regarding both knowledge and the Anthropocene. Morton aligns himself with the anthropologist Dominic Boyer, as they both position themselves outside the Anthropocene as a field of STEM-governed knowledge and utility. However, in trying to establish a counter-tradition, they succeed in excluding STEM and replacing it with SSH knowledge instead.

They are highly critical of the idea that STEM will be the sole saviour and guide of humanity: "[...] it's going to be very difficult to shift the trajectory of the Anthropocene. At least given the timeframes that science is telling us. But maybe those timeframes are also designed to stimulate heroic interventions by engineers and entrepreneurs, new legions of green hypersubjects" (Morton and Boyer 2021, 82). These hypersubjects are intrinsically linked to STEM, and therefore play an important role in Morton and Boyer's critique. However, to better understand hypersubjectivity it is important to outline the context they are placed within, and where they fit in relation to the Anthropocene. Thus, Morton and Boyer's theory provides a sceptical discourse that is highly critical of knowledge in the Anthropocene: "[...] agrilogistics is the first wave of the catastrophe we call the Anthropocene" (17). Morton uses the term hyperobject to describe agrilogistics, alongside phenomena such as global warming, Covid, and capitalism. They have named this "the hyperobjective era", which they consider to be part of the Anthropocene.

The description of industrial agriculture as a hyperobject and the first wave of Anthropocene catastrophe highlights the dissimilarity between the nature of this theory and the tradition found in STEM that perceives science as the saviour. Not only are they critical of the role of science as the saviour and guide, but they also disagree with Leinfelder, Zalaciewicz, and Merchant on the idea that SSH ought to play a supplementary role in the Anthropocene. In contrast, they see SSH as playing a major role in changing the perspective on

knowledge, making the unthinkable thinkable, and problematising “the grid” (Morton and Boyer 2021, 45) i.e. society based around a neoliberal economic structure. By doing this they establish a responsibility for SSH to reimagine our relation to knowledge in the Anthropocene: “I just wanted to say that part of the unthinkability of moving against the trajectory of the Anthropocene is this idea that we must always continue to supply the grid” (45). In this sense, they are not only looking to reinvent our relation to the Anthropocene but also the industrial and societal structures that constitutes it.

Unlike Leinfelder, Zalaciewicz, and Merchant, Morton and Boyer identify the perpetrator of their hyperobjective era and, in extension, the Anthropocene, who they name the hypersubject. Hypersubjects behave according to neoliberal ideals that denote a certain type of rationality and knowledge to their actions, such as the separation of subjects and objects, which is presented as the primary cause of the hyperobjective era: “They wield reason and technology, whether cynically or sincerely, as instruments for getting things done” (Morton and Boyer 2021, 14). These traits are neither uncommon in STEM nor typically used with a negative connotation. However, according to Morton and Boyer, those that adhere to this type of knowledge and subject position will attempt to use their privilege and technology as a way to seek dominion and control others, and: “You will recognize them as the type of subjects you are invited to vote for in elections, the experts who tell you how things are [...]” (14). This type of subject is described as someone willing to continue the trajectory of the Anthropocene, and content to stay within the confines of the grid, even if it is the cause of multiple ecological disasters. In short, hypersubjects recall Leinfelder, Zalaciewicz, and Merchant’s notion of STEM.

Even though hypersubjects can be considered as the driving force of the Anthropocene, this way of life, according to Morton and Boyer, is slowly coming to an end as: “It is hyposubjectivity rather than hypersubjectivity that will become the companion of the hyperobjective era” (Morton and Boyer 2021, 14). According to Morton and Boyer, hyposubjects are hard to define, as they have only just started to emerge. They do not reach a definition, but it is clear that the path starts with taking responsibility for our actions:

[...] we still have to cope with the fact that we have this sort of massive, narcissistic attachment to our own sense of distinctiveness as a species, and this sense that we're at the top of a great chain of being, and that we are the ones who may have gotten ourselves into the Anthropocene but we're also the saviors, the only ones who are going to get us out of this situation. (19)

The desire to be the saviour is a hypersubjective trait, according to Morton and Boyer, and one of the things that have led to the hyper-objective era. They believe that hypersubjects want to transcend themselves and humanity, which criticises our current lifestyle and the assumption that all problems will be solved by us as long as we exceed ourselves. In contrast, hyposubjects do not seek transcendence, instead, they subscend, which could be the key to rethinking our society and the Anthropocene.

With the idea of subscendence and hyposubjects, they present an alternative to neoliberalism: "Their [i.e the hyposubjects] political projects aren't orchestrated, transparent, forced movements, but rather implosive, deliquescent, projects of unplugging" (Morton and Boyer 2021, 71). The idea of unplugging presents a radical change to society, as it means to completely disconnect one-self from all neoliberal systems. STEM is ingrained within the grid, which means that unplugging presents a different option of approaching knowledge and knowing the Anthropocene than those previously discussed in the article, and therefore provides an epistemological alternative in the form of exclusion. However, the notion of imagining knowing subjects as hypo- and hypersubjects or sub- and transcending separates the Anthropocene into two kinds of knowledge instead of reimagining them in terms of a merger. Therefore, Morton and Boyer do not attempt to integrate STEM and SSH knowledge but rather separate them.

### Conclusion

Leinfelder's image of the physician as unifying and integrating the knowledge of the Anthropocene remains an unfulfilled one. Merchant mentions the possibility of epistemological parity between SSH and STEM but opts for the complementary role of communicator, nevertheless. And Morton and Boyer's reimagination of An-

thropocene knowledge seems to be very much predicated on the exclusion of STEM. The Anthropocene as a knowledge project remains an ongoing one, then. The best way forward we believe involves the successful integration of STEM and SSH knowledges in a manner that does not involve stratification and division. Anthropocene knowledge must try to integrate opposites such as traditional forms of scientific knowledge and recent object-oriented approaches. Ultimately, a unifying way of knowing the Anthropocene would then make room for other forms of knowledge of the Anthropocene as well: premodern and non-Eurocentric, for example.

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### Notes

- 1 Helena B. Sveigård participated in the early stages of writing the article. Ms Sveigård also proofread the manuscript.
- 2 Jan Zalasiewicz is an important figure in contemporary Geological Sciences. As Chair of the Subcommittee on Quaternary Stratigraphy, he plays a key role in "the establishment of a standard, globally-applicable stratigraphical scale" (Subcommission on Quaternary Stratigraphy 2022). Within this context, he is part of the Anthropocene Working Group attempting to formally define the Anthropocene as "a geological unit within the Geological Time Scale" (Anthropocene Working Group 2022).
- 3 The idea of pure knowledge without human interest has been problematised by, for instance, Jürgen Habermas, *Knowledge and Human Interests*. Translated by Jeremy J. Shapiro. Beacon Press: Boston. 1971.
- 4 Geology has never been free from human interest. From the beginning it regarded the world as a *resource*. In his *The Map That Changed the World: William Smith and the Birth of Modern Geology*, Simon Winchester spells out some of the scientific, political, economic, and social effects of William Smith's *geological map England, Wales and the south of Scotland*, i.e., "the first true geological map of anywhere in the world." (xvi) Not just pure scientists but industrialists, colonialists, and empire builders found uses for Smith's and subsequent geological maps.