ICON: Journal of the International Committee for the History of Technology 23 (2017): 23-31.

UNCANNY NATURE

Why the concept of Anthropocene is relevant for historians of technology

Maria Paula Diogo, Ivo Louro, Davide Scarso

Naturalization of technology and *technologization* of nature are common concepts used by historians of technology. The perception of "nature" and "technology" as balanced sides of the pair is, however, deceptive. In both cases technology is the driving force, either by imposing itself as a "second" nature and reclaiming its status as a "form of life"[1] or by domesticating and controlling nature by transforming landscapes and ecosystems to enhance food and energy supplies, both on local and global scales. Nature remains thus as a detached and passive provider, a background against which human history unfolds. The notion of history as an inherently human domain traverses western modernity from Vico's *The New Science* to Sartre's *Critique of Dialectical Reason*, in a close and complex relationship with the idea of freedom and moral autonomy as features that distinguish human beings from the non-human entities, both animate and inanimate, that populate nature.[2] Recently a third dimension emerged in this

1. L. Winner, *The Whale and the Reactor: A Search for Limits in an Age of High Technology* (Chicago: University of Chicago Press, 1986). Winner uses Wittgenstein's term of Lebensform (*Philosophical Investigations and On Certainty*) to highlight how technology reflects a particular form of life.

2. The intricate genealogy of western ontological dualism is, of course, the object of a

CONTACT: Centro Interuniversitário de História das Ciências e Tecnologia, Faculdade de Ciências e Tecnologia, Universidade NOVA de Lisboa

relationship — the creation of the so-called "technological nature," i.e. artificial and digital representations of the wild that fulfill our inborn affiliation with the environment without actually engaging with nature.[3] This *lumpennature*, deprived of its primal values and build on a technological basis, contaminates the essence of true nature eventually leading to its dissolution as a category.[4]

In Western worldview, which has been hegemonic from the 16th century onwards,[5] nature, when it escapes human control, is perceived as an uncanny — sometimes even hostile — entity that opposes the cozy and ordered human-made world. The Baconian and Cartesian idea of controlling nature through technology immediately comes to mind, although some authors may argue that the same rationale is to be found behind magical practices that are supposed to affect nature.[6] Surely there are different gradients of intervention, but the core concept of manipulating reality to serve certain ends is common to the pre-classical world and today's society.

The absence of nature *per se in* history and *as* history — in mainstream narratives it comes to the surface as a resource and not as an actor — has been pinpointed consistently by philosophers and historians along the 20th century. The *École des Annales* — Bloch, Febvre and Braudel, Kranzberg and Pursell, Benjamin, Schatzki, the 1960s debate on the culture-nature divide, and more recent scholarship have discussed the visible and invisible entanglements

---

vast literature in the history and philosophy of science. For a remarkable synthesis, see P. Descola, *Beyond Nature and Culture* (Chicago: University of Chicago Press, 2013), in particular Chap. 3, "The Great Divide".

3. Psychologists are particularly attentive to this issue. See https://depts.washington.edu/hints/.

4. As McKibben notes, "the contemporary divide between nature and human culture no longer exists as "we have deprived nature of its independence, and this is fatal to its meaning. Nature's independence is its meaning—without it there is nothing but us." B. McKibben, *The End of Nature* (New York: Random House, 1989), 58.

5. Hegemony is employed here in the way it is used in International Relations Theory, i.e. as a set of conditions that allow predominance or ascendancy of a state or region over others.

6. "Magic, based on man's confidence that he can dominate nature directly, if only he knows the laws, which govern it magically, is in this akin to science." B. Malinowski, *Magic, Science and Religion* (New York: Doubleday, 1948), 3. The essay was first published in Science, Religion and Reality, edited by James Needham New York, The Macmillan Company, 1925. The kinship of science and magical practices is also strongly endorsed by Lévi-Strauss, see in particular the first chapter of *The Savage Mind* (Chicago: University of Chicago Press, 1966).

among nature, technology and humans for almost a century.[7] It is within this framework that the concept of Anthropocene, by highlighting the epistemological limits of humanities and social sciences, enters the academic community of historians of technology as something of a disruptor, bringing the conscience of nature's voice to the realm of history. The word Anthropocene was coined by Eugene Stoermer in the 1980s, was popularized by Paul Crutzen in 2000, and soon became a buzzword.[8] The discussion about the meaning and utility of the concept for different disciplines, its primal moment, and its conceptual and epistemological potentialities has triggered a lively debate. Scholars from the humanities and social sciences and, particularly, historians of science and technology may offer valuable contributions.

Introduced as a wakeup call for the relentless usufruct[9] of the earth's most fundamental life cycles, the notion of having entered an "Age of Man," as it is often referred to, goes not without problems and aporias. Two classical questions apply to the concept of the Anthropocene: the *when* and the *who*. The question of dating the beginning of the Anthropocene epoch is still controversial: while a widely acknowledged hypothesis points at the onset of the Industrial Revolution in the 1700s, the formal proposal by the Anthropocene Working Group suggests the post-war "great acceleration" in industrial development and radioactive fallout from nuclear experiments as the corresponding global geological marker.[10] Others argue that the decisive transition should be dated back to the "Columbian exchange" of the late 15th century, implying colonialism and global trade as the material and political preconditions of the

7. M. Bloch, *Les caractères originaux de l'histoire rurale française* (Paris: Belles Lettres, 1931); Lucien Febvre, "Pour l'histoire des sciences et des techniques,"*Annales d'istoire économique et sociales* 7.36 (1935): 646-648; F. Braudel, *La Méditerranée et le Monde Méditerranéen à l'époque de Philippe II*. (Paris: Armand Colin,1949); M. Kranzberg and C. Pursell, eds., T*echnology in Western Civilization* (New York: Oxford University Press, 1967); W. Benjamim, Peter Demetz, ed., *Reflections: Essays, Aphorisms, Autobiographical Writings* (New York: Shocken, 1986), T. Schatzki, "Nature and Technology in History," *History and Theory* 42.4, (2003): 82-93, J. Williams, "Understanding the place of humans in nature," in *The Illusory Boundary: Environment and Technology in History,* ed. M. Reuss and S. Cutcliffe (University of Virginia Press, 2010), 9-25.

8. W. Steffen *et al*. "The Anthropocene: conceptual and historical perspectives," *Philosophical Transactions of the Royal Society A*, 369 (2011): 842–867.

9. In civil law sense: humans do not own nature, but can use it as they wish.

10. P. Crutzen, "Geology of Mankind," *Nature* 415 (2002): 23; "Media note: Anthropocene Working Group (AWG)" 29 August 2016.

Anthropocene.[11] Finally, the "early anthropocene hypothesis" suggests that human activities have had dramatic impacts on the earth system since the Neolithic Revolution, i.e. the transition to sedentarism and agriculture.[12]

On the other hand, one of the most widespread and convincing critiques of the concept of Anthropocene is its ahistoricity, the use of "we" and "us" as if human society was an homogeneous, flat and free-floating reality. A growing number of authors consider that the discourse on the Anthropocene inherently emphasizes the urgency of global solutions for a global problem caused by humanity as a whole, intentionally levelling socio-economical differences and concealing political conflicts.[13] These authors propose alternative concepts to describe the "age of mankind", particularly by stressing the role played by different forms of capitalism (including state capitalism) in the unbridled exploitation of natural resources, thus bringing to the forefront the divide between those who explore and those who are explored. Colonial and postcolonial studies also respond to this criticism by discussing how European colonial science, technology, and medicine anchored a new global worldwide epistemology and ideas of progress and growth that profoundly changed the very concept of ecology, both in colonial and postcolonial periods. Additionally the very term of Anthropocene risks of strengthening the priority of human agency over non human entities, which is at the core of the debate.[14] Seen in this way, the elites of the wealthier and more technologically advanced countries may soon configure as unprecedented "geopowers" and take up the mission of "fixing" the planet for the sake of mankind, geo-engineering being the most prominent proposal in this direction.[15]

---

11. S. L. Lewis and M. A. Maslin, "Defining the Anthropocene," *Nature* 519 (2015): 171-189.
12. W. F. Ruddiman, "The Anthropogenic Greenhouse Era Began Thousands of Years Ago," *Climatic Change* 61 (3) (2003): 261-293.
13. A. Malm, A. Hornborg, "The Geology of Mankind? A Critique of the Anthropocene Narrative," *The Anthropocene Review* 1 (2014): 62-69; J. W. Moore, *Capitalism in the Web of Life: Ecology and the Accumulation of Capital* (London: Verso, 2015).
14. D. Haraway, "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin," *Environmental Humanities* 6 (2015): 159-165.
15. For the notion of "geopowers" see C. Bonneuil, J-B. Fressoz, *The Shock of the Anthropocene. The Earth, History and Us* (London: Verso, 2016), on geoengineering, see C. Hamilton, *Earthmasters. The Dawn of Age of Climate Engineering* (New Haven and London: Yale University Press, 2013) for a detailed critical appraisal.

The Anthropocene Campus

Among the various *fora* that have sheltered the discussion of the "Age of Man" — exhibitions, newspapers, academic journals, environmental groups — the *Anthropocene Curriculum and Campus* is one of the most engaging.[16] Organized in Berlin by the Haus der Kulturen der Welt and the Max-Planck-Institut für Wissenschaftsgeschichte (MPIWG), under the baton of Bernd Scherer and Jürgen Renn, the first Anthropocene Campus — the Anthropocene Issue — took place in 2014. It was a one-week intense submersion in the topic, with nine seminar courses both theoretical and practical. In 2016, the second campus — the Technosphere Issue — used the same model.[17] The main idea behind both *campi* was "Our notion of nature is now out of date. Humanity forms nature." This is the core premise of the Anthropocene thesis, announcing a paradigm shift in the natural sciences as well as providing new models for culture, politics, and everyday life.

The Anthropocene Curriculum is the pedagogical twin brother of the *campi*. It feeds on the discussions and works presented during the seminars in order to explore "uncharted transdisciplinary connections, and to experiment with new forms of higher education" that allow for "cross-disciplinary thinking, mutual learning, new modes of research, and civic commitment in order to secure their future."[18] Recently Jürgen Renn presented the basic insight that drives the activities of the Anthropocene Curriculum: change comes from exchange.[19] Drawing on his own research and on recent literature on the history of knowledge, Renn calls attention to the fact that major "revolutions" have seldom been the result of highly determined research efforts aiming at solving specific problems.[20] Rather, it was the exploration and accumulation of knowledge apparently devoid of immediate application, on the one hand, and a dynamic exchange among many different "epistemic communities", on the

16. "Anthropocene Curriculum," https://www.anthropocene-curriculum.org (accessed 13 March 2018).
17. Although the term technosphere exists since the 1970s, it was popularized by the geoscientist Peter Haff (P.K. Haff, "Technology as a geological phenomenon: implications for human well-being," *Geological Society Special Publications* 395 (2013): 301-309).
18. "Idea," https://www.anthropocene-curriculum.org/pages/root/idea/
19. J. Renn, "The Evolution of Knowledge. Rethinking Science in the Anthropocene," 1st CIUHCT Distinguished Lecture, Lisboa, 2017.
20. J. Renn (ed.), *The Globalization of Knowledge in History* (Berlin: epubli GmbH, 2012).

other, that sparked the most momentous shifts in human history. A complex network of interactions between the different "knowledge regimes" of science, technology, religion, the arts, traditional practices and policy-making allowed for the emergence of new socio-epistemic paradigms.

This is precisely the rationale of the Anthropocene Curriculum, to promote the exploration of new forms of institutional experimentation bringing together different actors and different modes of knowledge: representatives of traditional communities, visual artists and performers, activists, policy-makers and academics from the sciences and humanities. Research thus moves at a double level, not only seeking to trigger new knowledge but also, and more importantly, seeking to trigger new *forms* of knowledge.

So it is not surprising that, inspired by and in close collaboration with the Berlin *campi*, a set of initiatives — seminars, activist groups, courses and art projects —were launched in 2017 (and will continue throughout 2018 and 2019): Deep Time Chicago, Anthropocene Curriculum Lyon, The Aerocene, Anthropocene East Asia, and Speculative Life, Montréal, and Anthropocene Campus, Philadelphia.[21]

The most recent event, in which the authors participated, was the result of the collaboration between Drexel University, the KTH Royal Institute of Technology (Sweden) and CIUHCT of NOVA University of Lisbon and University of Lisbon (Portugal). Taking up a format that is common among the offspring of the Anthropocene Curriculum, along with traditional plenary sessions, the participants to the Philadelphia Campus were asked to choose two among four main seminars. The seminars, conducted by leading researchers from different countries, dealt with several topics central to the scholarship and policy of the Anthropocene with a particular focus on its relevance for historical analysis. Assisted by guest-facilitators, the participants discussed and elaborated key issues, such as voice and representation, global history, slow disaster and "environing" technologies while setting up different approaches to interdisciplinary and cooperative learning. Also a distinguishing feature of the Anthropocene Campi, field visits to polluted sites and a wildlife refuge in the surrounding area offered a powerful counterpart to the indoor sessions.

21. See "Anthropocene Curriculum." The authors are currently part of an ongoing project on the concept of anthropocene in colonial scientific, medical and technological settings (Anthroplands, PTDC/IVC-HFC/6789/2014) and have submitted to the Portuguese National Board for Science and Technology (FCT-MCTES) a 3 years strongly interdisciplinary project inspired by the Anthropocene Campus format (Anthropolab).

The Role of Technology

One does not need to emphasize how the relations between nature, society and technology are at the very core of the many thorny issues of the debate on the Anthropocene. Scholarship on the history of technology is instrumental in facing the dramatic effects of the human colonization of nature, while at the same time, resisting the call for urgent planetary "techno-fixes" and the more or less tacit "technological determinism" that underpins them.

Technological determinism is obviously the elephant in the room. The assumption that the growing network of technological artifacts gave rise to a new and autonomous earth-system, the "Technosphere", which is "powerful in altering the history of this planet and the conditions for life in it"[22] is dangerously close to hard determinism, as well as technological anthropomorphism and animism, thus ignoring human agency. Criticism of this approach has been put forward mainly (but not exclusively) by three well-known models, familiar to historians of technology: SST - social shaping of technology by MacKenzie and Wajcman; SCOT - social construction of technology by Pinch and Bijker, and ANT - actor-network theory by Callon, Latour and Law.[23] These models point out the relevance of human agency: in choosing the design of individual artifacts and systems, as well as the direction of innovation (SST); as the main force in shaping technology (SCOT); as part, together with nonhumans, of shifting networks of relationship that shape the social and natural world (ANT). Yet, if the primacy of social relations and the safeguarding of human agency, however constructed, have had a crucial role in critical and emancipatory endeavours, they both take on an uncanny literalness in the Anthropocene. For ecomodernists and the advocates of a "planetary stewardship", nature is precisely socially constructed: nature as a separate domain does not exist

22. "Technosphere research project 2015-2019." https://www.hkw.de/en/programm/projekte/2015/technosphere/technosphere_mehr_informationen/technosphere.php (accessed 9 December 2017).

23. D. MacKenzie, J. Wajcman (eds.), *The Social Shaping of Technology* (Buckingham (UK): Open University Press, 1985); T. J. Pinch, W. E. Bijker, "The Social Construction of Facts and Artefacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other," *Social Studies of Science* 14 (1984): 399-441; B, Latour, *Reassembling the social: An introduction to actor-network-theory* (Oxford: Oxford University Press, 2005); M. Callon, "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay," in *Power, Action and Belief: A New Sociology of Knowledge*, ed. J. Law, (London: Routledge & Kegan Paul, 1986): 196-223.

anymore.[24] The concept of a "Good Anthropocene" created [?] by absorbing the natural world into a human made world — "we will be proud of the planet we create"[25] — perpetuates the Promethean attitude that imbued modernity.[26] It deflects attention from the urge to deeply change the rationale that presently underpins development and growth and fosters the idea that it is possible to continue to walk the same path and avoid obstacles by using technology to adjust and fix upcoming problems.

Historians of science and technology have already singled out how scholarship in these fields is particularly suitable to unpack the "narratives of historical change at the junction of science, technology, and the environment."[27] We further argue that the challenges of the Anthropocene require of us a deeper engagement with materiality, summoning historians and philosophers of science and technology to a wider debate in which the underpinnings and effects of crucial conceptual categories (nature, society, and technology, in the first place), and the subsequent disciplinary boundaries, are put into question.

24. *An Ecomodernist Manifesto. A Manifesto to use humanity's extraordinary powers in service of creating a good Anthropocene*; W. Steffen et al., "The Anthropocene: From Global Change to Planetary Stewardship", *AMBIO: A Journal of the Human Environment* 40.7 (2011): 739-761.

25. E. Ellis, "The planet of no return: Human resilience on an artificial Earth," *The Breakthrough,* 2012.

26. Bonneuil, Fressoz, *The Shock of the Anthropocene.*

27. H. Trischler, "The Anthropocene. A challenge for the History of Science, Technology, and the Environment," *NTM - Zeitschrift für Geschichte der Wissenschaften, Technik und Medizin* 24.3 (2016): 309-335.

Bibliography

"Anthropocene Curriculum." https://www.anthropocene-curriculum.org (accessed 13 March 2018).

"An Ecomodernist Manifesto. A Manifesto to use humanity's extraordinary powers in service of creating a good Anthropocene." http://www.ecomodernism.org/ (accessed 13 March 2018).

"Media note: Anthropocene Working Group (AWG)" August 29 2016, http://www2.le.ac.uk/offices/press/press-releases/2016/august/media-note-anthropocene -working-group-awg (accessed 13 March 2018).

"Technosphere research project 2015-2016." https://www.hkw.de/en/programm/projekte/2015/technosphere/technosphere_mehr_informationen/technosphere.php (accessed 9 December 2017).

Benjamim, W., Peter Demetz, ed. *Reflections: Essays, Aphorisms, Autobiographical Writings.* New York: Shocken, 1986.

Bloch, M. *Les caractères originaux de l'histoire rurale française.* Paris: Belles Lettres, 1931.

Bonneuil, C. and J-B. Fressoz. *The Shock of the Anthropocene. The Earth, History and Us*. London: Verso, 2016.

Braudel, F. *La Méditerranée et le Monde Méditerranéen à l'époque de Philippe II*. Paris: Armand Colin, 1949.

Callon, M. "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay," in *Power, Action and Belief: A New Sociology of Knowledge*, edited by J. Law, 196-223. London: Routledge & Kegan Paul, 1986.

Crutzen, P. "Geology of Mankind." *Nature* 415 (2002): 23.

Descola, P. *Beyond Nature and Culture.* Chicago: University of Chicago Press, 2013.

Ellis, E. "The planet of no return: Human resilience on an artificial Earth." The Breakthrough (2012). https://thebreakthrough.org/index.php/journal/past-issues/issue-2/the-planet-of-no-return (accessed March 13, 2018).

Febvre, L. "Pour l'histoire des sciences et des techniques,"*Annales d'histoire économique et sociales* 7.36 (1935): 646-648

Haff, P.K. "Technology as a geological phenomenon: implications for human well-being." *Geological Society Special Publications* 395 (2013): 301-309.

Hamilton, C. *Earthmasters. The Dawn of Age of Climate Engineering*. New Haven and London: Yale University Press, 2013.

Haraway, D. "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin." *Environmental Humanities* 6 (2015): 159-165.

Kranzberg M. and C. Pursell, eds. *Technology in Western Civilization.* New York: Oxford University Press, 1967.

Latour, B. *Reassembling the social: An introduction to actor-network-theory.* Oxford: Oxford University Press, 2005.

Lewis, S.L. and M. A. Maslin. "Defining the Anthropocene." *Nature* 519 (2015): 171-189.

MacKenzie, D. and J. Wajcman, eds. *The Social Shaping of Technology*. Buckingham (UK): Open University Press, 1985.

Malinowski, B. *Magic, Science and Religion* (New York: Doubleday, 1948).

Malm, A. and A. Hornborg. "The Geology of Mankind? A Critique of the Anthropocene Narrative." T*he Anthropocene Review* 1 (2014): 62-69.

McKibben, B. *The End of Nature*. New York: Random House, 1989.

Moore, J.W. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. London: Verso, 2015.

Pinch, T.J. and W. E. Bijker. "The Social Construction of Facts and Artefacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other." *Social Studies of Science* 14 (1984): 399-441.

Renn, J. "The Evolution of Knowledge. Rethinking Science in the Anthropocene." 1st CIUHCT Distinguished Lecture, Lisboa, 2017.

Renn, J., ed. *The Globalization of Knowledge in History*. Berlin: epubli GmbH, 2012.

Ruddiman, W.F. "The Anthropogenic Greenhouse Era Began Thousands of Years Ago." *Climatic Change* 61.3 (2003): 261-293.

Schatzki, T. "Nature and Technology in History." *History and Theory* 42.4 (2003): 82-93.

Steffen W. et al. "The Anthropocene: From Global Change to Planetary Stewardship." *AMBIO: A Journal of the Human Environment* 40.7 (2011): 739-761.

Steffen, W. et al. "The Anthropocene: conceptual and historical perspectives." *Philosophical Transactions of the Royal Society A* 369 (2011): 842–867.

Trischler, H. "The Anthropocene. A challenge for the History of Science, Technology, and the Environment." *NTM - Zeitschrift für Geschichte der Wissenschaften, Technik und Medizin* 24.3 (2016): 309-335.

Williams, J. "Understanding the place of humans in nature." in *The Illusory Boundary: Environment and Technology in History*, edited by M. Reuss and S. Cutcliffe, 9-25. University of Virginia Press, 2010.

Winner, L. *The Whale and the Reactor: A Search for Limits in an Age of High Technology.* (Chicago: University of Chicago Press, 1986).